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Preface

On 18 and 19 November 2021, a group of education researchers from 8 countries gathered in a virtual space to discuss 'Education, Research and Innovation: New Directions for Africa', in the 9th edition of the South Africa International Conference on Education (SAICEd 2021).

This Book of proceedings contains the full papers that have gone through a rigorous, blind peer-review process. We received 85 submissions. However, the final number of papers accepted for publication was 36.

The SAICEd 2021 organising committee would like to thank all participants for their contributions. We would also like to thank the keynote speaker, the presenters of workshops, and all reviewers who, through their expertise have assisted in improving manuscripts to appear in the conference proceedings. Finally, we thank the editors who have worked very hard to produce the proceedings.

Prof A. Mji
Conference Chair

Reviewers of full papers

The organising committee of SAICEd 2021 would like to thank the following reviewers of the full papers and others whose names do not appear in the list.

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Review Process

In total, 85 manuscripts in different areas within the field of education were received. Of these manuscripts, 58 were full papers. All the full papers were subjected to a double-blind review. Each paper was reviewed by at least 2 reviewers. The reviews were carried out by experts in the different fields of education based on 22 criteria of the full paper evaluation form. Following the review process, the editorial committee considered the reviewers' comments, and 12 manuscripts were found to be unsuitable for publication. Reports were sent to the authors of the remaining 46 papers with suggestions of what they needed to address for the papers to be published. After receiving the re-worked manuscripts, the editorial committee finally accepted the 36 full papers for inclusion in the proceedings.

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TEACHER EXPERIENCES OF LEARNER RETENTION IN THE FOUNDATION PHASE AND ITS EFFECT ON LEARNERS' ACADEMIC PROGRESS AND SOCIAL DEVELOPMENT

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Abstract
Teachers offer a unique insight into the practice of learner retention and the possible effects of retention on their academic progress and social development. Although the practice of learner retention is implemented in numerous schools, a gap in the literature exists regarding the benefits of retention on learners' academic progress and social development. This qualitative study aimed to understand teachers' experiences and perceptions of retention in the Foundation Phase and its effect on the social development of learners. Bronfenbrenner's systems theory was used to underpin this study since learners interact with teachers and peers academically and socially. Data was collected through individual and group interviews, using a semi-structured interview schedule. Data was analysed thematically. The study found that teachers strongly advocated for learner retention where learners did not meet the minimum grade requirements. Teachers reported that retained learners showed improved academic and social development. Teachers were also aware of the negative effects of retention on the social development of learners. Due to the findings of this study, teachers, principals, parents, and policymakers are more knowledgeable of how teachers experience, justify, and implement learner retention in the Foundation Phase. They are aware of the positive academic and social developmental effects on retained learners. It is recommended that the Department of Education review its retention policy and apply a flexible clause to allow for learners to be retained for short periods instead of a whole academic year.
Keywords: Learner retention, foundation phase, teachers, effects. Social-emotional development.

INTRODUCTION

Learner retention is an educational intervention that originated in the twentieth century and has received increasing attention. Learner retention can be defined as the act of requiring a learner to repeat their current grade due to poor academic or social attainment (Department of Basic Education [DBE], 2015). Globally there has been an increase in research in grade or learner retention of learners. Some academics are pro-retention and there are those who are against the idea of learner retention, believing that retention has negative effects on learners academically and socially (Blazer, 2019).

Learner retention is a practice of keeping learners back in the same grade because they have not mastered the necessary skills to progress to the next grade. According to Meador (2020), the strongest predictor of retention is a learner's academic ability as assessed by the teacher. The importance of teacher judgments in the decision to retain a learner is emphasised – since the decision lies with the teacher and the motivation for retention. Özek (2014) and Jimerson and Renshaw (2012) justify their finding by highlighting the benefits of retention to struggling learners. The additional time spent in the grade has significant impact on the academic, social and emotional development of learners.

Teachers offer a unique insight into the practice of learner retention and the possible effects of retention on the academic progress and social development of retained learners. Learner retention is a custom that requires learners to repeat a school grade level if they did not master the essential knowledge and skills as stipulated by curriculum policy for a grade level (DBE, 2011). Although this practice of learner retention is implemented in numerous school systems, internationally and within the borders of South Africa, a gap in the literature exists regarding the benefits thereof on learners' academic progress and social development. Research studies in the Global North has highlighted the negative effects of learner retention; however, there are proponents of retention who highlight some benefits (Meador, 2020). There is a degree of evidence in literature that many teachers believe that retention can be beneficial to struggling learners.

Although this practice is continuing in South Africa, most research studies have criticised learner retention as an ineffective practice to improve learning (Ahmad, 2021; Renaud, 2013). Learner retention has been shown to have socio-emotional implications for retainees, e.g. lower self-confidence, higher levels of hyper-distractible behaviour, a higher risk of developing depressive symptoms, and lower levels of well-being at school (Jimerson & Renshaw, 2012). According to the DBE (2015), learners are allowed to repeat a grade within a phase. The reason cited was that each learner is unique and matures at a different pace; therefore, learners cannot be compared with each other regarding their developmental stages and maturity. The DBE (2011) and Jimerson and Renshaw (2012) justify themselves by stating that repeating a grade affords learners more time and opportunity to develop and catch up with their peers psychologically and socially. Furthermore, grade repetition was also a way to help teachers deal with various learning disabilities and personalities in the classroom (Meador, 2020).

The purpose and objective of this study were to explore teachers' perceptions of retention and the social development of retention on learners in the Foundation Phase. The primary research question that guided this study is: *What are teachers' perceptions regarding learner retention in the foundation phase and its effects on the social development of young learners?*

REVIEW OF LITERATURE

Explanation of learner retention

Learner retention refers to the practice of retaining learners who are struggling to achieve academic success and are kept in the same grade (Renaud, 2013). This practice is based on the belief that repeating a grade is beneficial to the learner (Vandecandelaere, Vansteelandt, De Fraine & Van Damme, 2015). This practice has been adopted in several countries nationally and internationally, where learners repeat a grade because they have failed to meet the required grade levels or standards outlined in the curriculum (DBE, 2015; Jones & Waguespack, 2011). This is a strategy for the remediation of learning or developmental delays for learners who cannot keep up with their peers or meet the expected grade or curriculum levels.

There have been doubts and concerns amongst academics regarding the effectiveness of retaining learners in a grade. According to Driessen (2019), empirical studies have found that learner retention may lead to positive academic achievements in the short term, but this gain disappears in the longer term. Learner retention escalates financial costs and may have a significant social and emotional impact, leading to school drop-out and anxiety amongst learners (Meador, 2020; Özek, 2014). Internationally learner retention is considered as one of

the most scrutinised and debated practices in education (Jones & Waguespack, 2011). In the past, school-based decision-makers have retained learners, since these decision-makers believed that keeping the learners back in a grade would allow them to consolidate the grade content and catch up with their peers on a social and academic level. According to DBE (2015), the policy on retention is implemented for the learner's benefit and advantage, which stipulates that a learner may only be retained once in a phase.

Learner retention in South African schools

According to the DBE (2011), an average of 9% of learners enrolled in South African schools during the academic year 2007/2008 were retained. South Africa has a notably high level of primary school retention compared to other developing countries, with a retention average of 5% or less (Driessen, 2019). In South Africa, learner retention is possible only through strict adherence to policy guidelines. To be retained, a learner should achieve below the academic levels as set out in the policy. All learners need to be competent in the basic skills of the four subjects; Home Language, First Additional Language, Mathematics and Life-Skills, to be promoted to the next grade. All learners should achieve a minimum of 50–59% in Home Language (first compulsory language), 40–49% in First Additional Language (second compulsory language), and 40–49% in Mathematics and (3 other subjects). If learners do not meet this minimum requirement, they will be considered for retention, taking into account other developmental factors (DBE, 2015).

Currently, a mark of below 30% constitutes a fail for a subject, "*making the barrier between success and failure one of the lowest in the world."* (Writer, 2018, p. 1). However, a learner who does not meet the requirements for promotion can be progressed to the next grade to prevent the learner from being retained in the Foundation Phase for longer than four years (DBE, 2015). The South African Admission Policy for Ordinary Public Schools of 1998 limits learner retention to a maximum of one year per school phase, meaning a possible four years of retention throughout the twelve years of schooling (DBE, 2021). Moreover, the policy about repetition, non-promotion, and retention acknowledges that the practice of retention rarely results in better learning achievement. According to the DBE's report on dropout rates and retention, it is stated that retention occurs more frequently in higher grades than in lower grades, due to higher grade teachers dealing with "*learners who have failed to master basic skills in primary school, but who have nonetheless progressed from grade to grade*" (DBE, 2011, p. 4). Furthermore, a third of all children in South African schools had repeated a grade, according to research conducted in 2007.

Teachers' perceptions of learner retention

Mupa and Chinooneka (2015) agree that some teachers believe that retention is appropriate when learners do not receive the learning support from home, display immature behaviour in the classroom, are socially unadjusted, or experience low achievements or learning disabilities. Kara (2014) states that learner retention can harm learners' self-concept and cause behavioural problems. Her study found retention to be harmful in three critical domains: social adjustment, academic achievement and avoidance of school. Renaud (2013) found that 77% of teachers advocated retention of learners because they (learners) were struggling to cope academically. They cited retention would help the learner to catch up on the learning. He also found that retained learners were socially well-adjusted, made friends easily and engaged with the learning since they were familiar with the content. The majority of the teachers agreed that retention was better implemented in the early grades because it did not have a significant social stigma. Witmer, cited in Renaud (2013), decided that young children in the early grades would benefit immensely if retained in the formative year. He

believes that during the formative years there is minimal stress and anxiety amongst young children. They have the propensity to cope, adapt and make friends easily. According to Kara (2014), teachers believed that retention in the early grades would improve a learner's school success and self-esteem.

According to Meador (2020) there are many adverse effects of retention especially in higher grades, where retained learners are more likely to drop out of school because they are physically more prominent than their classmates and a year older in age. According to White (2010), learner retention has no benefits on the retained learner but has a negative impact on achievement, social and emotional adjustment, self-confidence, and attachment to school. Jimerson and Renshaw (2012) found that retained learners are often less confident, less self-assured, less engaged in academics, less popular, less socially competent, and have more maladaptive behaviours than their peers. Most teachers who implement retention practices do so in terms of policies and guidelines of the education system. In South Africa, teachers are expected to adhere to the policy and show that the necessary interventions had taken place before retaining learners (DBE, 2015). Although some teachers are against learner retention in South African schools due to the social stigma on learners, they are mandated by policies to ensure that retention is for the learner's benefit.

Effects of retention on the social development of learners

Retention is associated with causing harmful effects on learners' academic achievement and social-emotional adjustment. Jimerson and Renshaw (2012) found that most retained learners exhibit negative attitudes towards school and are frequently absent from school. They state that learner retention in the higher grades causes low self-esteem, drug abuse, suicidal inclinations, and violent behaviours. Driessen (2019) states that retention has adverse effects on learners' emotional health and social adjustment. Retention is reported for triggering emotional distress and decreasing peer acceptance; still, empirical findings on the social-emotional effects of retention are inconclusive. This study examined teacher experiences of the impact of retention on the social development of learners.

According to numerous studies conducted since the 1990s, retention causes negative social-emotional development and leads to lower self-esteem, higher dropout rates, and a negative attitude towards school (Jimerson & Renshaw, 2012). Marsico Institute (2012) agrees with Jimerson and Renshaw (2012) that despite a common perception that retention allows for academic catch-up; it also causes social-emotional problems such as loss of self-esteem and sense of school belonging. Retained learners continued to suffer peer discrimination and were often assigned lower social statuses. Özek (2014) reported that some children indicated feeling embarrassed about being separated from their same-age peers and are often stigmatised by teachers and parents as failures. According to Jimerson and Renshaw (2012), teachers reported that retainees were more unpopular and less socially competent than their promoted or non-retained peers. Retainees rank lowest on the emotional health and peer acceptance scale and display significant behavioural problems (Blazer, 2019).

Nonetheless, according to Tkach (2013), teachers can inhibit these detrimental effects by acknowledging social development theories and methods for fostering social-emotional skills in their classroom. Tkach (2013) recommends the implementation of the following social-emotional skills in the school and classroom: learners' self-reflection, active listening, forward-thinking, and communication skills to co-operate effectively in the classroom and school setting. Furthermore, Jones and Waguespack (2011) suggest that teachers and schools

who support positive social-emotional skills enable learners to improve their academic performance and possess a positive outlook on their academic work.

CONCEPTUAL/THEORETICAL FRAMEWORK

Retention occurs in several developing countries, with learners' surroundings and environment playing an important role (Knoff, 2016). Bronfenbrenner (1979) developed the bio-ecological systems theory about human development (Kamenopoulou, 2016), as he argued that people are embedded in multiple nested systems, with development being a result of complex interactions between an individual and the factors within their various systems influencing each other. The bio-ecological systems theory can be described as interrelated systems of influences and facets of an individual (Bronfenbrenner, 1979). According to Kamenopoulou (2016), the ecological theory of child development provides an insight into how children and young individuals mature and progress in their developmental years as they interact with teachers and peers in the learning environment.

Krishnan (2010) states that children develop gradually and involve a give-and-take or shared relationship between themselves as individuals and their environment. The teachers, peers and the school environment (mesosystem) have a direct impact on the interrelationship with retained learners. Teachers' perceptions about retention impacts on their attitudes and beliefs about retention. Despite exhaustive debates on the negative effects of retention, teachers are in a position to either encourage or discourage retention practices in schools. Within this system, peer and teachers' attitudes have a direct effect on the social-emotional development of retained learners. Research by Jimerson and Renshaw (2012) and Özek (2014) agree that retention affects learners negatively; and their relationship and interaction within the learning environment has a significant impact on the retained learner.

The application of the bio-ecological systems theory as a theoretical framework holds an advantage since its focus is on the interaction between internal and external factors pertaining to the individual (Kamenopoulou, 2016). By focusing on individual factors, including contextual factors and how they influence each other, studies constructed upon the bio-ecological systems theory might help researchers investigate methods to support the inclusion of children whose complex individual characteristics cause them to be disadvantaged in schools and societies. Factors in retainees' ecological systems might enable researchers and teachers to identify other predictors of retention and indicate the effects of retention on learners' social-emotional development. Bronfenbrenner's (1979) bio-ecological systems theory adequately provides a conceptual framework on which to build the present study on the impact of retention on learners' social development.

METHODS

This study applied a qualitative research approach within the interpretivist paradigm on teachers' perceptions of learner retention in the Foundation Phase and its effect on the social development of the learner (Yin, 2013). According to Creswell (2013), this method provided the researcher with an opportunity to understand teachers' views and perceptions on learner retention and its effect on the social development of young learners. The qualitative approach allowed participants to share their lived experiences of the phenomena. Phenomenology was used in this study to identify the phenomena (teacher's perception toward retention and its effect on the social development of young learners) and to focus on the subjective experiences and understanding teachers' lived experiences. A purposive sampling method was used to purposefully select six (6) Foundation Phase teachers from one school in the Gauteng Province. This method enabled the authors to elicit thick, descriptive information

from the participants, regarding their attitudes towards learner retention. The researcher interviewed two participants from Grade 1, 2, and 3. However, due to personal reasons, one Grade 1 teacher was unavailable to participate.

For this reason, the researcher could only interview five (5) participants, one from Grade 1 and two each from Grades 2 and 3. The selection criteria included teachers who had to have a minimum of five years of teaching experience in the Foundation Phase; they should have retained a learner during their years of teaching and have taught learners who were retained in a grade. To ensure anonymity and the protection of the identity of the participants (Maree, 2014), the following codes are used in the study P1 – 5. P standing for the participant.

Data were collected through in-depth individual and focus group interviews with grade-specific participants. Since there was only one participant from Grade 1, the researcher interviewed her alone. For the other two grades, focus group interviews took place at the participant's school. The researcher used a semi-structured interview open-ended questionnaire to collect the data. Data analysis was inductive whereby the authors identified themes from the raw data. Audio recording was used to record the interviews, with the permission of the participants. The audio recordings were transcribed to ensure that no details were omitted from the interview process (Maree, 2014). The data was analysed and relevant themes were identified and used in the discussion (Creswell, 2014). The researcher compared multiple data sources, searching for common themes: policy documents, audio records, and interview schedules (Creswell, 2014). The ethical consideration of this paper included obtaining informed consent and maintaining anonymity, confidentiality, privacy, avoidance of betrayal and deception, to meet the requirements of the ethical code of conduct. All participants signed informed consent and agreed to participate voluntarily in the study. The researcher emphasised the importance of confidentially and anonymity to the participants before conducting the focus group interview.

RESULTS AND FINDINGS

From the data analysis, the following significant themes emerged:

- Teachers' understanding and perceptions of retention
- Effects of retention and social development of learners

Theme 1: Teachers' understanding and perceptions of retention

Meador (2020) states that the personal beliefs and perceptions of teachers, and their knowledge of retention are to be considered vital variables in the process of learner retention. The first question focused on gathering, examining, and presenting teachers' perceptions and understanding of learner retention within a South African context. The researcher asked the participants to share their understanding of learner retention. According to P1, P2, P3, P4 and P5, their understanding of learner retention is:

> *To keep a learner behind in a grade. In other words, it means to fail a learner because they did not meet the learning outcomes. Retention is failing a learner in the Foundation Phase. Retained learners do not have a basic understanding of the subject content and will struggle in the next grade. Because of this, these learners should repeat the grade to get a deeper understanding of the subject.*

Although all the participants shared a similar understanding of retention in the early grades, not all participants favoured retention. P3 stated:

> *I don't see how keeping a learner back in a grade is going to help the learner. I think learners should be allowed to progress to the next grade because learners develop differently. Sometimes a learner may need only a few months to catch up on the work. It's not fair to keep a learner for a whole year in a grade.*

Although all teachers shared a similar understanding of 'retention', there were differing views on retention in the Foundation Phase. P4 and P5 were pro-retention. According to P5, she believed that retention is appropriate and should be implemented in all schools. She indicated that she is satisfied with the DBE's policy on progression. She stated, "*I am for retention of learners. We cannot send learners to the next grade if they are not competent and have not met all the learning outcomes.*"

According to P4, she agrees with the view of P5, but states:

> *We should not send learners to the next grade if they are not socially, emotionally and academically ready. We will do the child more disfavour than helping him. In our classes, we can see those learners who are not prepared for the next grade. I have learners in my class who are not school ready. They should spend another year in the Grade R class before they come to Grade 1. Some children are age-appropriate (ready) but not school ready.*

Teachers define school readiness as the self-regulatory and social domains. At the same time, parents view school readiness as basic academic skills — school readiness is an essential factor in predicting future academic success. According to P2, she stated, "*All learners do not develop at the same pace, sometimes it is necessary to keep a learner back in a grade for another 3-6 months. That is all the time they need to mature academically and socially. However, the DBE policy does not allow for this flexible movement of learners."*

When the researcher probed which is the best grade to retain a learner, P1, P3 and P5 agreed that learners should be retained in Grade 1. They stated that when learners are young, they do not fully comprehend the concept of failure. They are able to adapt socially. Contrary to this view, P2 and P4 believed that learners should be retained at Grade 3 level. They believed that when learners are older, they will understand the importance of studying and taking their work seriously.

Regarding retention, the final comment P2 made was: "*We work with learners daily and have seen the benefits of retention. Learners grow and develop exponentially in our classes. Retained learners show confidence, enthusiasm and interest in their schoolwork. Yes, I agree about the disadvantages, but as a teacher, I see benefits to learner retention in a grade."*

There were ambivalent views regarding which grade is the most appropriate to retain learners. However, the DBE is very specific in their policy on retaining a learner only once in a phase. Therefore, in a 12-year schooling period, learners may only be retained four times throughout their schooling.

Theme 2: Effects of retention on the social development of learners

Bronfenbrenner (1979), states that human development occurs in conjunction with factors within an individual's environment and the interrelationships between these factors. These factors have a direct impact on the self-concept of retained learners. Jimerson and Renshaw

(2012) believes that retention is associated with causing harmful effects on learners' academic and social-emotional development. The researcher wanted to gain an in-depth understanding of the effects of learner retention on learners in the Foundation Phase. The question posed to participants was, "What are the effects of learner retention on the social development of learners in the Foundation Phase?" All the participants, P1, P2, P3, P4 and P5, agreed that retention positively and negatively impacts learners in the Foundation Phase. According to P2, she stated:

> *Yes, retention affects the learners. I have noticed that in my class, my retained learners are more confident with their work. They can apply their knowledge and also help other learners. There is a boost in their confidence levels*.

According to P4, she agreed with P2's view that retained learners are more confident. She further went on to say, *"In my class, I have noticed that learner X, who was very quiet and reserved the previous year, is now very sociable, active, helpful and always eager to share her knowledge with others.*" P4 indicated that she had made the best decision for learner X and has no regrets about retaining the learner.

In response to the question, P3 said: "*Initially it is a shock to them that they are held back…children are so good at adapting, the year that they stay behind – they make new friends on their own social and thinking level, so they adapt quicker than what we believe."*
P1, P3 and P5 all agreed that retained learners experience a high degree of stress and anxiety. According to P1, retention has an "*impact on the learners' social development – especially if they remain in the same school. Children can be very mean and cruel. Retained learners are often teased or bullied."*

P3 shared her experience with her retained learners in her class. She indicated:

> *My retained learners in my class became socially withdrawn, were often absent from school, and emotionally unstable, they cried very often. I believe that retention has psychologically affected the learners in my class. They are no longer with their friends and often feel lonely. You could see the loneliness in this child.*

P5 mentioned: "*Within my classroom, my learner Y made friends easily. Unfortunately, my retained learner (Y) was often teased and bullied by his peers outside of the classroom. She had witnessed them constantly asking him, 'how could he fail an easy grade; why is he not in Grade 4?' I noticed that learner Y struggled emotionally and socially. The school environment was not the best place for learner Y to develop."*

P5 indicated that retention for learner Y benefited him socially more than emotionally since he made friends during the repeated year (social development) but was still teased by his previous classmates (emotional harm). Considering this study's theoretical framework, Bronfenbrenner's (1979) bio-ecological systems theory, an improvement was visible within the learner's microsystem (immediate peer environment). Still, within his exosystem (previous classmates and broader social influences), he experienced regression. Bronfenbrenner (1979) argues that human development occurs in conjunction with factors within an individual's environment and the interrelationships between these factors.
Even though some learners might benefit from retention, one cannot successfully predict who will and who will not. Retention has long-term negative consequences to academic, social and emotional development, however, there is some evidence of positive outcomes of retention.

DISCUSSION

The perceptions shared by all the participants concur with Jimerson and Renshaw (2012). They agree that learner retention is a process employed at the school level, by experts, to keep back those learners who have not met the expected requirements for the grade. Findings from this study has shown that there is evidence that all the participants were familiar with the *National Policy Pertaining to the Programme and Promotion Requirements of the National Curriculum Statement Grades R-12* (DBE, 2015). This policy clearly outlines the promotion and progression requirements from one grade to the next depending on the achieved learning outcomes for the grade. The participants' understanding of retention is also aligned to Jones and Waguespack's (2011) view, that retention is about keeping a learner back in a grade because the learner has not achieved the learning outcomes for the particular grade and subjects.

According to the literature review, there are varying views and debates on the retention of learners. Driessen (2019) reveals that there are considerable doubts about the benefits of learner retention. He states that retaining a learner in a grade has a high financial cost, between 5% and 12% of the total expenditure. He further says that keeping a learner back in a grade contributes significantly to the social and emotional impact on the learner. The author believes that learners suffer socially and emotionally – because they have to be in a class with younger children, build new friendships, and experience a degree of humiliation (Blazer, 2019).

There is some validation towards learner retention. Vandecandelaere et al. (2015) states that when learners repeat a grade, it gives them time to catch up with their peers psychologically and socially. Allowing a learner to repeat a grade also assists teachers to help learners with a variety of learning disabilities and personalities in their classrooms. This was evident in P2's response where she found her retained learner was very sociable and confident in her class. According to Clark (2020), happiness and academic achievement are mutually reinforcing; when learners are happy, they perform well in their academic work, and learners who are performing well in their academic work are delighted children. This view aligns with P4 who stated that her retained learner became sociable, active, helpful and eager to share her knowledge with others. Knoff (2016) states that retention should not be required when an additional year in the same grade level will not benefit a learner. All participants agreed that retention must be implemented only when it is to the benefit of the learner and it would give learners more time to catch up with the work. This finding is incongruent with the DBE's policy on learner retention.

Meador (2020) agrees that learner retention has some positive advantages for young learners. Those learners who are developmentally behind are able to catch up. Another year in the same grade creates an environment where they are confident, self-assured, and familiar with schoolwork. Being in the same grade also give learners some stability and familiarity, especially when it comes to the teacher and the classroom environment. P2's response concurred with Meador (2020) that retained learners begin to thrive and develop exponentially; however, according to P3, her learners became socially withdrawn and were affected by being retained in a grade. The authors believe that retention is most beneficial when the retained learner receives intensive intervention such as personalised education plans, smaller class sizes and tutoring programmes to help them overcome individual problems.

CONCLUSION

Learner retention is implemented for various reasons, ranging from learner immaturity to a lack of specific skills, academic competence, and achievement. According to the experience of teachers, retention is implemented to benefit learners and limit their intellectual struggle in higher grades. Teachers agree that retention might be harmful to the social development of learners but advocate the necessity to retain if a learner does not meet academic requirements.

RECOMMENDATIONS

It is recommended that for retained learners:

- Teachers should develop individually-planned programmes, encourage a buddy support system, extra classes, a bridging programme so that learners can master subject content with ease and less stress.
- Since retention impacts the social and economic development in the country, retention should be the last option for any learner before all other intervention programmes have been exhausted.
- The DBE is recommended to review and learn of the practices in other countries where retention is below 3%, for example, Norway (0%), Japan (0%) and Finland (2.4%).
- To support retainees socially and emotionally, teachers can emphasise 'Values in Education', especially the principle of Ubuntu, respect and kindness to make children aware that learner retention is about consolidating learning or closing the gaps in knowledge. It is not a failure in life.

REFERENCES

Ahmad, A. (2021). Grade retention: Is it a failed practice. *Academy of Education and Social Sciences Review, 1*(1), 1-13. doi: doi.org/10.48112/aessr.v1i1.50

Blazer, C. (2019). Elementary school grade retention. *Information Capsule Research Services, 1805.* Retrieved from https://files.eric.ed.gov/fulltext/ED598545.pdf

Bronfenbrenner, U. (1979). *Ecology of human development: Experiments by nature and design*. Cambridge, Mass: Harvard University Press.

Clark, T. (2020). Children's wellbeing and their academic achievements: The dangerous discourse of 'trade-offs' in education. *Theory and Research in Education, 18*(3), 263-294. https://doi.org/10.1177/1477878520980197

Creswell, J. W. (2014). *Qualitative inquiry & research design: Choosing among five approaches*. Los Angeles, CA: Sage Publications.

Department of Basic Education. (DBE). (2011). *Report on dropout and learner retention strategy to the portfolio committee on education*. South Africa: Department of Basic Education.

Department of Basic Education. (DBE). (2015). *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grade R to 12 (NPPPPR).* South Africa: Department of Basic Education.

Department of Basic Education. (DBE). (2021). *National Education Policy Act, 1996 (Act No. 27 of 1996)*. South Africa: Department of Basic Education.

Department of Education. (DoE). (2008). *The ministerial committee on learner retention in the South African schooling system.* South Africa: Department of Education.

Driessen, G. (2019). Grade retention, grade repetition, holding back a grade. *Encyclopaedia. https://www.researchgate.net/publication/335229950_Grade_retention_grade_repetition_holding_back_a_grade.*

Jimerson, S. R., & Renshaw, T. L. (2012). Retention and social promotion. *Principal leadership:* September, 2012, 12-16. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.445.9362&rep=rep1&type=pdf

Jones, P., & Waguespack, A. (2011). Grade Retention. In S. Goldstein & J. A. Naglieri (Eds), *Encyclopedia of Child Behavior and Development*. Boston, MA: Springer Publishing. doi: https://doi.org/10.1007/978-0-387-79061-9_1272

Kara, D. (2014). The effects of retention on student's achievement. Conference proceedings of the Georgia Educational Research Association Conference. 25. Retrieved from https://digitalcommons.georgiasouthern.edu/gera/2014/2014/25

Kamenopoulou, L. (2016). Ecological systems theory: A valuable framework for research on inclusion and special educational needs/disabilities. *Pedagogy: global observatory for inclusion,* (88), 515-527.

Knoff, H. (2016). Grade retention is not an intervention: How we fail students when they are failing in school. *Creative leadership solutions.* Retrieved from https://www.creativeleadership.net/blog/2016/3/20/grade-retention-is-not-an-intervention-how-we-fail-students-when-they-are-failing-in-school.

Krishnan, V. (2010). Early child development: A conceptual model. Presented at the early childhood council annual conference. New Zealand. Retrieved from https://pdfs.semanticscholar.org/8099/6bed2ef51e4128e5251f98242009888f4028.pdf.

Maree, K. (2014). *First steps in research*. Pretoria: Van Schaik.

Marsico Institute. (2012). Does retention (repeating a grade) help struggling learners? University of Denver. Retrieved from https://www.du.edu/marsicoinstitute/media/documents/Does_Retention_Help_Struggling_Learners_No.pdf

Meador, D. (2020). Essential Questions Concerning Grade Retention. *ThoughtCo,* Aug. 26, 2020. Retrieved from thoughtco.com/essential-questions-concerning-grade-retention-3194685. [Accessed 18 October 2021]

Mupa, P., & Chinooneka, T. I. (2015). Factors contributing to ineffective teaching and learning in primary schools: Why are schools in decadence? *Journal of Education and Practice*, *6*(19), 1-9. ISSN 2222-288X (Online). https://files.eric.ed.gov/fulltext/EJ1079543.pdf

Renaud, G. A. (2013). Grade retention: Elementary Teacher's Perceptions for Students with and without Disabilities. *Sage Open*, April-June 2013, 1-16. doi: 10.1177/2158244013486993

Özek, U. (2014). Hold back to move forward? Early grade retention and student misbehaviour. *National Centre for Analysis of Longitudinal Data in Education Research*, Washington, DC. Retrieved from https://caldercenter.org/sites/default/files/WP100%20Final.pdf.

Tkach, L. (2013). Social development in democratic elementary-school classrooms. *Department of applied psychology*. New York: NYU, Steinhardt. Retrieved February 28, 2018, from https://steinhardt.nyu.edu/appsych/opus/issues/2013/spring/tkach

Vandecandelaere, M., Vansteelandt, S., De Fraine, B., & Van Damme, J. (2015). The effects of early grade retention: Effect modification by prior achievement and age. *Journal of School Psychology, 54*, 77-93. doi: https://doi.org/10.1016/j.jsp.2015.10.004

White, R. L. (2010). *A qualitative inquiry of grade retention as perceived by adults who were retained*. [Unpublished Doctorate thesis]. Liberty University.

Writer, S. (2018, April 15). School pass marks in South Africa vs the rest of the world. *Business tech*. Retrieved from https://businesstech.co.za/news/lifestyle/231111/school-pass-marks-in-south-africa-vs-the-rest-of-the-world/.

Yin, R. K. (2013). *Case study research: Design and methods*. Thousand Oaks: Sage Publications.

MNEMONICS AND PUPILS' ACADEMIC ACHIEVEMENT IN BASIC SCIENCE: A QUASI-EXPERIMENTAL RESEARCH

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Abstract
The study investigated the effect of mnemonic instructional strategy on pupils' achievement in Basic Science in Igbo-Etiti Local Government Education Authority, Enugu State, Nigeria. A pre-test, post-test non-equivalent control group quasi-experimental research design was adopted for the study. The sample of the study comprised 63 primary 5 pupils in two intact classes from two primary schools in the area of the study. The Basic Science Achievement Test (BSAT) developed by the researchers with a reliability index of 0.81 was used for data collection. Data collected were analyzed using analysis of covariance (ANCOVA). The findings of the study revealed that mnemonic instructional strategy had a significant effect on academic achievement of pupils in Basic Science. It was recommended, therefore, that teachers should endeavour to employ mnemonics in the classrooms for better academic achievement of pupils in Basic Science.

Keywords: Academic Achievement in Basic Science, Mnemonics, Pupils, Quasi-experimental research

INTRODUCTION

In a global sense, assessment seems to have been accepted as a major aspect of instructional strategy, and there seem to exist two powerful ideologies of assessment during instructions: assessment for and assessment of learning. Jana (2017) maintains that assessment for and assessment of learning are two fundamental aspects of instructional strategy employed to promote learners' academic skills. Assessment for learning refers to formative assessment, which is carried out regularly within the context of instructional procedure to help the teacher measure skills of the learners to modify instructional strategy appropriately (Heick 2018). While assessment of learning refers to a summative assessment carried out at the end of instructions and is mostly used to determine the extent to which the target of instruction was achieved (Dubec, 2019). Additionally, Jana insisted that the teacher should address four fundamental issues while planning an effective assessment: the purpose of assessment, learning objective, assessment mode, and the reporting style.

However, in education, assessment is a practice through which the teacher receives feedback on the pupils' learning outcomes, makes valid judgements, and provides individualized instructions where necessary. Assessments can be formal or informal. Formal assessments are tests, projects, and quizzes that are timed, invigilated, and scored, through which the teacher determines the achievement of the pupils. While informal assessment refers to casual unceremonious tests and demonstrations in the class, that are neither scored nor graded (Bales, 2019). Assessment helps the teacher to identify areas of the pupils' weakness and where more instructions are needed. Considering the benefits of assessment, therefore, pupils need to be frequently assessed especially in basic science.

Basic science as a foundation level of sciences is universally esteemed high due to its indispensability in science courses and life. Smith (2017) pointed out that basic science is vital for the nation's economic and cultural development. Sinha (2016) stated that basic

science introduces learners to science subjects such as chemistry, physics, biology, and mathematics. Science provides a solution to basic human problems and challenges (Belluz et al., 2016). Despite the importance of science, the appalling poor performance of pupils in Basic Science is terrifying. Ugwuanyi and Okeke (2020) lamenting the dismal performance of pupils in basic science pointed out that the situation is an embarrassment in Nigeria. The authors suggested a model shift from the traditional method of teaching basic science in primary school to a more efficient strategy, one of which is mnemonic instructional strategy.

Mnemonics may be seen as a memory device that aids in remembering some details of a material and may be in form of a phrase, acronym, poem, song among others (Dagmawi, 2017). Okoro and Unamba (2018) conceptualized mnemonic instructions strategy as being able to link present information to prior knowledge through graphic or sound cues or both through instruction. The authors further observed that mnemonic instructional strategy stimulates young learners' imaginative and flexible thoughts leading to mastery of subject matters leading to education for sustainable development.

Sustainable Development (SD) is a cognizant developmental structure that could persist for a long period without prejudicing the future (Mensah, 2019). This indicates that SD is aware that actions on one aspect of life or development may have a devastating effect on other aspects and so factor other aspects while planning for the one. The United Nations Development programme (2021) stated clearly that Sustainable Development is a universal call to action that can bring an end to human suffering, poverty, inequality, protect the planet, enthrone peace, security, and prosperity knowing that action or inaction in a specific area affects results in others. Sustainable Development is, therefore, the ability to chant a programme of education for children in basic science without jeopardizing other areas of life.

Science is the pivot of development and economic growth (Engwa, 2014). Science seems to be the key to job creation and opportunities, as achievement in science translates to critical and flexible thinking. Most aptitude tests for promotions, placements, and employments are based on sciences. In the areas of health and healthy living, technology, economic growth and sustainability science is the cornerstone (Rull, 2014). According to Kola (2013), the implication of this is that the economic growth of a nation rests squarely on her scientific development.

In an experimental study on the use of mnemonic instructional strategy in teaching chemistry in secondary schools, Adepoju (2014) found out that students who were exposed to mnemonic instructional strategy found it easier to remember concepts than other students who were taught chemistry using the conventional method of teaching. Simanjuntak, (2017) in another study, discovered that there was a significant improvement in mastering vocabularies by students through the use of mnemonics instructional strategy than conventional strategy. In a related but separate study, Okoro and Unamba (2018) revealed that pupils taught mathematics using mnemonics instructional strategy outperformed their counterparts taught mathematics using the conventional teaching method and that gender has no significant influence on the pupils achievement.

Futhermore, Umar and Samuel (2021) revealed that gender stereotyping has no significant influence on students' achievement in Basic Science and that mnemonic instructional strategy is more effective than talk and chalk strategy. Mocko et al. (2017) in a related but separate study also discovered that the use of mnemonics among tertiary students reduced anxiety and improved self-esteem and self-confidence in students. In another study, Aston (2020)

revealed that special needs pupils manifested rapid improvement when the mnemonic instructional strategy was employed while teaching them than when they are taught using the traditional method of teaching.

Statement of the Problem

That pupils and students are shying away from Basic Science and Mathematics seem to be an understatement. This situation is culminating in frustration and despair among teachers of young children. The situation needs urgent attention through an effective instructional strategy. The traditional method of talk and chalk seems to be the only instructional strategy used while teaching Basic Science in Nigeria. This method being teacher-centered makes it impossible for learners to participate actively, thereby leading to learners' poor achievement in Basic Science. Since this method has been identified as inadequate and a reason for pupils' poor performance in basic science, it is imperative to discover and apply an alternative instructional strategy that is learner-centered, such as mnemonic instructional strategy. Hence, this study investigated the effect of mnemonic instructional strategy on pupils' achievement in basic science in Igbo-Etiti Local Government Education Authority, Enugu state, Nigeria.

Purpose of the Study

Generally, the study was to examine the impact of mnemonic instruction strategy on the academic achievement of pupils in basic science. Specifically, the study determined if:

- Pupils taught basic science using mnemonic instructional strategy have better achievement than those taught using the conventional approach.
- Male and female pupils have the same achievement mean scores in basic science.

Research Questions

The study was guided by the following research questions:

1. What are the mean achievement scores of pupils taught basic science using mnemonic instructional strategy and those taught using the conventional strategy?
2. What are the mean achievement scores of male and female pupils in basic science?

Hypotheses

The following hypotheses were formulated for the study and tested at 0.05 level of significance.

Ho_1: There is no significant difference in the mean achievement scores of pupils taught basic science using mnemonic instructional strategy and those taught using the conventional strategy.

Ho_2: There is no significant difference in the mean achievement scores of male and female pupils in basic science.

METHODOLOGY

The study adopted a quasi-experimental research design type utilizing the pre-test, post-test non-equivalent control group design. The population comprised all the 1,803 primary 5 pupils in all the 62 public primary schools in Igbo-Etiti Local Government Education Authority, Enugu State, Nigeria. A sample of 63 primary 5 pupils from two public primary schools selected through a simple random sampling procedure was used for the study. Two (2) intact classes were assigned to control and experimental groups, in each of the two (2) primary

schools. This came to a total of 31 pupils in the control group and 32 pupils in the experimental group. These numbers were made up of 24 males and 39 females. The instrument used in the study is the researchers' made instrument titled Basic Science Achievement Test (BSAT). The instrument was a 25-item multiple-choice test with items generated from physics, chemistry, biology, agricultural science and geography. The items were drawn using a table of specifications to ensure the content validity of the test. Three experts validated the instrument, one each from Science Education, Childhood Education, and Measurement and Evaluation. Their inputs were considered as the instrument was restructured. The reliability of the instrument was determined by administering the instrument to a group of 30 pupils outside the study sample through the test-retest method within two weeks. The data were analyzed using Pearson Product Moment Correlation Coefficient, and a reliability coefficient of 0.87 was obtained. The two groups were given a pre-test to determine their cognitive level prior to the tretament. Subsequently, the experimental group was taught by their regular basic science teacher, who already was trained on the use of mnemonic instructional strategy. This strategy allowed the pupils to assimilate the concepts taught and allowed them to take active participation in the class activity producing their mnemonics to aid their individual memory. The control group was taught the same concepts by their regular teacher using the conventional method. The pupils accepted what the teacher taught without active participation in the classroom activities. This programme lasted for four weeks after which the pupils were given a post-test with a rearranged version of the pre-test. The data collected were analyzed using mean and standard deviation to answer the research questions and ANCOVA statistical tools to test the null hypotheses at 0.05 level of significance.

RESULTS

Research Question One: What are the mean achievement scores of pupils in Basic Science when taught using mnemonic instructional strategy and those taught using the conventional strategy?

Table 1: Mean analysis of the achievement scores of experimental and control groups

	Pretest			Posttest		Mean gain
Treatment	N	Mean	Std. Deviation	Mean	Std. Deviation	
Experimental Group	32	6.48	1.32	19.81	4.27	10.31
Control Group	31	6.50	1.32	11.50	1.61	2.00

Table 1 showed that the pupils of the experimental group had a mean achievement score of (M = 6.48, SD = 1.32), while the control group pupils had a mean of (M = 6.50, SD = 1.32) at the pretest. On the other hand, the mean achievement score of the experimental group at the posttest is (M = 19.81, SD = 4.27), while that of the control group is (M = 11.50, SD = 1.61). The mean gain scores of 10.31 and 2.00 for the experimental and control groups respectively indicate that the pupils of the experimental group had higher posttest mean achievement score than the control group counterparts.

Ho_1: There is no significant difference in mean achievement scores of pupils in Basic Science when taught using mnemonic instructional strategy and those taught using conventional strategy.

Table 2: Analysis of covariance of the difference in the mean achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1536.999[a]	4	384.250	35.167	.000	.626
Intercept	423.635	1	423.635	38.772	.000	.316
Pretest	.171	1	.171	.016	.901	.000
Treatment	1398.543	1	1398.543	127.998	.000	.604
Gender	.145	1	.145	.013	.909	.000
Treatment * Gender	4.092	1	4.092	.374	.542	.004
Error	917.810	84	10.926			
Total	21678.000	89				
Corrected Total	2454.809	88				

a. R Squared = .268 (Adjusted R Squared = .236)

Table 2 revealed that there is a significant difference in the mean achievement scores of pupils taught Basic Science using mnemonic instructional strategy and those taught using the conventional lecture method of teaching in favour of the pupils exposed to mnemonic instructional strategy, F (1, 84) = 127.998, p = .000. Hence, the null hypothesis was rejected (p < .05). Besides, the effect size of 0.604 indicates that 60.4% change in the achievement of pupils in Basic Science is as a result of their exposure to mnemonic instructional strategy.

Research Question Two: What are the mean achievement scores of male and female pupils in Basic Science?

Table 3: Mean analysis of the achievement scores of male and female pupils in Basic Science

	Pretest			Posttest		Mean gain
Gender	N	Mean	Std. Deviation	Mean	Std. Deviation	
Male	24	8.06	1.23	12.75	4.46	4.69
Female	39	7.98	1.33	12.66	4.23	4.68

Table 3 showed that the mean achievement score of male pupils at the pretest is M = 8.06, SD = 1.23 while that of the female pupils is M = 7.98, SD = 1.33. However, male pupils had higher mean achievement score (M = 12.75, SD = 4.46) than the female pupils (M = 12.66, SD = 4.23).

Ho_2: There is no significant difference in mean achievement scores of male and female pupils in Basic Science.

Table 2 showed that there is no significant difference in the mean achievement scores of male and female pupils in Basic Science, F (1, 84) = 0.013, p = .909. Hence, the null hypothesis was not rejected (p > .05).

Ho_3: There is no significant interaction effect of treatment and gender on pupils' achievement in Basic Science.

Table 2 showed that there is no significant interaction effect of treatments and gender on pupils' achievement in Basic Science, F (1, 84) = .374, p = .005. Thus, the null hypothesis was not rejected ($p > .05$).

DISCUSSION OF FINDINGS

From the findings of the study, it is obvious that mnemonic instructional strategy is more effective than conventional instructional strategy, as shown in Tables 1 and 2. Table 2 indicated that there existed a momentous difference in the mean achievement of pupils taught basic science utilizing mnemonic instructional strategy and those taught using conventional strategy. The finding of the study validated the findings of Adepoju (2014) who discovered that learners who were taught chemistry utilizing mnemonic instructional strategy achieved better than those who were taught utilizing the conventional method. Furthermore, the findings of the studyis in line with the findings of Umar and Samuel (2021) who discovered that mnemonic instructional method has positive and significant influence on students' achievement in Basic Science.

The findings of the study indicated that even though male pupils performed better than female pupils in Basic Science, there is no weighty difference in the mean achievement scores of male and female pupils in Basic Science. This implies that gender has no remarkable effect in the mean achievement score of pupils in basic science. This finding is in line with the discoveries of Umar and Samuel (2018), that gender stereotyping has no significant influence on students' achievement in Basic Science. The finding of the study is also in line with the finding of Okoro and Unamba (2018), who discovered that has no significant impact on the academic achievement in Basic Science.

CONCLUSION AND RECOMMENDATIONS

In line with the findings of the study, it is obvious that mnemonic instructional strategy enhances pupils' achievement in Basic Science and is better than conventional instructional strategy. Again, it is concluded that gender is not a major factor in pupils' achievement in Basic Science. It is, therefore, recommended that mnemonic instructional strategy be better packaged, and teacher education programme should include training on how to utilize mnemonic instructional method during instructions.

REFERENCES

Adepoju, O. A. (2014). Mnemonic as an innovative approach to creative teaching of secondary school chemistry. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.945.8971&rep=rep1&type=pdf

Aston, Z. (2020). Exploring the impact of musical mnemonic strategies on student achievement and engagement in inclusive science classes. https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2496&context=gradreports

Bales, K. (2019). 13 Creative examples of informal assessment for the classroom. https://www.thoughtco.com/informal-classroom-assessments-4160915

Belluz, J., Plumer, B. & Resnick (2016). The 7 biggest problems facing science. https://www.vox.com/2016/7/14/12016710/science-challeges-research-funding-peer-review-process

Dagmawi (2017). Using mnemonics to learn English language. https://shaneschools.com/en/using-mnemonics-to-learn-english/

Dubec, R. (2019). Assessment for, as, and of learning. https://teachingcommons.lakeheadu.ca/assessment-and-learning

Engwa, A. G. (2014). Science and technology in Africa: The key elements and measures for sustainable development. https://www.researchgate.net/profile/Engwa_Godwill2/publiccation/283658488

Heick, T. (2018). The difference between assessment of learning and assessment for learning. https://www.teachthought.com/pedagogy/the-difference-between-assessment-of-learning-and-assessment-for-learning/

Jana, B. (2017). Assessment for learning vs. assessment of learning. https://www.pearsonassessments.com/professional-assessments/blog-webinars/blog/2017/12/assessment-for-learning-vs--assessment-of-learning.html

Kola, J. A. (2013). Importance of science education to national development and problems militating against its development. *American Educational Research Journal 1*(7), 225-229. https://www.researchgate.net/publication/263654373

Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. https://www.tandfonline.com/doi/full/10.1080/23311886.2019.1653531

Mocko, M., Lesser, L. M., Wagler, A. E & Wendy S. F. (2017) Assessing effectiveness of mnemonics for tertiary students in a hybrid introductory statistics course. *Journal of Statistics Education 4*(2), 64-78. DOI: 10.1080/10691898.2017.1294879

Okoro, J. A. & Unamba, E. (2018). Assessment of the impact of mnemonic instructional strategy on pupils' achievement in mathematics; a case for sustainable development. https://www.researchgate.net/publication/343920702

Rull, V. (2014). The most important application of science. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4198034/

Simanjuntak, H. M. (2017). The effect of using mnemonic method on students' achievement in mastering vocabulary. https://core.ac.uk/download/pdf/225825093.pdf

Sinha, S. (2016). What is basic Science? https://www.quora.com/What-is-basic-science.

Smith, C. H. L. (2017). What is the use of basic science? https://www-zeuthen.desy.de/~jknapp/JK/Reading_files/basic_science.

Ugwuanyi, C. S. & Okeke, C. I. O. (2020). A multimedia instructional package on for enhancing achievement in basic science. *International Journal of Advanced Science and Technology, 136*(1), 51-60.

Umar, U. S. & Samuel, R. I. (2021). Influence of mnemonics on Achievement in basic science among Upper Basic School Students. *International Journal of Current Innovations in Advanced Research, 1*(6), 14 – 19. https://www.ijciaropenaccess.com/docs/volume1/issue6/IJCIAR-02.pdf

Umar, U. S. & Samuel, R. I. (2018). Influence of Gender Stereotyping on Achievement in Basic Science among Upper Basic School Students. *International Journal of Current Innovations in Advanced Research, 1*(6), 14 – 19. https://www.ijciaropenaccess.com/docs/volume1/issue6/IJCIAR-02.pdf

United Nations Development Programme (2021). What are sustainable development goals. https://www.undp.org/sustainable-development-goals

UNPACKING SOUTH AFRICAN PHYSICAL SCIENCES TEACHERS' REPORTED CHEMICAL LABORATORY SAFETY PRACTICES

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ABSTRACT
The emphasis on inquiry-based learning (IBL) may have rightfully led to increased practical laboratory activities in the South African schooling system. How teachers are grappling with chemical laboratory safety (CLS) challenges that are often associated with increased laboratory activities is unclear. While some studies have reported teachers' aversion to practical laboratory work with students for accountability fears in case of accidents, studies that unpack physical sciences teachers' CLS practices are scarce. This quantitative study investigated teachers' CLS practices in one South African province. A Laboratory Safety Survey Questionnaire consisting of 20 statements, with a four-response alternative Likert scale was administered to 72 participants from forty-two schools that had laboratories. Teachers' CLS practices were found to be generally suboptimal, especially concerning laboratory and chemical storage and waste disposal. Results from the computed Pearson chi-squared tests for statistical significance suggest that teachers from better-resourced schools reported safer practices than those from less-resourced schools. There were no significant differences in CLS reported practices between teachers who had majored in chemistry and those who had not. Authorities could consider using virtual tools to enhance CLS practices during training for in-service teachers. Teacher training institutions should create space for modules on laboratory management courses to prepare future teachers for the workplace.
Keywords: Inquiry-based learning, laboratory safety, Laboratory management, chemical disposal, physical sciences

INTRODUCTION
Poor chemical laboratory safety practices pose serious threats to the users and the environment (Akpullukcu & Cavas, 2017) Although hazardous chemicals are often used in school laboratories, chemical laboratory safety (CLS) is usually an afterthought in developing countries (Mogopodi, Paphane, & Petros, 2015; Eguna, Suico & Lim, 2011, National Research Council, 2010). Even exposure to some commonly used reagents in elementary school science classes may present dangers in different forms and to different degrees: some can be corrosive, explosive, easily oxidising, flammable, harmful, irritating, radioactive (Walters, Lawrence, and Jalsa, 2017). Laboratory accidents have ranged from simple cuts to severe burns or serious injury (Akpullukcu & Cavas, 2017).

In the South African context, since 1994, there has been an increase in the provision of science resources in schools for populations that were previously disadvantaged owing to the discriminatory policies of the past (DBE, 2011). The Curriculum Assessment Policy Statement (CAPS) the most recent curriculum launched in 2012, places increased emphasis on laboratory activities for science learners (Ramnarain & Fortus, 2013). In the subject of Physical Sciences (a composite of Chemistry and Physics), the curriculum includes a set of practical laboratory experiments for Grade 10–12 that teachers and students need to conduct. To enhance the implementation of the present curriculum, authorities have increased the

supply of laboratory resources to schools, including chemicals and science equipment (DBE, 2011).

Uncertainty on safety issues and the fear of taking responsibility in case accidents occur often lead teachers to conduct teacher-centred demonstrations only or virtual experiments only and therefore depriving students of hands-on experience in the laboratory (Sedghpour, Sabbaghan, & Sataei, 2013; Torres et al., 2015). In some cases, teachers' uncertainty regarding safety may lead teachers to shy away from conducting experiments altogether (Ramnarain & Hobden, 2015). Although inquiry based-learning approaches go beyond simply allowing students to plan, organise and conduct experiments (Ramnarain & Hobden, 2015), such learner-centred practical work form a key component of IBL in the science teaching and learning process. Laboratory practical work in which students have greater autonomy assists students in developing abilities necessary to do and to understand scientific inquiry (National Research Council, 2010). Drayton and Falk (2001) reported that IBL enhances students' experimental skills. Ultimately, the relationship between students' experimental skills and IBL approaches is complex and probably symbiotic. Consequently, teacher-centred demonstrations or teachers shying away from conducting experiments due to their preoccupation with safety, constrains efforts towards both improving the implementation of IBL approaches and enhancing students' experimental skills.

Providing opportunities for students in experimentation should accompany concerns for CLS (Artdej, 2012). Improved science teachers' confidence with chemical laboratory safety practices could ultimately enhance their implementation of one component of IBL in sciences by allowing more student autonomy in conducting experiments. Understanding how teachers are grappling with chemical laboratory safety issues could be a crucial step to address any gaps in their awareness or practices.
This study sought to respond to the following questions:

1. What are teachers' practices with regards to chemical laboratory safety?

2. To what extent do teachers' chemical laboratory safety practices differ according to school resource levels, teachers' science specialisation and their teaching experience?

LITERATURE REVIEW

There is substantial literature on various themes in chemical laboratory safety, ranging from teachers' and/or students' chemical laboratory safety awareness (Artdej, 2012), teacher' and/or students' CLS practices (Eguna et al., 2011; Sedghpour et al., 2013; Mogopodi et al., 2015), and the state of high school laboratories in meeting chemical safety standards (Schenk, Taher & Oberg, 2018). Oftentimes studies investigate a combination of these themes (Kandel, Neupane & Giri, 2017; Okebukola et al., 2020; Walters et al., 2017). It is important to point out that ultimately CLS requires a holistic approach, and any categorisation of themes is mostly for convenience.

While awareness probes teacher knowledge or their interest in safety issues, actual practices seek to unpack their actual conduct in the laboratory. There may be a gap between teachers' safety awareness and their actual practices, with factors such as limited budgets, the state of the laboratories in question and large laboratory classes impacting on actual practices despite heightened awareness in some cases (Okebukola et al., 2020; Schenk et al., 2018). The present article focuses on science teachers' actual laboratory practices. These include, but are not limited to, how teachers enforce student laboratory wear, how they store chemicals and how they dispose of chemical waste.

Investigating CLS in high schools in Botswana, Mogopodi et al., (2015) discovered sub-optimal laboratory safety management practices, ranging from poor inventory management to poor chemical storage practices. Okebukola and others (2020) used a mixed method to investigate chemical safety in Nigerian schools. The study concluded that urban students were more in breach of chemical safety practices than their rural counterparts. The study also reported low levels of chemistry laboratory resourcing, inadequate or non-existent chemical safety training of teachers, and poor enforcement of safety regulations (Okebukola et al., 2020).

Studies have linked the reason for poor safety practices in school laboratories to the lack of exposure to modules on chemical laboratory safety during teacher training and in-service programmes for teachers. (Annetta et al., 2014; Torres, Tovar, Egremy, 2015; Walters et al., 2017). Many teacher preparations programmes do not train science teachers to adequately deal with the safety challenges they might confront in the science classroom (Schenk et al., 2018). Though a substantial literature links teachers' suboptimal chemical laboratory safety practices to inadequate exposure in training programs, the problem could be linked more to the changing roles most teachers undergo after their tertiary studies. As students, they may not have been exposed to management basics such as taking chemical inventory, waste chemical storage, or recording incidents related to accidents. While emphasising everyday safety basics during teacher training may enhance CLS practices, these approaches may not significantly enhance actual laboratory safety practices, including laboratory management.

Numerous studies have sought to recommend solutions to the suboptimal CLS practices among teachers (Annetta et al., 2014; Mogopodi et al., 2015). The potential of virtual tools to improve CLS practices is yet to be fully exploited in developing countries. In a study that focused on in-service teachers CLS practices, Annetta et al., (2014) exposed a group of in-service teachers to virtual safety tools such as online videos and concluded that such exposures improved teachers' CLS awareness and practices in real-life laboratories setups. Virtual tools can also be used by teachers to expose students to videos that highlight safety precautions before conducting experiments. Zhu et al (2018) concluded that multiple virtual tools can enhance students' safety practices when used appropriately. After citing poor teachers' knowledge and practices of laboratory safety management, Mogopodi, et al., (2015) recommended that tertiary institutions evelope chemical safety continuing education curricula targeted at in-service teachers. Entrenching a safety culture in the whole system may require creating special modules on safety for pre-service teachers, further training for in-service teachers and clear laboratory safety policy guidelines in schools. Reducing the class size could also improve CLS practices (Schenk et al., 2018)

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is developed by the National Research Council and is elaborated in a document entitled *Promoting Chemical Laboratory Safety and Security in Developing Countries* (National Research Council, 2010). The framework departs from a research-based conclusion that in developing countries, chemical laboratories safety is often undertaken as an afterthought (National Research Council, 2010). Furthermore, other factors such as budgetary constraints, cultural norms, and lack of awareness, militate against optimal CLS in developing countries. The framework contains important aspects of chemical laboratory safety practices and awareness, as well as guidelines for setting up laboratory safety programmes for schools. Below I highlight some of the aspects teachers should note according to the framework.

Safe laboratory management

Most schools in developing countries do not have laboratory technicians to assist science teachers in laboratory management (National Research Council, 2010). Managing school laboratories entails, among other duties, taking chemical inventory, correctly labelling chemicals, making sure the laboratory is always securely locked to prevent access from unauthorised people, storing chemicals appropriately, collecting chemical waste into labelled waste containers for disposal, enforcing appropriate laboratory wear and appropriate student conduct in the laboratory. This is apart from teachers' other duties such as planning, delivering classes, as well as marking students' assignments, setting up experiments putting away equipment after experiments and cleaning up the laboratory afterwards (Mizzi, 2013). Conducting laboratory activities presents challenges to most teachers because they are required to be simultaneously attentive to general discipline, while ensuring safety, and monitoring students' cognitive and motor engagement.

Safe attire in the laboratory

Teachers must ensure that students work safely. (Hill Jr & Finster 2016). This entails teachers enforcing appropriate laboratory wear for laboratory and protective gear during experiments with toxic or hazardous chemicals (Hill Jr & Finster, 2016; National Research Council, 2010). The main protective clothing required is laboratory coats, gloves, and safety glasses (or goggles). Protective clothing minimizes dermal exposure to chemicals (Hill Jr & Finster, 2016), while most laboratory coats are made from non-flammable materials, thereby offering protection in case of fire or laboratory explosions. Protective clothing may not need to be worn every time the students are conducting experiments, but they should be mandatory when students are conducting experiments with toxic, hazardous chemicals (Hill Jr & Finster, 2016; National Research Council, 2010). Closed-toe shoes are required to protect against direct contact with corrosives (Hill Jr & Finster, 2016). Wearing appropriate laboratory clothing may be oftentimes challenging to enforce in developing countries due to financial constraints (National Research Council, 2010), due to lack of awareness or due to both factors.

Safe behaviour and safe habits in the laboratory

Challenges related to laboratory safety have been associated with teachers' inability to deal with adolescents' behaviour, especially in confined and busy spaces like laboratories (Schenk et al., 2018). In a review article on chemical laboratory safety in tertiary institutions, Ménard and Trant (2020) concluded that accidents are caused by a lack of safety culture and habits. Unlike in tertiary institution laboratories, in high school the teacher is often the only adult dealing with larger numbers of often excited adolescents. Ensuring that all students are observing safety precautions and at the same time making sure they are conducting the laboratory activities efficiently, can be quite demanding on the teacher. The situation becomes worse in cases where teachers themselves lack some basics of safety culture in the laboratories.

Safe chemical storage in the laboratory

Chemical laboratory waste disposal is probably the most challenging aspect of laboratory safety in some high schools (National Research Council, 2010; Sedghpoura et al., 2013). The National Research Council has concluded that laboratories in developing countries have no proper waste disposal facilities, or their systems lack cost-effective means of waste disposal (National Research Council, 2010). Unlike in developed countries, there are no waste disposal companies in developing countries. This usually means waste chemicals from laboratories end up being poured in the municipal drain with all matters of environmental

consequences associated with such actions (National Research Council, 2010). To effectively tackle waste disposal challenges, procedures must be established through which chemical waste is properly collected and stored by teachers after experiments. This should include collecting the waste from schools by other authorities (possibly environmental authorities in the South African context) and properly disposing of it. Teachers are expected to clearly label waste chemical containers used during experiments. In cases where there are waste disposal procedures, these containers are collected and disposed of appropriately (Hill Jr & Finster, 2016; National Research Council, 2010).

METHODOLOGY

This report is based on a broader survey research quantitative study. A survey research design was used in this study. Survey research allow high representativeness of the entire population at low cost (Creswell, 2013)). Ethical clearance was obtained from the university authorities to conduct the research. Invitations were sent to 92 science teachers from the fifty-three schools that had been verified to have working laboratories in one South African district. Seventy-six (76) teachers from 42 schools consented to take part in the research. A pilot study was conducted with four of these. The survey questionnaire was then administered to 72 teachers. A modified laboratory safety questionnaire for middle school science teachers, developed by Akpullukcu and Cavas (2017), was employed in this study.

The final adapted questionnaire had two sections. Section A had six items, and participants were required to fill in demographic data such as the number of years of experience and the subject(s) they majored in. Section B involved 20 items reflecting on teachers' laboratory practices. Teachers' responses to the 20 items of Section B were measured on a 4-point Likert scale: Never, Seldom, Often, and Always. The questionnaire hard copy was hand-delivered to all 76 participants (including the four pilot study participants). We provided a separate detailed information sheet that described each of the items, which we distributed to the 72 participants during the actual survey. The questionnaire hard copy was hand-delivered to all 76 participants (including the four pilot study participants).
For the data analysis, the 20 items were conveniently categorised into four groups including several aspects from the National Research Council guidelines as follows:

- Laboratory management
- Chemical storage
- Enforcement of chemical laboratory attire
- Laboratory behaviour

Data were analysed using IBM SPSS 25.0 software. Bar graphs were constructed using Excel, which present percentage responses to address the first research question. The reliability of the data was determined with a Cronbach alpha of 0.84. When data are categorical and are not normally distributed, non-parametric tests are more appropriate for analysis (Pallant, 2013). Thus, for addressing the second research question, contingency tables were constructed using Excel. Subsequently, Pearson chi-squared tests were run for determining the statistical significance of differences between responses from different categories of respondents. School resource levels were determined according to the South African quintile system (which classifies schools according to resources), with schools in quintiles 1–3 considered poorly resourced and those in quintiles 4 and 5 as well resourced. Teacher qualifications were differentiated according to whether participants had majored in chemistry or not.

RESULTS

Teachers reported chemical laboratory management practices

Figure 1 below summarises participants' responses to questions investigating teachers' chemical laboratory practices related to laboratory management.

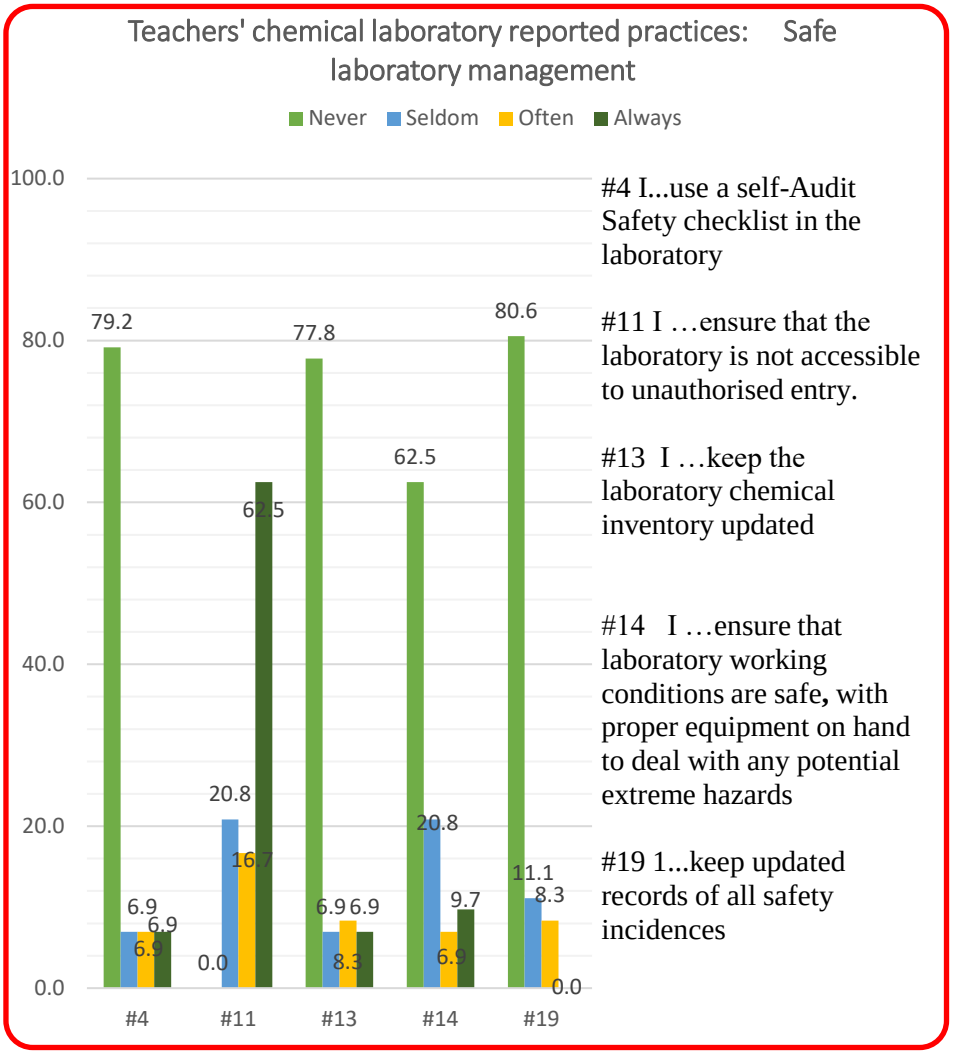

Figure 1. Teachers' chemical laboratory practices related to laboratory management

Most of the participants reportedly did not use any self-audit safety checklist in their laboratories, with approximately four in five reporting that they never used such a tool, with only 12.8% reporting that they often and always use the self-audit safety tool. Almost four in five participants (79.2%) reported that they either always or often ensure the laboratory was not accessible to unauthorised entry. Most participants (77.8%) reported that they never kept the chemical inventory updated. Fewer than one in five participants reported that they never ensured that the laboratory safe and ready to deal with any safety eventualities. Fewer than 10% of the teachers reported optimal practices (often or always) in terms of keeping records of all safety incidences.

Teachers' CLS reported practices related to laboratory attire

The category for chemical laboratory wear consisted of five items. Figure 2 below summarises teachers' responses to these items.

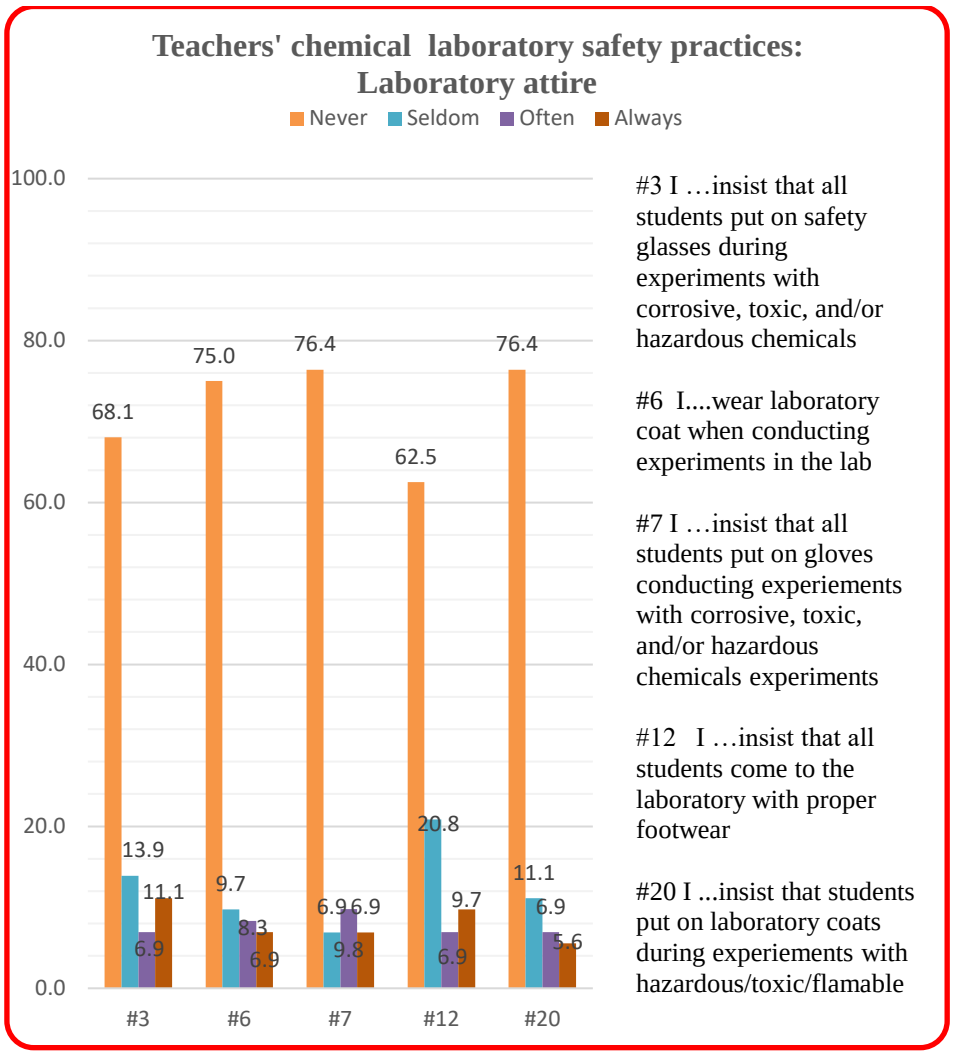

Figure 2. Teachers' chemical laboratory practices related to laboratory wear

Most teachers' practices were suboptimal regarding safety glasses, with 82.0 % confirming that they seldom or never insist that all students wear safety glasses during experiments with corrosive, toxic and or hazardous chemicals. Three in four participants never wore laboratory coats when conducting experiments. Almost nine in ten participants (87.5%) seldom or never insisted that students put on laboratory coats during such experiments. Fewer than one in five (16.7%) of the participants either always or often insisted that students put on gloves when conducting experiments with corrosive, toxic and hazardous reagents. More than four in every five participants seemed unconcerned with the type of footwear students brought to laboratories, with 83.3% confirming they never or they seldom insisted on the issue.

Teachers' reported CLS practices related to waste disposal and chemical storage

Most participants (87.5%) reported that they did not use waste containers to store chemical waste, with almost nine in 10 confirming that they never or seldom used waste containers. Figure 3 below summarises findings on teachers' responses on chemical waste storage and disposal.

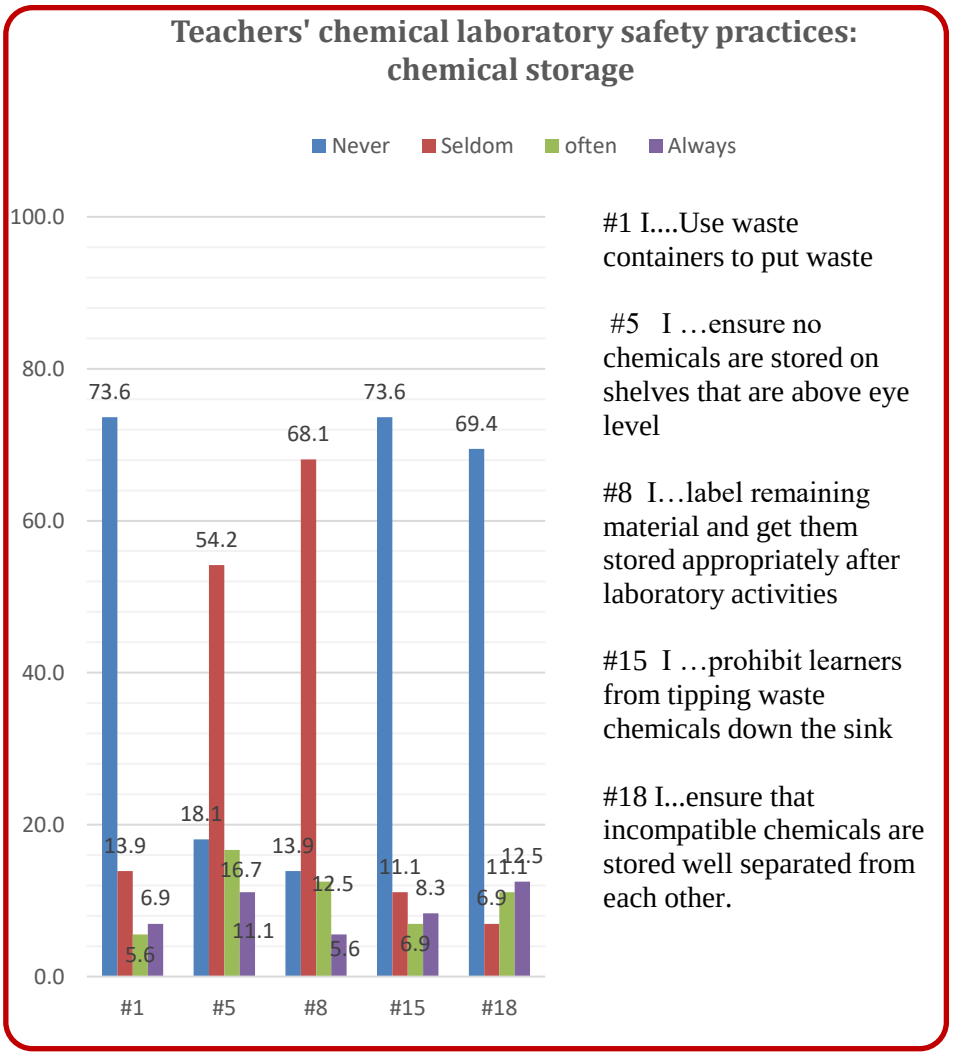

Figure 3. Teachers' chemical laboratory practices related to chemical storage

Item 10 focused on teacher CLS waste disposal practices, and four out of five participants confirmed that they let students tip chemical waste down the drain. Only 27.8% of the participants exhibited optimal practices (either always or often) when it came to ensuring that no chemicals are stored above eye level (item 5). Fewer than one in every five participants labelled and stored chemicals properly. In response to item 14, practices were suboptimal, with 76.3% confirming they never or they seldom checked whether chemicals were stored according to compatibility.

Teachers' reported CLS practices students' laboratory behaviour

Figure 4 summarises teachers' responses to other general safety items that could not be classified under the previous categories.

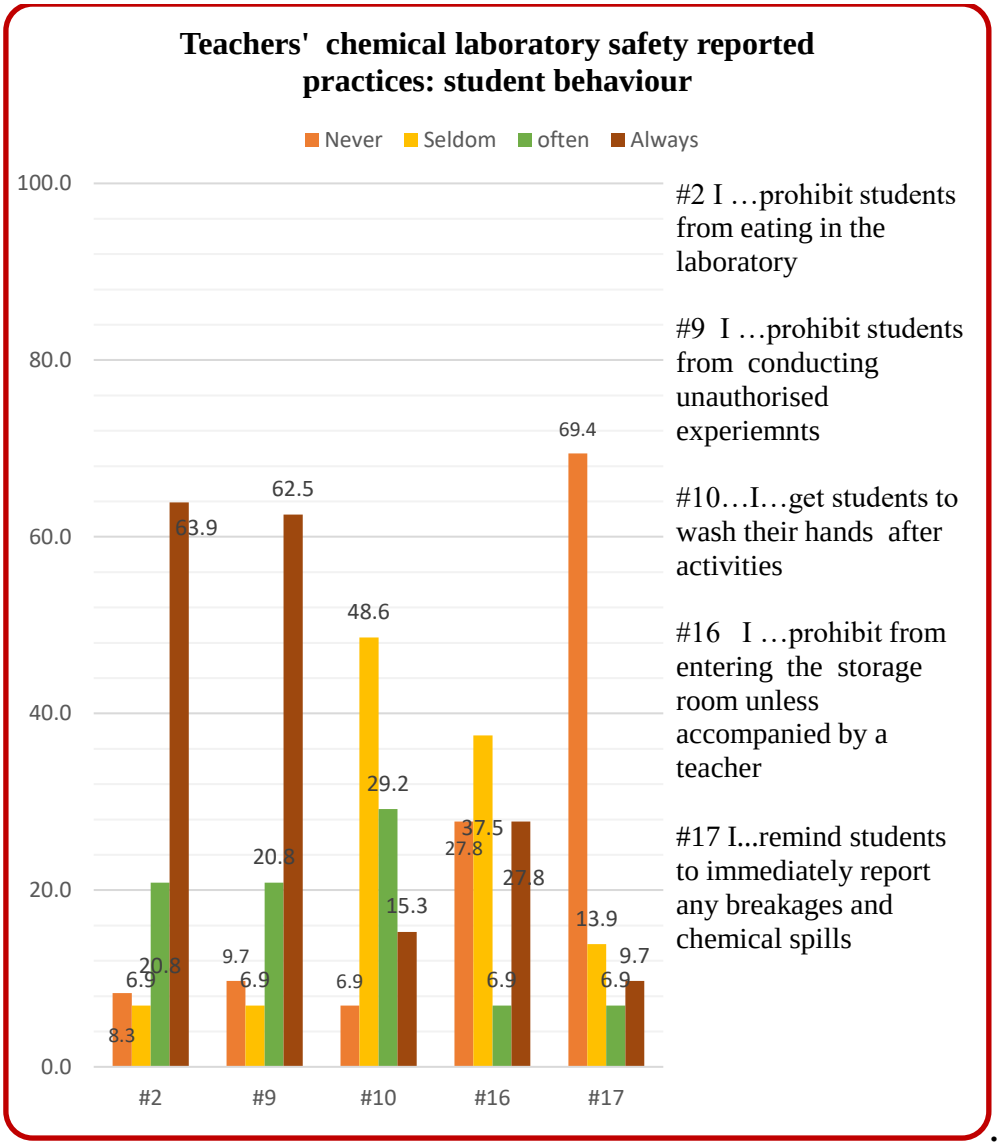

Figure 4. Teachers' chemical laboratory practices related to student behaviour

Most participants (83.3%) reported that they prohibited students from eating in the laboratory and a similar number (83.3%) prohibited students from conducting unauthorised experiments in the laboratories. Almost half of the participants' practices were optimal in terms of ensuring students wash their hands after an experiment with 44.5% reporting that they either always or often make students wash their hands. Most teachers reported that they never or seldom reminded students to immediately report breakages and spillages.

Teachers' reported laboratory safety practices by their school's resource level, the science specialisation and teaching experience.

The non-parametric Pearson chi-squared test was used to determine the level of significance of the differences of the categorical data (not normally distributed). Firstly, contingency tables of the observed and expected data were constructed after collapsing the Likert scale (Never and Seldom into one column and Often and Always into another column). The tables were constructed for three categories – the resource level of the school at which participants taught; whether participants had majored in chemistry or not; and the participants' number of years of teaching experience. For this report, Always and Often are considered responses

reflecting optimal CLS practices while Never and Seldom are considered responses reflecting suboptimal safety practices. The alpha level was set at 0.05.

Table 1. Participants' laboratory safety practices against the resource level of their school

Resource level of school participants taught	*N*	*Never/Seldom (Suboptimal)*	*Always/Often (Optimal)*	*Total*
Poorly Resourced Schools (Quintiles 1 to 3)	27	601 (75.1%)	199 (28.6%)	800
Well Resourced Schools (Quintiles 4 and 5)	40	356 (65.9%)	184 (34.1%)	540
Total	*67**	*957 (75.1%)*	*383(28.6%)*	*1340*

NB*: The total number of participants was 72. However, five of these teachers came from private schools that were not classified on the South African schools' quintile system.

A chi-square test of independence was performed to examine the relationship between the types of schools that participants taught at and their chemical laboratory practices. The results revealed a significant association between resource level of schools where participants taught and their CLS practices, χ^2 (N = 67) = 13.68, p = .003. Participants who taught at well-resourced schools reported safer CLS practices than those who taught at less-resourced schools as supported by percentage distributions (Table 1).

A chi-square test of independence was performed to examine the relationship between participants' major area of specialisation (chemistry major or not) and CLS.

Table 2. Participants' laboratory safety practices versus their science specialisation

Participant Specialisation	*N*	*Never/Seldom (Suboptimal)*	*Always/Often (Optimal)*	*Total*
Chemistry Majors	35	373 (67.2%)	182 (32.7 %)	555
Non-chemistry majors	37	390 (74.3%)	135 (25.6 %)	525
Total	*72*	*1027 (70.6%)*	*413(29.4%)*	*1440*

The results suggest no significant difference between responses from participants who had majored in chemistry and those who had not majored in chemistry χ 2 (N = 72) = 11.13, p = .01

Table 3 below shows the observed values according to years of teaching experience.

Table 3. Participants' laboratory reported safety practices versus their teaching experience

Participant Teaching Experience (Years)	*N*	*Never/Seldom (Suboptimal)*	*Always/Often (Optimal)*	*Total*
Less than 5	7	78 (36.7%)	27 (61.2%)	105
Between 5 and 15	53	243 (33.2%)	251 (66.8%)	795
More than 15	12	141 (32.8%)	39 (6729%)	180
Total	*72*	*1027 (36.0%)*	*413 (64.0%)*	*1440*

A chi-square test of independence was performed to examine the relationship between participants' number of years of teaching experience and their chemical laboratory safety practices. The results suggest no significant difference in participants' reported CLS practices according to the duration of their teaching experience, χ^2 (N = 72) = 7.67, p = .17.

DISCUSSION OF RESULTS

Teachers' reported safety practices were suboptimal with most of them reporting unsafe laboratory practices in the four categories investigated. Teachers' enforcement of appropriate student laboratory attire indicated that close to 87.5% never or seldom insisted that students wear laboratory coats during such experiments, with 82.0 % confirming that they never or seldom insist that all students wear safety glasses during experiments with corrosive, toxic and or hazardous chemical. Fewer than one in five of the participants either always or often insisted that students wear gloves when conducting experiments with corrosive, toxic and hazardous reagents. These results suggest worse practices when compared to a similar study conducted in Nepalese schools which showed that 63% of the teachers always enforced the use of safety goggles and 57% said that they always enforced the use of gloves by their students (Kandal et al., 2017). Budgetary constraints have been cited as militating against optimal CLS practices. However, in this case, it is not clear whether breaches of protocols on proper laboratory attire were due to budgetary constraints, a lack of awareness of such requirements or owing to a combination of other factors. In cases where they were not aware of the required attire, they would less likely make requests for safety goggles from their school authorities.

Chemical storage and chemical waste disposal practices were also found suboptimal. Chemical waste disposal could be very challenging for teachers in developing countries with non-existent waste disposal plans (National Research Council, 2010). Four in five participants seldom or never prohibited students from tipping waste chemicals into the municipal drain, with 87.4% confirming that they seldom or never used chemical waste containers. Such suboptimal waste disposal practices pose potential chemical contamination both in the immediate school environment or in the wider community. Most concerning to authorities is the result indicating that more than seven in 10 participants failing to consider chemical compatibility when storing chemicals. Storing incompatible chemicals closely may result in explosions (National Research Council, 2010).

Schenk et al (2018) report that safety challenges in the laboratory may stem from challenges related to managing groups of adolescents in confined places. How teachers manage students' conduct in the laboratory may have important bearing on safety. Most participants (84.7%) prohibited students from eating in the laboratory, and almost a similar result (83.3%) prohibited students from conducting unauthorised experiments in the laboratories. These results are comparable to those from a study in Nepalese schools that suggested that one in four of the teachers prohibited students from eating in the laboratories (Kandal et al., 2017). Discussion of safety issues at the outset of experiments is a key moment to improve students' safety practices. However, the results show that approximately three in every five teachers missed these opportunities.

The resource level of the school impacted significantly on teachers' CLS practices, with teachers from well-resourced schools exhibiting safer practices than those who taught in less-resourced schools. This finding concurs with some findings from other studies that have concluded that Laboratory safety challenges are often exacerbated by budgetary constraints

(Eguna et al., 2011). The number of years of teaching experience and whether teachers had majored in chemistry or not, did not impact significantly on teachers' CLS reported practices. Reasons for such suboptimal safety practices are complex and would warrant further research. Suggesting improved support for teachers, Schenk, et al., (2018) noted that teachers lack time and resources for preventative risk management. Apart from their teaching duties, physical sciences teachers are burdened with tasks such as preparing equipment, solutions, and reagents for practical science lessons, in addition to purchasing materials and equipment (Mizzi, 2013).

CONCLUSION

While changes to the secondary school curriculum that emphasise more laboratory practical centred approaches are a welcome progressive development, they may not have been matched by an equal emphasis on chemical laboratory safety. Chemical safety practices in school laboratories were suboptimal with limited use of basic protective clothing such as safety glasses and laboratory coats. Authorities should be particularly concerned about teachers' poor practices relating to laboratory and chemical storage and waste disposal. Poor chemical storage and disposal practices may result in chemical hazards impacting communities that lie in the proximity of some schools. Teachers from well-resources schools exhibited safer CLS practices than those from poorer schools. There were no significant differences in teachers' CLS practices according to duration of teaching experience or according to whether they had majored in chemistry or not. Budgetary constraints, laboratory conditions and school policies may militate against optimal safety practices. Teacher training institutions should create space for modules on laboratory management courses to prepare teachers for the workplace where they manage laboratories, especially in the South African schooling system, where there are no laboratory technicians in school laboratories. Separate modules for laboratory safety management could be more rigorous in preparing pre-service teachers in their future roles as science teachers there they will also double as laboratory managers. Student exposure to online virtual tools such as videos focusing on CLS, may assist teachers in enforcing optimal safety practices in their laboratories.

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REFERENCES

Akpullukcu, S., & Cavas, B. (2017). The development of laboratory safety questionnaire for middle school science teachers. *Science Education International, 28(3),* 224-23.

Annetta, L., Annetta, R., Minogue, J., Folta, E., Holmes, S., Vallett, D., & Cheng, R. (2014). Safe science classrooms: Teacher training through serious educational games. *Information Sciences, 264,* 61-74.

Artdej, R. (2012). Investigating undergraduate students' scientific understanding of laboratory safety. *Procedia-Social and Behavioral Sciences, 46,* 5058-5062.

Creswell, J. (2013). Research design: qualitative, quantitative, and mixed methods approaches. London, United Kingdom: Sage.

Department of Basic Education (2011). *Guidelines relating to planning for public school infrastructure*. Pretoria: Government Printers.

Drayton, B., & Falk, J. (2001). Tell-tale signs of the inquiry-oriented classroom. *NASSP Bulletin*, *85*(623), 24-34. http://refhub.elsevier.com/S0742-051X(13)00175-3/sref22

Eguna, M.T., Suico, M.L.S., Lim, P.J.Y. (2011*).* Learning to be safe: Chemical laboratory management in a developing country. *Journal of Chemical Health & Safety*. P. 1-7.

Hill Jr, R. H., & Finster, D. C. (2016). *Laboratory safety for chemistry students*. John Wiley & Sons.

Kandel, K. P., Neupane, B. B., & Giri, B. (2017). Status of chemistry lab safety in Nepal. *Plos one*, *12*(6), e0179104. Crossref. PubMed.

Ménard, A. D., & Trant, J. F. (2020). A review and critique of academic lab safety research. *Nature chemistry*, *12*(1), 17-25.

Mizzi, D. (2013). The Challenges Faced by Science Teachers When Teaching Outside Their Specific Science Specialism. *Acta Didactica Napocensia*, *6*(4), 1-6.

Mogopodi, D., Paphane, B., & Petros, S. (2015). Assessment of chemical management practices and safety in junior secondary school laboratories in Gaborone. *Journal of Chemical Health & Safety, 22(5)*, 17–27.

National Research Council. 2010. *Promoting Chemical Laboratory Safety and Security in Developing Countries*. Washington, DC: The National Academies Press. https://doi.org/10.17226/12857.

Okebukola, P. A., Oladejo, A., Onowugbeda, F., Awaah, F., Ademola, I., Odekeye, T., ... & Ajayi, O. A. (2020). Investigating Chemical Safety Awareness and Practices in Nigerian Schools. *Journal of Chemical Education*, *98*(1), 105-112.

Pallant, J. (2013). SPSS survival manual: A step by step guide to data analysis using SPSS program (6th ed). McGraw-Hill Education.

Ramnarain, U. & Fortus, D. (2013). South African physical sciences teachers' perceptions of new content in a revised curriculum. *South African Journal of Education*, *33(1).* http://dx.doi.org/10.15700/saje.v33n1a573.

Ramnarain, U., & Hobden, P. (2015). Shifting South African learners towards greater autonomy in scientific investigations. *Journal of Curriculum Studies, 47(1),* 94–121. https://doi.org/10.1080/00220272.2014.966153

Schenk, L., Taher, I. A., & Öberg, M. (2018). Identifying the scope of safety issues and challenges to safety management in Swedish middle school and high school chemistry education. *Journal of Chemical Education*, *95*(7), 1132-1139.

Sedghpour, B. S., Sabbaghan, M., & Sataei, F. M. (2013). A survey on the pre-service chemistry teachers' Lab safety education. *Procedia-Social and Behavioral Sciences*, *90*, 57-62.

Torres, F., Tovar, L. A. N., & Egremy, M. C. (2015). Virtual interactive laboratory applied to high schools programs. *Procedia Computer Science, 75,* 233–238. https://doi.org/10.1016/j.procs.2015.12.243

Walters, A.U.C., Lawrence, W. & Jalsa, N.K. (2017). Chemical laboratory safety awareness, attitudes, and practices of tertiary students. *Safety Science 96 (1),* 161–171

Zhu, B., Feng, M., Lowe, H., Kesselman, J., Harrison, L., & Dempski, R. E. (2018). Increasing enthusiasm and enhancing learning for biochemistry-laboratory safety with an augmented-reality program. *Journal of Chemical Education*, 95(10), 1747–1754. http://dx.doi.org/10.1021/acs.jchemed.8b00116

VOCATIONAL TRAINING AND WORK-BASED LEARNING FOR UNEMPLOYED YOUTH IN SOUTH AFRICA

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Abstract
Youth unemployment in Sub-Saharan Africa has become a global concern. In this connection, vocational education training programmes delivered in the form of work-based learning have been used to help young people to acquire employability skills and integrate into the labour market. The purpose of the paper is to examine the approaches of vocational training delivery for skills acquisition. The paper utilized mixed research methods of qualitative and quantitative approaches to conducting the study; purposive sampling to select 24 training centre managers and 512 trainees. The data were collected by using the survey questionnaires, one-on-one interviews and site observations. The findings revealed that the vocational training delivery occurred at 75% in firms or industries, which were at the same time the stakeholders and training providers. As a result, the training contents were determined by a specific skills competence of the firms or industries. The author concludes that the training delivery mechanism had a close link with the world of work to facilitate the utilisation of acquired skills in the labour market.

Keywords: Vocational training, Youth employment, Skills development, Workplace learning, Unemployed youth, South Africa

INTRODUCTION

Youth unemployment in Sub-Saharan Africa has become a global concern. International Labour Organization ([ILO], 2020, p.44) notes that, though youths in all countries of the world face a higher risk of unemployment than adults, the challenge is particularly marked in Sub-Saharan Africa. Furthermore, a considerable number of young people in Sub-Saharan Africa are not in employment, education or training (NEET). As a solution to the problem of alarming youth unemployment in Sub-Saharan Africa (SSA), local governments have prompted a new consideration of the role of vocational education and training (VET) in school-to-work transition (Oketch, 2016; Wildschut & Kruss, 2019). In other words, there are increased interest and possible progress in VET programmes, and some local governments have started to implement VET programmes as part of service delivery to unemployed and disadvantaged young people (Mayombe, 2021). This paper argues that the provision of VET programmes delivered in the form of work-based learning (WBL) can help young people to acquire employability skills, hence facilitating school-to-work transition. Therefore, the paper assesses the delivery of non-school-based VET programmes for disadvantaged youth in the eThekwini Municipality, South Africa.

A distinguishing aspect of vocational education and training programmes are their delivery approach in the form of work-based learning. Studies have shown that VET programmes delivered in the form of WBL have the potential to facilitate the smooth school-to-work transition of previously unemployed young people (Akoojee, 2019; Drewery, Pretti & Church, 2020; ILO, 2018). The Advantage of WBL is that it combines theoretical and practical components of the skills acquisition happening in an authentic world of work. This

is why Akoojee (2019) and ILO (2018) maintain that the provision of VET programmes to unskilled young people can tackle their status of unemployment if the programmes entail WBL. In this connection, the provision of VET programmes delivered in the form of WBL has been used to help young people to acquire employability skills. However, little is known about the effectiveness of VET programmes delivered in the form of WBL for disadvantaged youth in the context of South Africa.

Integrating work-based learning in VET programmes

Empowering the unemployed and disadvantaged youth through VET programmes enables them to compete with other job seekers in the labour market. However, VET programmes can better empower disadvantaged young people only if they are delivered in the form of work-based learning (Reddan, 2017; Rowe & Zegwaard, 2017). By definition, WBL is "an approach to career-focused education that includes classroom-based and workplace-based forms of learning that are appropriate for the professional qualification" (The Council on Higher Education, 2011, p.6). Work-based learning in VET generally denotes any learning activity or programme which incorporates theory with practice to provide trainees with work experience. In other words, WBL is an educational and training approach that incorporates academic components and workplace practices for the joint benefit of trainees and employers. Ferns, Russell and Kay (2016) point out that WBL allows the insertion of relevant real-world learning into the delivery of the training programmes to prepare trainees to enter the labour market and meet the demands of employers.

Work-based learning enables the achievement of a smooth school-to-work transition for disadvantaged youths. The advantage of integrating WBL in VET programmes is to reduce the reluctance of employers who consider as risky to offer jobs to young graduates fleshly coming from school without work experience. Jackson and Collings (2018) also noted that WBL enhances graduate work readiness and recognition of their relevant experience at the entry-level. Though WBL approaches are used for several reasons, including the acquisition of practical experience, the paramount one is to enhance trainees' employability after graduating. Empirical studies show that WBL prepared trainees for success in the workplace (Drewery, *et al.,* 2020). Young people involved in WBL revealed that their success in gaining jobs and good performance was linked to work experiences which played an important role in positioning them as attractive to their employers.

Problem statement

The concern in this paper is that disadvantaged youths (aged 15-34 years) are the most stricken by unemployment in Sub-Saharan Africa and South Africa. Some of the young job seekers are not well educated, do not possess the employability skills and work experience required by employers in the labour market (ILO, 2020). As a result, they have been discouraged by the labour market and are also not building their skills through education and training. The empowerment of young people through the VET programmes helps them to compete with other job seekers in the labour market. As discussed above, VET programmes can yield good results to young people only if they are implemented in the form of WBL (Reddan, 2017; Rowe & Zegwaard, 2017).

Despite good results yielded by WBL on vocational training programmes, its implementation faces some challenges. The challenges are related to resources and delivery approaches. For instance, Rook (2017) reported in the context of Australia that a lack of resources for providing WBL opportunities was one of the challenges. Moreover, WBL face implementation challenge due to the lack of partnership between relevant stakeholders

responsible for the delivery of practical components of the training (Ferns et al.,2016; Rowe et al., 2012). Therefore, this paper looks at the effectiveness of VET programmes delivered in the form of work-based learning (both theoretical and practical components) for disadvantaged youth in the context of South Africa.

Research questions and objectives

The main research question is: How does the provision of VET programmes delivered in the form of work-based learning (WBL) facilitate the acquisition of employability skills and a smooth school-to-work transition? The sub-questions are as follows:

- What was the approach of theoretical training (classroom-based) of VET programmes?
- What was the approach of work-based learning components to help trainees acquire practical skills?
- How did mentors help the young trainees gain work experience from the workplace or industry?

The purpose of the paper is to examine the approaches of VET delivery in the form of work-based learning in facilitating the acquisition of employability skills and a smooth school-to-work transition. The objectives of the paper are to:

- examine the approach of theoretical training (classroom-based) of VET for skills acquisition;
- examine the approach of work-based training components to help trainees acquire practical skills;
- examine the way mentors helped the young trainees gain work experience from the workplace or industry.

In this paper, the term employability skills mean the right skill set an individual should possess to meet the needs of the employer (Jackson, 2016). It is a prerequisite for individuals to successfully enter the labour market on completion of their studies.

THEORETICAL FRAMEWORK

This paper utilises the constructivist theory of teaching and learning to examine the approaches of VET delivery in the form of work-based learning.in facilitating the acquisition of employability skills. According to Nagowah and Nagowah (2009, p.280), “constructivism is a learning theory that is actively constructed in the mind of the learners out of their experiences in the world”. The paper analyses the data through three teaching and learning principles of constructivism theory as outlined by Huang (2002). Firstly, 'interactive learning' stresses that learners interact with the learning materials, each other and the trainers in an active way. Khanal (2014) argues that interactive learning is a strategy of teaching allowing the facilitators to actively engage the learners in their learning process through teacher-learner interaction, learner-learner interaction and hands-on demonstrations. The facilitator encourages learners to participate actively in the process of learning. The interaction comprises discussions, group works and dialogue between trainees and trainer.

Secondly, "collaborative learning" involves peer exchanges of ideas, skills among learners (Huang, 2002). Kaye (in Khanal, 2014, p.97) explains collaborative or cooperative learning as “the acquisition by individuals of knowledge, skills or attitudes occurring as the result of group interaction.” Collaborative learning emphasises that "learners do not learn in isolation

from others, [rather,] people naturally learn and work collaboratively in their lives" (Huang, 2002, p.32). Thirdly, the 'authentic learning' of constructivism stresses that “learning must be lifelike and that learning needs to meet real-life experiences" (Huang, 2002, p.33). This principle of learning entails learning-by-doing in the workshops, workplace or through simulation-based learning.

The application of these three principles to the examination of the approaches of VET delivery in the form of work-based learning is that learning may be possible if the training centres use the VET curriculum which is tailored according to the labour market requirements. Khanal (2014, p.96) further states that the "major implications of constructivism for the learning environment of adult education entail using curriculum adapted to learners' prior knowledge, tailoring of teaching methods to learners' background and employing open-ended questions that stimulate dialogue among learners". In the context of this paper, the three principles are applicable during theoretical training (classroom-based), work-based training and mentorship for gaining work experience in the workplace.

Literature review

Most of the available literature focuses on WBL connected to TVET colleges and universities, which is a school-based WBL programme. There are not enough publications on WBL related to non-school-based vocational education and training for vulnerable and unemployed youths. What makes a difference between the two types of WBL is that the former follows a national curriculum designed within a learning system at the national or provincial level. The latter deals with non-school-based VET programmes whose curriculum is designed by different stakeholders at a local level to suit the needs of the trainees and employers. Despite the type of WBL related to two forms of VET programmes, the work-experience component of VET can be attained through various models of WBL (Reddan, 2017). A model of WBL is also characterised by flexibility in terms of the length, frequency and timing of the practical component.

The success of WBL depends on stakeholder relationships and commitment to the programmes. Ferns *et al*. (2016) point out that a training centre or institution should create and maintain stakeholder relationships for the effectiveness of WBL. Similarly, the Council on Higher Education (2011) advises that the WBL custodian has the responsibility to maintain relationships with important stakeholders and obtain their commitment from the designing to the closing phases. Nevertheless, Ferns *et al.* (2016) caution that some stakeholders get involved in WBL with expectations, needs and competing interests, a fact making it hard to manage the relationships. Rook (2017, p.202) maintains that "Managing expectations and competing demands of stakeholders is part of maintaining positive stakeholder relationships". In most cases, the cause of getting the buy-in of the stakeholders resides in the fact that they have interests and demands to satisfy the needs and objectives of their organisations.

Achieving practical experience fosters the employability of trainees from VET programmes. Reinhard, Wynder and Kim (2020) note that WBL seeks to expose trainees early in their training programmes to the realities of their future jobs through simulations and assignments of the real world of work. In their study, Jackson and Collings (2018) reported that WBL programmes were a channel to attain practical work experience and academic credit which also led to the recognition of the qualification by the employers after the completion of an education programme. Moreover, in an empirical study, Drewery, *et al.* (2020) reported that WBL prepared university students for achievement in their future careers. Respondents stated

that the success was connected to work experiences which played a significant role in positioning students as suitable candidates for employers.

There is abundant literature on vocational education and training in general, but few on non-based schools and disadvantaged youth Sub-Saharan South. The available literature focuses on the contributions of WBL to college students' capacity development, gaining work experience leading employability prospects (Reddan, 2017; Rowe & Zegwaard, 2017; Smith & Worsfold, 2015). Other studies analysed the contribution of WBL to the talent pipelines and the challenges faced in implementing WBL in undergraduate programmes (Rook, 2017; Drewery, *et al.*, 2020). In the context of South Africa, Scholtz (2020) examined the assessment methods in WBL for university students, focussing on the accomplishment of specific skill learning areas and performance appraisals. However, little is known about the WBL approach in the context of non-school-based VET for disadvantaged and unemployed youth. To fill this gap in the existing knowledge, this paper focuses on the provision of VET programmes delivered in the form of WBL for disadvantaged youth in South Africa.

METHOD

This paper is based on a large-scale research project which utilised a mixed research methods approach involving quantitative and qualitative methods (Creswell, 2014). The original study involved both the quantitative method (512 trainees) and the qualitative method (10 current and past trainees). Similarly, this paper used the same mixed research methods of quantitative and qualitative approaches. The researcher used the mixed methods research approach for two-fold reasons. Firstly, he intended to get statistical (quantitative) results from a sample of respondents (trainees, managers and trainers) and to use interviews to help explain those results in detail (Creswell, 2014). Secondly, the mixed methods research approach helped to examine the conducive factors (internal and external) of VET for skills acquisition and gaining hands-on experience during practical sessions.

Study population and sample size

The population for the study was all the youth who trained at eThekwini Municipal, training centre managers and trainers. The training centres entail training providers and institutions that signed an agreement with the eThekwini Municipality for the vocational skills development of young people. The sample entailed training centres managers, trainers and young trainees. It was estimated that 3,000 disadvantaged youth were trained in 12 different vocational training courses from 2015 to 2019. Using mixed sampling methods of stratified and purposive sampling techniques (Kumar (2011), the researcher selected 512 trainees, 32 trainers and 24 training managers from 24 training centres to get their views on their experiences of VET programmes.

Concerning the sampling method for young trainees for the quantitative component, the researcher used the purposive sampling method to select current and past trainees. They were selected based on the following criteria:

- Being current or past trainees of the eThekwini Municipal Academy from 2015 to 2019;
- Having completed the vocational skills training programmes for unemployed youth;
- Being wage-employed, self-employed (in the formal or informal sectors) or unemployed;
- Age ranging from 18-35 years and who are willing to take part in the research.

For the qualitative component, from the 512 young trainees who filled in the survey questionnaire, six participants were selected for interviews (Zohribi, 2013, p.256), based on the following criteria:

- Being currently employed whether in informal public or private sector;
- Being selected according to the type of VET course on one side and type of post-training occupation after graduating on other;
- Selected according to gender, areas of residence (CBD, township).

Data collection and analysis

To obtain valid and reliable data for the assessment of the approach of vocational training delivery, the researcher used a survey questionnaire, semi-structured interviews, and workshop and site observations. For quantitative data collection, specified survey questionnaires were distributed to 512 young trainees (current and past trainees), 24 training managers and 32 trainers. For the qualitative data collection, one-on-one semi-structured interviews (specified) were conducted with seven training managers and 10 trainees who completed the survey questionnaires.

All data were analysed concurrently in line with the research objectives and theoretical framework. Concerning the analysis of quantitative data, the Statistical Packages for Social Sciences (SPSS) software was used. The analysis of quantitative data fell into three categories, which are descriptive, associative and causative (Fouché & Bartley, 2011). The qualitative data were coded, then sorted and classified to find common themes or categories (Nieuwenhuis, 2012). Each category was assigned a label or a tag. Codes and themes helped the researcher to understand the raw data by putting names into descriptions and interpretation.

FINDINGS

Demographic information of the young trainees

It is significant to elaborate on the demographic characteristics of the young trainees who were disadvantaged, hence in need of such vocational education and training. The analysis of the findings on the race shows that the majority of the participant trainees were black Africans (97.5%), yet only 2% of them were coloured and 0.6% of them were Indians. Concerning the gender, males consisted of 51.8% and the other 48.2% of them were females. It was said that the young trainees had achieved a certain level of education but could not be employed because they lacked employability skills attractive to the employers. Similarly, for the purpose and focus of this paper, the analysis of their highest education attainment helped to determine whether or not it could enable them to acquire vocational skills at a determined level of qualification within the National Qualification Framework (NQF) and according to the South African Qualification Authority (SAQA). Figure 1 presents the highest level of formal schooling level of trainees before enrolling for vocational education and training (VET) programmes.

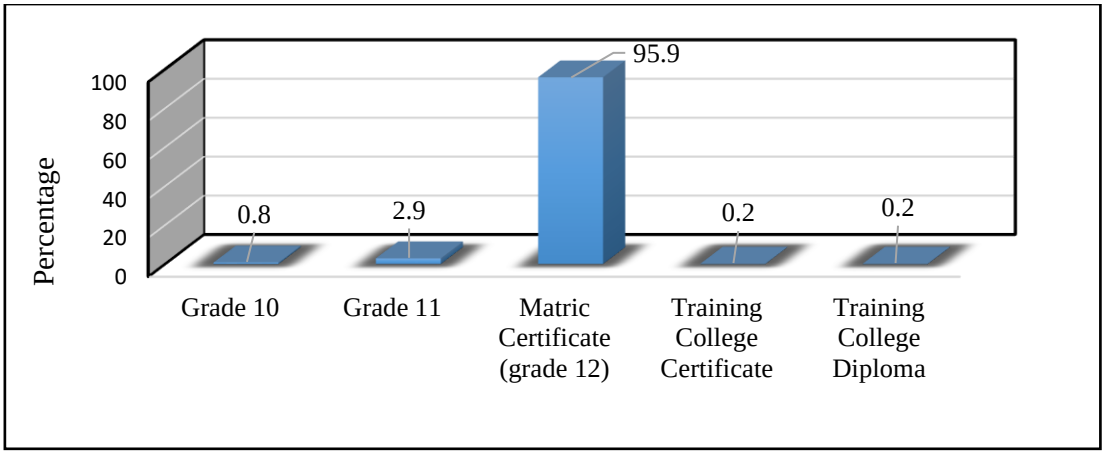

Figure 1. The highest level of trainee's formal schooling

The findings on the highest level of formal schooling in Figure 1 show that the majority (95.9%) of the young trainees who were admitted on VET programmes had Matric Certificate (Grade 12). Trainees who completed grades 10 consisted of 0.8% and grade 11 entailed 2.9%. However, other trainees had certificates (0.2%) and diplomas (0.2%) from TVET colleges, but they were still unemployable due to the lack of employability skills. These findings suggest that the minimum requirement for admission on the programmes or any skill training course was a Matric certificate. However, few candidates with grades 10 and 11 were also admitted based on their work experience in the area of a training course or Recognition of Prior Learning (RPL) criteria. During interviews, one manager (EMA 1) explained that "*The programmes also catered for unemployed candidates who have been outside of formal education for several years but had gained work experience from his/her previous employment. Now that person wanted to obtain a vocational qualification*".

The analysis of VET programmes revealed that a trainee had to choose one skills training course from a list of 10 available vocational training courses. The course list comprised construction and carpentry, Information and Computer Technology (ICT), small medium and micro-enterprises (SMME), Early Child Development (ECD), lifeguard skills, firefighter, boilermaker and welding, upholstery, professional driving and motor mechanics. The duration of a course depended on the type of training course and level of qualification to be achieved. The training courses lasting for three to six months were construction, plastering and carpentry, ICT and SMME because their purpose was to satisfy the urgent needs of employers who approached the municipality. Other training courses lasted one or one and half years. The longest VET programme was for three years (motor mechanics, boilermaker, welding and fitter), which consisted of apprenticeship programmes.

The approach of theoretical training at the centre for skills acquisition

An effective training delivery lays a good foundation for employment outcomes. However, in the case of this VET programmes, the municipality was not directly involved in the theoretical delivery, a task reserved to training providers that signed a memorandum of understanding with other stakeholders of the programmes. Therefore, training managers were asked during the interviews to describe the main characteristics of the training delivery. All centre managers confirmed that their training centres implemented a Competency-Based Training package that entailed key activities intended to ensure that each training objective is achieved.

During the observations of the theoretical training in the classrooms and workshops, the examination revealed that the delivery approaches consisted of integrating classroom learning with practical learning in the workshops at the training centres. In other words, the theoretical component of the VET was strengthened by the practical component of the training delivery. Furthermore, it was found through interviews and observations that the trainees used to attend a class for theory lessons at designed training centres for one or two days and other days were spent in the training centres' workshops, companies or institutions related to the specific training programme. Table 1 presents the respondents' views on the approaches of VET delivery for skills acquisition.

Table 1. Respondents' views on the approaches of VET delivery

Statement on the training delivery	**Young trainees**						**Trainers & managers**					
	Agree		**Neutral**		**Disagree**		**Agree**		**Neutral**		**Disagree**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
The training consisted of 25% theory in the classroom.	428	83.6	29	5.7	55	10.8	13	23.2	14	25	32	57.1
The training consisted of 75% practice in workshops or the real world of work.	406	79.3	14	2.7	92	18	42	75	9	16.1	4	7.14
The Training focused on technical skills only.	428	83.6	33	6.4	51	10	17	30.4	10	17.9	29	51.8
Trainees had enough time to practice skills at the centre during training.	375	73.3	17	3.3	120	23.4	51	91.1	5	8.9	--	--
The practical component of the training was well used.	413	80.7	16	3.1	83	16.2	45	80.4	8	14.3	3	5.4
Major attention was given to link training to industries or workplace	477	94.3	11	2.1	18	3.5	43	76.8	7	12.5	2	3.6

Note: Percentage within a respondent group

The analysis of the responses in Table 1 shows differences and similarities from both groups on some statements regarding the percentages. Concerning the time spent on the theoretical component of the training, 83.6% of the young trainees agreed that the training consisted of 25% theory in a classroom. Only 10.8% of the trainees disagreed with the statement. Similarly, 57.1% of trainers and centre managers disagreed that the training consisted of 25% theory in the classroom, while 23.2% of them agreed on the statement.

The analysis of Table 1 above reveals that the delivery of the vocational training (both theory and practice) was aligned with the requirements of the labour market in a specific field. Respondents were asked to indicate whether or not the trainers were linking the training activities to industries or the workplace. The majority (94.3%) of the young trainees agreed that the major attention during the training was given to link training to industries or workplace, and only and only 3,5% of them disagreed with the statement. On the other side of the managers and trainers, 76.8% of them agreed that the major attention during the training was given to link training to industries or workplaces, while 12.5% of them were neutral on the statement.

During one-on-one interviews, the respondent trainees were asked their views about the theoretical component of the skills training programmes. A trainee from a lifeguard training course explained as follows:

> *We used to have theory sessions in the classrooms in which activities were well explained practically. Materials were also available for theory sessions. What I can say is that there was a sort of mixture of theory and practice at the same time. The swimming coach provided a theory on how to save a life. After a theory session, we used to go* to *the centre workshop and apply what we had learnt in class.*

A professional driving graduate also said:

> *To be honest, the theory sessions in class were very good. All activities focussed on tasks that were appropriate to the real world of work. We were happy with the assessments which were practical and linked to the tasks to be performed when becoming a professional driver.*

A combined analysis of the findings in Table 1 and interviews reveals that, though the theory sessions were good, trainees spent more time on practical sessions than theoretical lessons in the classrooms. The delivery approach consisted of integrating classroom learning with some practical sessions in workshops. The findings from trainees, managers and trainers revealed that trainees attended classes for theory lessons at colleges or their respective training centres for a few hours and did practical sessions in companies or institutions. Both quantitative and qualitative findings suggest that there was a combination of theory and practice-oriented methods of training delivery. However, a close analysis of the views from all categories of the respondents suggests that the approaches of teaching-learning were more practical than theoretical.

The approaches of WBL helping trainees acquire practical skills

The training delivery approaches the trainers and other stakeholders used could help trainees acquire practical skills for their future employment. On the practical component of the delivery approach, the analysis of Table 1 above reveals that 79.3% of the young trainees agreed that the vocational training consisted of 75% practice in workshops or the real world of work. However, only 18% disagreed and 2.7% of them were neutral on the statement. In the same way, 75% of managers and trainers aligned with the trainees by confirming that the training consisted of 75% practice in workshops or the real world of work, yet 16.1 were neutral on the statement. These findings are an indication that the trainees spent more time on practical sessions than theoretical lessons in the classrooms.

Linking the above findings to work-based learning, it was also significant to ask the respondents' views on the time that was allocated to practice skills during the vocational training. In this regard, 73.3% of trainees agreed that they had enough time to practice skills at training centres during training in the workshops or workplace, while 23.4% of trainees disagreed with the statement. On the side of the trainers and managers, 91.1% of them agreed that trainees had enough time to practice skills in the workshops or workplace, while 23,4% of them disagreed with the statement.

During one-on-one interviews, some trainees shed more light on the findings in Table 1 above. A male trainee who completed a diesel-mechanical course explained:

> *The vocational training programme prepared me well to get a job. I am applying in the world of work all skills that I acquired from our training centre. I was employed in this*

automotive repair company because of the technical skills training I received from the training centre.

Graduate from ICT training course who became employed at a health clinic said:

The way our trainers were teaching us computers was very easy to understand the content of ICT skills. The training was much practical and linked to a future type of job of capturing data. As a result, my work at this health clinic is to capture patient data in the computer system.

The findings from Table 1 and interviews suggest that the approaches of vocational training delivery to help trainees acquire practical skills were mainly practical. Data from participant and site observations showed that the trainees spent much of their time on practical sessions in the centre workshops or workplaces. The analysis of the findings reveals that the practice-oriented approach might have facilitated the acquisition of skills and fostered the ability to work in companies or institutions immediately after graduating. In other words, the use of workshops, on-the-job training contributed to skills acquisition.

Helping the trainees gain work experience from the workplaces or companies

The purpose of helping training gain practical work experience while being on VET programmes was to facilitate a smooth school-to-work transition. Therefore, the training centres and other stakeholders ought to create conducive environments for workplace-based training as a mode of delivery. The findings from one-on-one interviews with young trainees and managers revealed that the trainees attended practical sessions in terms of on-the-job training for experience in companies or institutions. One manager (M3) reported as follows:

Through the provision of vocational training programmes, we aim to empower youth with marketable skills and work experience in their area of their training. They were unemployed because of the lack of marketable skills after completing their matric certificates. So, the only way to empower them was to design a training delivery approach as work-based training leading to employment outcomes. To attain this goal, we signed partnerships with external stakeholders who provided opportunities for the training to practice skills in the companies.

A second manager (M 7) explained the partnership with the SETA as follows:

Our vocational training programme lasts for three years. Our company provides opportunities for workplace-based training. Like other stakeholders in the training programmes, the young trainees had to sign fixed-term contracts during the duration of the training programme. Our training centre is registered with MERSETA to provide vocational skills. At the end of the training, the trainees undergo a trade test.

It was also revealed during interviews that the practical sessions in the companies were under the supervision of an instructor and/or mentor selected by the host company. The trainees signed fixed-term contracts (micro-placements) with the host companies for the duration of the VET programmes. The findings in this section suggest that the approach of training delivery in the form of work-based training helped trainees to gain work experience.

DISCUSSION OF FINDINGS

The delivery approach consisted of helping young trainees to master the theoretical content of the vocational training course in the classroom first. The theoretical elements were

supplemented by some practical sessions in workshops so that trainees may grasp the concepts and terms of the subject. This finding concurs with the argument of Jackson and Collings (2018) who state that, for a VET to be recognised and bear credits for an academic qualification, there should be a sufficient element of theory in class. The inference is that the practical component should not be overemphasised to the detriment of theory lessons (Council on Higher Education, 2011). However, the present study reveals that it is necessary to help trainees apply the key concepts of the lesson through simulation and the use of centre workshops. The findings learning entails learning-by-doing in the workshops or through simulation-based learning.

In addition to practical lessons in the centre workshops, trainees had opportunities to practice skills in companies or institutions that signed a memorandum of understanding with the eThekwini Municipality. This was authentic learning aiming at meeting the learning needs of the training in real-life experiences (Huang, 2002). The finding concurs with the argument of Reinhard, *et al*. (2020) that WBL seeks to expose young trainees early in their training programmes to the realities of their future careers through assignments of the real world of work. The inference from the findings is that the practice-oriented approach might have facilitated the acquisition of skills and fostered the ability to work in companies or institutions immediately after graduating.

The use of on-the-job training and workplace-based training was very important for acquiring work experience. Depending on the type of skill training course, some training centres used a project-based training approach. The findings are similar to those in Jackson and Collings' (2018) study. They reported that WBL programmes helped the students to achieve practical work experience and academic recognition to obtain several credits for the completion of a training programme. What is key in the present study is that there was a balance in the training delivery approach between theory and practice in workplaces under a supervision of a mentor. From the views of the young trainees, the component of workplace learning was converted into internship programmes for the period of the training course.

The trainees signed fixed-term contracts (micro-placements) with the host companies for the duration of the VET programmes. This finding concurs with the view of Scholtz (2020) who notes that the effectiveness of WBL programmes depends on suitable placements in the industry or institutions where trainees are afforded opportunities to practice skills and demonstrate competencies. The finding implies that the suitable placements of the trainees were important to develop the opportunities for learning in professional practice.

CONCLUSIONS

The purpose of the paper was to examine the approaches of VET delivery in the form of work-based learning in facilitating the acquisition of employability skills and a smooth school-to-work transition. In connection with the paper objectives, evidence from the findings shows that the vocational training delivery occurred at 75% in training centres' workshops, companies or institutions, which were at the same time the stakeholders and training providers. As a result, the training contents were determined by a specific skills competence of the firms or industries. The training approach consisted of "learning-by-doing" in the real world of the work environment. The author concludes that the training delivery mechanism had a close link with the world of work to facilitate the utilisation of acquired skills in the labour market. The practice in the workshops, workplace, mentorship and micro-placements helped the young trainees gain work experience for future employment.

REFERENCES

Akoojee, S. (2019). Informal economies, work-based learning, and Sustainable National Skills

Development in Africa. In McGrath, *et al.* (Ed) *Handbook of Vocational Education and Training: Developments in the Changing World of Work*: Springer, pp 103-120. Available at: https://doi.org/10.1007/978-3-319-94532-3.

Council on Higher Education. (2011). *Work-integrated learning: Good practice guide. HE Monitor No. 12.* August 2011. Pretoria: Council on Higher Education (CHE)

Creswell, J.W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches.* Washington, DC: Sage Publications.

Drewery, D., Pretti, T. J & Church, D. (2020). Contributions of work-integrated learning programs to organizational talent pipelines: Insights from talent managers. *International Journal of Work-Integrated Learning*, 21 (3), 275-288.

Ferns, S., Russell, L. & Kay, J. (2016). Enhancing industry engagement with work-integrated learning: Capacity building for industry partners. Asia-*Pacific Journal of Cooperative Education, Special Issue, 17 (4), 349-375.*

Fouché, C.B. & Bartley, B. (2011). Quantitative data analysis and interpretation. In De Vos, A.S. (Ed), Strydom, H., Fouché, C.B., & Delport, C.S.L. *Research at Grass Roots: For the Social Sciences and Human Service Professions.* 4th ed. Pretoria: Van Schaik Publishers.

Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology, 33 (1), 27-37.*

International Labour Organisation (ILO). (2018). Interns and Outcomes: Just how effective are internships as a bridge to stable employment? Employment Working Paper No. 241. Available at https://www.ilo.org/wcmsp5/groups/public/ed_emp/documents/ publication/wcms_637 362.pdf.

International Labour Organization (ILO). (2020). World employment and social outlook: Trends 2020. Geneva: ILO.

Jackson, D., & Collings, D. (2018). The influence of work-integrated learning and paid work during studies on graduate employment and underemployment. *Higher Education, 76(3), 403-425.*

Khanal, P. (2014). Making virtual learning interactive and meaningful: Implication of constructivism for adult students. *International Journal of Research Studies in Education, 3(1), 91-102.*

Kumar, R. (2011). *Research Methodology: A Step-by-Step Guide for beginners*. London: Sage.

Nagowah, L. & Nagowah, S. (2009). A reflection on the dominant learning theories: Behaviourism, cognitivism and constructivism. *The International Journal of Learning, 16(2), 279-285.*

Nieuwenhuis, J. (2012). Qualitative Research Designs and Data Gathering Techniques. In Maree, K. *First Steps in Research* (pp. 69-97). Pretoria: Van Schaik Publishers.

Oketch, M. (2016). Cross-country comparison of TVET systems, practices and policies, and employability of youth in Sub-Saharan Africa. In Eicker, F., Haseloff,G. & Lennartz, B. (ed). *Vocational education and training in Sub-Saharan Africa: Current Situation and development*. Bielefeld (Germany): W. Bertelsmann Verlag GmbH & Co. KG

Mayombe, C. (2021). *Vocational education and training in Sub-Saharan Africa: Evidence - informed practice for unemployed and disadvantaged youth*. Gewerbestrasse: Palgrave Macmillan.

Reddan, G. (2017). Enhancing the employability of exercise science students. *Asia-Pacific Journal of Cooperative Education, 18(1), 25-41.*

Reinhard, K., Wynder, M., & Kim, W. (2020). Developing best practice for cooperative and work-integrated education: Lessons from Germany, Australia and South Korea. *International Journal of Work-Integrated Learning, 21(2), 177-191.*

Rook, L. (2017). Challenges implementing work-integrated learning in human resource management university courses. *Asia-Pacific Journal of Cooperative Education, 18(3), 199-212.*

Rowe, A., Mackaway, J., & Winchester-Seeto, T. (2012). But I thought you were doing that-clarifying the role of the host supervisor in experience-based learning. *Asia-Pacific Journal of Cooperative Education, 13(2), 115-134.*

Rowe, A. D., & Zegwaard, K. E. (2017). Developing graduate employability skills and attributes: Curriculum enhancement through work-integrated learning. *Asia-Pacific Journal of Cooperative Education, 18(2), 87-99.*

Scholtz, D. (2020). Assessing workplace-based learning. *International Journal of Work-Integrated Learning, 21(1), 25-35.*

Smith, C., & Worsfold, K. (2015). Unpacking the learning-work nexus: 'Priming' as a lever for high-quality learning outcomes in work-integrated learning curricula. *Studies in Higher Education, 40(1), 22-42.*

Wildschut, A. & Kruss, G. (2019). Challenges to agency in workplaces and implications for VET: Mechatronics artisans in the automotive sector in South Africa, In Simon McGrath Martin Mulder, Joy Papier, Rebecca Suart (Ed). Handbook of Vocational Education and Training: Developments in the Changing World of Work. Cham: Springer Nature Switzerland AG, 141-155.

Zohrabi, M. (2013). Mixed method research: instruments, validity, reliability and reporting findings. *Theory and Practice in Language Studies*, 3(2), 254-262. Retrieved from http://dx.doi.org/10.4304/tpls.3.2.254-262.

PRESERVICE PHYSICAL SCIENCES TEACHERS' PERCEPTION OF THE VIEWS ON THE NATURE OF SCIENCE

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Abstract
Teaching the views on the nature of science (NOS) to learners improves their scientific literacy. However, understanding the views on NOS is challenging to both learners and teachers. Observations have shown that views on NOS are dichotomous and complex. Given the preceding background, this study explored third-year physical sciences preservice teachers' views on NOS after having attended an online methods course that included the topic. Using a qualitative approach, eight preservice teachers at one South African university responded to the Views of Nature of Science Questionnaire (VNOS) instrument. The qualitative data collected were analysed using content analysis techniques. The findings showed that the participants were aware of the views on NOS after having attended the methods course. However, they experienced tensions in reconciling the dichotomous view on NOS on the use of inferences and observations to generate knowledge. They placed more importance and value on the role of observations reliability of methods in developing scientific knowledge and put less emphasis on the role of inferences. This finding may be an indication of how the preservice teachers learnt science and perceived how to teach science in their future classrooms. The findings indicate a need to expose preservice teachers to other methods of scientific investigation that do not rely on observations.
Keywords: NOS, preservice teachers, views on nature of science

INTRODUCTION

Scientific knowledge is used to understand the world around us; therefore, teaching science includes equipping learners with values and assumptions that define scientific literacy. Science is distinct due to the epistemological assumptions that determine how scientific knowledge is developed (Lederman, 1992; Erduran et al., 2019). Understanding how scientific knowledge is developed includes understanding how scientists work and how society reacts to and interacts with scientific knowledge. Teachers' and learners' views on NOS have been a subject of research for many decades, and significant strides have been made in improving how it is understood (Yalçin & Yalçina, 2011). Lederman's (1992, 2006) work has been recognised for laying the foundation of some of the important tenets of the views on NOS (Ibrahim et al., 2009; Kucuk, 2008). Nevertheless, according to Ibrahim et al. (2009), literature has acknowledged that views on NOS are understood differently by scholars, teachers, and learners and that some of the understandings contradict each other. One of the NOS tenets highlighted by literature is the notion that whilst scientific knowledge is developed from empirical processes, it is also influenced by scientists' backgrounds, beliefs, and biases (Ibrahim et al., 2009; Lederman, 2006; National Science Teaching Association [NSTA], 2021).

Consequently, scientific knowledge becomes simultaneously objective and subjective because it is generated through human creativity in addition to systematic observations and is part of social and cultural activities (Lederman, 2006). One of the goals of science education is for learners to develop an understanding of the views on NOS to promote scientific literacy (Tairab, 2001). Accordingly, understanding the views on NOS helps learners recognise the

relationship between science and technology and how that relationship can improve people's lives (Das et al., 2018). However, it has been noted that views on NOS are not taught in most science classrooms, and as a result, some tertiary students may have the same level of understanding of the views on NOS as school learners. Kucuk (2008) confirmed that learners and teachers typically do not have informed views on NOS. The views of learners and teachers in their understanding of NOS can be classified into naïve, transitional, and informed views (Das et al., 2018). In a study conducted in South Africa by Vhurumuku and Dudu (2017), it was found that third-year Bachelor of Education (BEd) preservice teachers' understanding of views on NOS was at the same level as that displayed by Grade 11 learners. Science preservice teachers need to develop adequate views on NOS during their training for them to be able to teach it in their future classrooms. Interventions such as technology-enhanced, inquiry-based, explicit and reflective instruction have been used to improve views on NOS (Das et al., 2018; Schellinger et al., 2019). In this study, I explored how third-year BEd preservice teachers made sense of the contradicting views on NOS after having completed an introductory course on the topic. Therefore, the study sought to address the question: How do physical sciences preservice teachers perceive the dichotomous views on NOS? The study contributes insights to the education of science preservice teachers in the views on NOS.

Views on the Nature of Science

Scientific knowledge and its development, otherwise known as NOS, are considered part of scientific literacy (NSTA, 2021). People use their understanding of NOS to make meaning of the scientific and technological phenomena around them, although this understanding may be flawed (Del Mar Aragon-Mendez, Acevedo-Diaz & Garcia-Carmona, 2019). In addition, NOS is used to understand the natural and the material world, and therefore, it is a way of knowing. NOS has both epistemic and non-epistemic components which are demonstrated as perceptions and views developed through educational experiences. García-Carmona (2021) suggests that learners should be exposed to educational experiences on NOS from an early age to make sure they develop more advanced views and perceptions. In the case of preservice science teachers, sometimes interventions are conducted in order to improve their views on NOS. Köseler and Kalyon (2020) observed that an intervention consisting of the argument-based laboratory method improved the preservice teachers' views on NOS. Erduran et al. (2019) confirm that educational experiences interventions to teach NOS improved preservice teachers' views from being solely epistemic to include other non-epistemic aspects.

It has also been acknowledged that science is a human endeavour in which continual developments make it evolve due to new discoveries (Ibrahim et al., 2009; Lederman, 2006). In the context of continual developments, Nuangchalerm (2009) says that preservice teachers may view science as an enterprise that consists of science, technology and society (STS). Reports that both teachers and learners have varied and limited views on NOS pointed to the complexity of scientific knowledge and practices (Das et al., 2018; NSTA, 2021). The NSTA (2021) indicated that the complexity of scientific knowledge is attributed to the fact that there is no single method to be followed in its development. Due to the existence of multiple methods in the development of scientific knowledge, Gathong and Chamrat (2019) in their study showed that preservice teachers can have traditional views or informed views on NOS. Traditional views are associated with the emphasis put on the objective and reliable nature of science. Under traditional views, the generation of scientific knowledge is believed to be largely dependent on observations. Das, Faikhamta and Punsuvon (2018) further indicate that

views on NOS can be classified as naïve (traditional and/uninformed), transitional (moving from naïve to informed), and informed (complete understanding of NOS).

This complexity of how scientific knowledge is generated could be one reason why learners and teachers may fail to possess informed views on NOS. It is also important to note that the methods of knowledge generation form part of science education and must be included in teaching and learning. Despite the emphasis on the notion that scientific knowledge is based on empirical evidence obtained from observations, there is also a realisation that it can also be developed through imagination, creativity, logical thinking, and theoretical methods (Gathong & Chamrat, 2019; Ibrahim et al., 2009; Lederman, 2006). However, the methods used to develop scientific knowledge are limited to natural means, precluding supernatural approaches (NSTA, 2021). The characteristics used to describe scientific knowledge may seem to be contradicting each other.

From the descriptions of NOS in Lederman (2006) and NSTA (2021), this study assumes that teachers and learners may find the dichotomous nature of scientific knowledge challenging to understand. For example, on the one hand, the use of empirical methods based on observations gives scientific knowledge its objective nature. On the other hand, the fact that scientific knowledge is influenced by biases and is socially and culturally embedded gives it a subjective nature. Whilst scientific knowledge is said to be reliable, it is also ever-evolving and subject to change. There have been calls for teachers to make sure they assist learners in understanding the difference between observations and inferences (NSTA, 2021). Scientific investigations to study nature and materials rely on various methods through observations and inferences (Ibrahim et al., 2009). Lederman's (1992, 2006) work has been recognised in aiding our understanding of NOS (ibid). The views on NOS based on the work of Lederman (1992, 2006) undergird the conceptual and analytical framework in this study. These views on NOS selected to undergird the analytical framework of the study are discussed in the next section under the description of the data collection instrument.

METHODS AND CONTEXT OF STUDY

Using an explorative qualitative approach and interpretivist paradigm, the study sought to explore how the third-year physical sciences preservice teachers made sense of the views on NOS that seemed to contradict each other. To that end, selected open-ended questions from the VNOS instrument by Abd-El-Khalick et al. (2001) were used for data collection. The open-ended items of the questionnaire elicited qualitative data through the preservice teachers' responses to the questions posed. Eight BEd physical sciences preservice teachers were conveniently selected from a 2021 class of 19 students at one South African university after having completed the first unit of a methods course in which views on NOS were taught. The sample was convenient because the preservice teachers who consented to be part of this study were the only ones available to participate in the study. The unit that focused on views on NOS had the following purpose: "to provide learning opportunities that will enable the development of clearer views of the nature of science and how it relates to and differs with other fields of study in theory and practice." The unit of the methods course was taught for four weeks through a two-hour-long online lecture once a week. The instructional method used to teach views on NOS was a mix of lecturer presentations and questioning techniques to generate discussions. The lectures were recorded and made available for use when needed.

Participants of the study

As mentioned in the previous section, the eight participating preservice teachers were in the third year of their BEd studies and enrolled for the first semester of a four-semester methods

course in physical sciences. The researcher extended an invitation to participate in the study to all 19 preservice teachers in the methods course. Only eight consented to participate in the study, and they were a rich source of data because the participants had had opportunities to learn the views on NOS in the first unit of the methods course. The participants were coded as PST1–PST8. PST1–PST3 were female participants, and PST4–PST8 were male participants. However, the influence of gender was not one of the factors being studied. The study sought to explore how the participants understood the dichotomous views on NOS.

Data Collection and Procedures

Most studies use close-ended questionnaires to measure the views on NOS. However, Lederman et al. (2000) suggested using open-ended questionnaires to improve the validity of the study findings. Assuming that open-ended questionnaires improve validity, this study adopted some of the question items published in Abd-El-Khalick et al. (2001). Questionnaire items 1, 3, 5, 11, 12, 13, and 15 from the VNOS instrument by Abd-El-Khalick et al. (2001) were used. The selection of items was purposive in order to elicit the participants' perceptions of the dichotomous views on NOS. The dichotomous views on NOS selected for the study were:

- scientific knowledge is developed through both observations and inferences,
- scientific knowledge is both objective and subjective, and
- scientific knowledge is both reliable and subject to change.

Table 1 shows the dichotomous elements of the views on NOS and the seven selected items from the VNOS instrument by Abd-El-Khalick et al. (2001). The invitation to participate in the study, the questionnaire, and instructions were sent to the participants through the Blackboard learning management system. The participants submitted their responses on the learning management system, and these were collected by the methods course lecturer.

Table 1. *Instrument to Collect Data on the Views on the Nature of Science*

Dichotomous View on NOS	Selected items from the VNOS instrument
Scientific knowledge is developed by means of observations and also through inferences	"What, in your view, is science? What makes science (or a scientific discipline such as physics, biology, etc.) different from other disciplines of inquiry (e.g., religion, philosophy)?" Abd-El-Khalick et al. (2001, p. 1) #1 "Does the development of scientific knowledge require experiments? If yes, explain why. Give an example to defend your position. If no, explain why. Give an example to defend your position." Abd-El-Khalick et al. (2001, p. 1) #3
The objectivity and subjectivity of scientific knowledge: Scientific knowledge is universal and free from biases versus the notion that scientific knowledge is socially and culturally embedded	"If you believe that science is universal, explain why. Defend your answer with examples." Abd-El-Khalick et al. (2001, p. 2) #12 "Scientists perform experiments/investigations when trying to find answers to the questions they put forth. Do scientists use their creativity and imagination during their investigations." Abd-El-Khalick et al. (2001, p. 1) #13 "Please explain why scientists use imagination and creativity. Provide examples if appropriate. If you believe that scientists do not use imagination and creativity, please explain why. Provide examples if

	appropriate." Abd-El-Khalick et al. (2001, p. 2) #15
Scientific knowledge is reliable and subject to change	"After scientists have developed a scientific theory (e.g., atomic theory, evolution theory), does the theory ever change?" Abd-El-Khalick et al. (2001, p. 1) #4 "If you believe that scientific theories do not change, explain why. Defend your answer with examples. If you believe that scientific theories do change: (a) Explain why theories change?" Abd-El-Khalick et al. (2001, p. 1) #5

Data Analysis

The collected data were analysed through qualitative content analysis techniques. The clusters of the questionnaire items under the three dichotomous views on NOS presented in Table 1 constituted the units of analysis. According to Zhang and Wildemuth (2009), a unit of analysis refers to the basic texts defined by the identified themes. All the texts were coded as a way of checking the consistency of the process and to ensure validity. The coded data were grouped and discussed under three themes.

FINDINGS

The study's findings are presented under three themes: the objective and subjective nature of scientific knowledge, development of scientific knowledge through observations and inferences, and scientific knowledge is reliable and subject to change.

The Objective and Subjective Nature of Scientific Knowledge

The participants seemed to acknowledge both the objective and subjective nature of scientific knowledge. They seemed to understand that some scientific ideas can serve as a worldview that people can accept or reject. PST3 indicated that scientific knowledge could be seen as a belief system that may compete with people's religions. She said:

> *Social and cultural values influence the work of scientists, and they also shape them. For example, cultures and societies have expectations that are beliefs, goals, and political views and these influence their (scientists) work. They must enquire if those in authority will accept the theory or not. They also must check if the theory does not tamper with their beliefs, such as religion.*

Similarly, PST5 indicated how values and ethical considerations may determine whether some scientific practices are promoted or not. He said:

> *We are all influenced by the cultures in which we grow up and the societies we live in. Those cultures shape our expectations, values, beliefs, and goals, and scientists are shaped by their cultures and societies, which in turn influence their work. For example, scientists may refuse to participate in certain kinds of research because it conflicts with their beliefs or values*.

PST7 suggested that scientific investigations may be influenced by indigenous knowledge systems entrenched in people's cultures. He mentioned that some scientists dedicate their work to verify some properties of materials that are reflected in people's cultural beliefs and practices. This is what he said:

> *Yes, science is infused with social and cultural values. For example, if it is believed that a certain plant has certain nutrients that can only be found in it, scientists will be prompted to look at this to confirm or deny that claim*.

The participants seemed to believe that scientific practices do not happen in a vacuum and that the developments are influenced one way or the other by other factors in society. PST8 mentioned some of the factors that may propel or hinder scientific advancement. He said:

> *I think science and scientific knowledge reflect the social and cultural values of society. Many factors, such as religion, politics, and the economy, influence the creation and development of scientific knowledge.*

In general, the participating preservice teachers believed that factors in societies and people's ways of life and beliefs might influence how scientific ideas are used and whether the knowledge can be accepted or rejected. However, there seemed to be an understanding that the methods used to produce scientific knowledge are more credible and reliable when they are based on evidence. PST8 emphasised the role of empirical research in the generation of scientific knowledge. He said:

> *Science is the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment. Science is different from other disciplines of inquiry because science is based on empirical research.*

It seemed, however, that the participants perceived scientific knowledge as subjective, based on whether people will accept or reject it as a worldview based on existing beliefs, cultures, and values. The objectivity of scientific knowledge seemed to arise from the methods of knowing based on observations used to generate scientific knowledge as compared to other disciplines such as religion. Therefore, in their consideration of scientific investigations that are based on observations, the participants thought that bias was unacceptable. This was confirmed by PST5 when he said:

> *Science can be defined as any system of knowledge that is concerned with the physical world and its phenomena and entails unbiased observations and systematic experimentations.*

The participants attributed the subjective nature of scientific knowledge to people's cultures, beliefs, and values, whilst they attributed the objective side to some of the methods used to build the knowledge system.

Development of Scientific Knowledge through Observations and Inferences

On analysing the participants' responses on their perceptions of the role of observations and inferences in scientific knowledge-building, there were observed tensions between the emphasis put on observations and the realisation that other methods such as imagination and creativity are also used. PST2 seemed to believe that the observations are important because they provide the evidence on which the scientific knowledge is built. She emphasised the role of verification and proof in determining whether scientific claims can be accepted or not. She said:

> *Experiments are required to gain/develop scientific knowledge, because through experiments, scientists can prove theories or answer questions we may have about the natural world. For something to be accepted in science, the hypothesis should be proven constantly and also proven reliable. The scientific method is utilized to make sure that we learn as much as possible from the experiments. Therefore, we believe that scientific knowledge is required to produce and carry out experiments to get the best possible results or conclusion.*

Similarly, PST4 highlighted that scientists need to conduct observations several times for them to verify results and reach a consensus on the conclusions. He said:

> *According to my knowledge, looking at mathematics as one … scientific knowledge accumulated by systematic study and organized by principles, tests have to be done to test if that developed scientific knowledge is true and can be passed on. Another thing: once it is developed, it will be then passed on to be tested by other scientists, although some will be against it, but they will provide*

> *reason based on principles they have used to say why they disagree; so, yeah, experiments are crucial.*

PST2 and PST4 highlighted the importance of observations, whilst PST3 acknowledged that it may not be possible to explain some scientific concepts based on data from observations conducted but through logical thinking and imagination. PST3 mentioned how scientists could use imagination to build scientific knowledge. She cited atomic theory as an example:

> *Scientists use imagination to provide explanations and to determine further questions that might yield results. For example, it was through imagination that matter consists of small units called atoms.*

The participants seemed to explain how scientific knowledge differed from other disciplines, yet said little or nothing on how it may be similar to the other disciplines. PST1 used observations to describe how scientific knowledge differed from other knowledge systems and the need for scientists to reach a consensus by achieving the same results. She said:

> *The way science is done differs from other disciplines, hence science can be verified by reproducing the same results.*

Whilst emphasising the importance of observations, PST1 also acknowledged the use of other methods based on inferences. She continued:

> *Science is the study of nature. In science, we study through experiments, measurements, as well as observation. Science is different from other disciplines, because it requires evidence to be built around fact and it is also put together through logic with imagination.*

However, some of the attempts to explain how scientific knowledge is different from other knowledge systems seemed to be ambiguous. PST7 seemed not to be acknowledging the theoretical nature of knowledge-building in science when he said:

> *It is a study through observations and experiments in which scientists find reasons why things happen in a certain way. What makes science different from other disciplines of inquiry is that those disciplines (religion and philosophy etc.) are based on ideas and theory.*

It seems as if the participants viewed observations as very important for the development of scientific knowledge, whilst also acknowledging the role of inferences.

Scientific Knowledge is Reliable and Subject to Change

On the notion that scientific knowledge is both reliable and subject to change, some of the participants believed that scientific knowledge is accepted only until new evidence points to different understandings. PST3 believed that scientific knowledge is always being improved, offering as an example the atomic theory. She said:

> *Science is always improving, and it is work in progress. Theories can be modified due to new evidence that emerges. For example, John Dalton proposed the atomic theory, but it was proved not to be limited and was later modified by the other scientists.*

PST6 supported the view that scientific knowledge can change and that some theories can be challenged by people holding alternative views. He said:

> Over time, as technology becomes developed and advanced, more information on *certain theories is discovered, leading to some theories being changed, or rejected. That is why theories change, as scientific research does not cease after result, but it is continuous. For example, a static universe, also called a "stationary" or "Einstein" universe proposed by Albert Einstein in 1917, was challenged by Edwin Hubble's discovery that the universe is constantly expanding.*

The two participants above used events in the history of scientific discoveries to support their beliefs that scientific knowledge keeps evolving as more evidence is made available through continuous research by scientists. They emphasised the notion that scientific knowledge can be improved as more research and scientific investigations are conducted on the topics. However, PST8 and PST5 expressed a different understanding of how scientific knowledge can be reliable and yet evolve at the same time, by putting emphasis on reliability. PST8 thought that there are some aspects of scientific knowledge that can change whilst others do not change. He seemed to imply that if reliable methods are used to build the knowledge, then the results will also be reliable in such a way that it will be difficult to refute the scientific knowledge. In the same paragraph, he acknowledged that theories may change whilst laws stay the same. He said:

> *Scientific laws do not change, because they were verified by the science community. Scientists take [a] long time to discover the various theories and test them to ensure that is true before being published. Theories are constantly changing and can be proven false at any time, but laws will not. For example, evolution as a theory may change as new evidence is discovered, but may also stay as a fact before the new evidence is discovered.*

PST5 seemed to have a similar opinion like the one expressed by PST8 that some theories may stay unchallenged for a considerable length of time. He claimed that some theories discovered years ago are still valid today and are being taught in schools. He said:

> *I believe that all the theories discovered years ago do exist now because we are still applying them now in our daily lives and [they] are still taught in schools.*

Although some of the participants could provide historical proof that scientific knowledge keeps evolving, some of them noticed that there are some theories and concepts that stay unchanged for a long time.

DISCUSSION

This study set out to explore how third-year physical sciences preservice teachers perceived the dichotomous views on NOS. The study contributes insights into how science preservice teachers perceive the views on NOS given that they should teach science in their future classrooms. After attending an online methods course in which NOS was taught, the preservice teachers in this study seemed to hold informed views. Studies confirm that educational interventions can improve preservice teachers' views on NOS (Köseler & Kalyon, 2020; Erduran et al., 2019). The dichotomous views on NOS as perceived by the preservice teachers were epistemic in nature and the concerns seemed to be on how the scientific knowledge could be validated. Erduran et al. (2019) confirm that preservice science teachers have epistemic and non-epistemic views on NOS. The first finding shows that the preservice teachers were aware of the reasons of both the objective and subjective nature of science. Whilst the preservice teachers expressed that science knowledge is developed through systematic experimentations and unbiased observations they also acknowledged that the body of knowledge may be influenced by cultural and political views. This finding is in line with the notion that scientific knowledge can be used as a lens to understand the natural world around us (Del Mar Aragon-Mendez et al., 2019), however, it competes with other socio-cultural and religious lenses that are also available for people to use.

The second finding shows that although the preservice teachers were aware that scientific knowledge could be generated by both observations and inferences, they however seemed to put emphasis on the role of observations. Gathong and Chamrat (2019) also observed that more preservice teachers in their study held this traditional view that scientific knowledge

should be generated through experimentations and observations. This finding may be an indication that the perservice teachers are more comfortable in relying on the observations to teach science in the classrooms in line with some of the ways of learning. The finding may also be an indication of the difficulties they experience in using inferences to learn or to teach science.

The third finding shows that the preservice teachers held informed views on the reliable and changing nature of scientific knowledge. The preservice teachers accepted and were able to explain that although scientific knowledge is reliable it can be improved and change over time. The dichotomy on reliability and change may have been easier for the preservice teachers to understand because they were able to relate the continual scientific and technological advances to NOS. Nuangchalerm (2009) confirms that preservice teachers view NOS as an enterprise that shows the relationship among science, technology and society (STS). Although the views on reliability and changing nature of science were informed, they seemed to be enabled by the traditional view that the preservice teachers held on that scientific knowledge is mainly generated through observations and evidenced based. The preservice teachers seemed to use the ample evidence available in the society of the scientific and technological advances (changing nature) to accept both the reliability and the evolving of NOS.

In this study, assumptions were made that views on NOS are rarely taught in schools (Kucuk, 2008) and that the views of some preservice teachers on NOS are not different from those held by high school learners (Vhurumuku & Dudu, 2017). It is for this reason that the participants' perceptions were elicited after they had covered the topic on the views on NOS in an online classroom environment. Interventions provide learning opportunities to improve learners' views on NOS (Das et al., 2018; Schellinger et al., 2019) and similarly in this study, the preservice teachers demonstrated a degree of informed views after they learnt about NOS. Perceptions on three dichotomous views on NOS were elicited. These are the objectivity and subjectivity of NOS; the role of observations and inferences in the building of scientific knowledge; and the reliability and evolving nature of scientific knowledge.

CONCLUSION

The findings showed that the participants had informed views on NOS dichotomy. However, they emphasised that scientific knowledge is built from evidence collected from observations which in turn put more value on objectivity and reliability. This finding is consistent with the conclusion made by Gathong and Chamrat (2019) that preservice teachers believed in the traditional evidence-based approach of NOS. The participants accepted that scientific knowledge is subjective and continually changing but this seemed to be based on observations they made of how people may use scientific knowledge as a lens to understand the world or opt to use other socio-cultural and religious lenses; and the observed scientific and technological advancements in society. The use of inferences to develop scientific knowledge was known to the preservice teachers but they seemed to undervalue the method. The study findings point to the need to expose science preservice teachers to other scientific investigations and methods of knowledge generation that do not rely on observations and the collection of evidence. Owing to the study design, the findings of this study cannot be generalised. However, the findings have insights that enrich debates on views on NOS and extend knowledge on how preservice teachers understand the views on NOS.

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REFERENCES

Abd-El-Khalick, F., Lederman, N. G., Bell, L., & Schwartz, R. S. (2001). Views of Nature of Science Questionnaire (VNOS): Toward valid and meaningful assessment of learners' conceptions of nature of science. *Proceedings of the Annual Meeting of the Association for the Education of Teachers in Science,* January 18-21, 2001, CostaMesa, CA.

Das, P. M., Faikhamta, C., & Punsuvon, V. (2018). Enhancing Bhutanese students' views of the nature of science in matter and its composition and study of gas laws through an explicit and reflective approach. *Science Education International*, *29*(1), 20-28. https://doi.org/10.33828/sei.v29.i1.3

Del Mar Aragon-Mendez, M., Acevedo-Diaz, J.A. & Garcia-Carmona, A. (2019). Prospective biology teachers' understanding of the nature of science through an analysis of the historical case of Semmelweis and childbed fever. *Cult Stud of Sci Educ*, 14, 525–555. https://doi.org/10.1007/s11422-018-9868-y

Erduran, S., Kaya, E. & Cilekrenkli, A., Akgun, S. & Aksoz, B. (2019). Perceptions of Nature of Science Emerging in Group Discussions: a Comparative Account of Pre-service Teachers from Turkey and England. *International Journal of Science and Mathematics Education*, 19, (1375–1396), https://doi.org/10.1007/s10763-020-10110-9

García-Carmona, A. (2021). Spanish Science Teacher Educators' Preparation, Experiences, and Views About Nature of Science in Science Education. *Science & Education*, https://doi.org/10.1007/s11191-021-00263-6

Gathong, S., & Chamrat, S. (2019). The nature of science views among intern general science pre-service teachers. *Journal of Physics: Conference Series*, Series 1340, 012084. https://doi.org/10.1088/1742-6596/1340/1/012084

Ibrahim, B., Buffler, A., & Lubben, F. (2009). Profiles of freshman physics' views on the nature of science. *Journal of Research in Science Teaching, 46*(3), 248-264.

Köseler, C. & Kalyon, S. (2020). Impact of Argument-Based Laboratory Method on Scientific Process Skills of Pre-Service Primary School Teachers and Their Views of the Nature of Science. *Journal of Curriculum and Teaching,* 9(4), 75- 88. https://doi.org/10.5430/jct.v9n4p75

Kucuk, M. (2008). Improving preservice elementary teachers' views of the nature of science using explicit-reflective teaching in a science, technology and society course. *Australian Journal of Teacher Education, 33*(2). http://dx.doi.org/10.14221/ajte.2008v33n2.1

Lederman, N. G. (1992). Students' and teachers' conceptions of the nature of science: A review of the research. *Journal of Research in Science Teaching, 29*(4), 331-359. https://doi.org/10.1002/tea.3660290404

Lederman, N. G. (2006). Research on Nature of Science: Reflections on the Past, Anticipations of the Future. Asia-Pacific Forum on Science Learning and Teaching, 7(1), 1-11.

Lederman, N. G., Abd-El-Khalick, F., Bell, R., & Schwartz, S. (2000). Views on the Nature of Science Questionnaire: Towards a valid and meaningful assessment of learners' conceptions of the nature of science. *Journal of Research in Science Teaching, 39,* 497-521. https://doi.org/10.1002/tea.10034

National Science Teaching Association (NSTA). (2021). *NSTA position statement: Nature of science*. https://www.nsta.org/nstas-official-positions/nature-science

Nuangchalerm, P. (2009). Preservice teachers perception about Nature of Science. *The Social Sciences,* 4(5), 43- 467.

Schellinger, J., Mendenhall, A., Alemanne, N., Southerland, S. A., Sampson, V., & Marty, P. (2019). Using technology-enhanced inquiry-based instruction to foster the

development of elementary students' views on the nature of science. *Journal of Science Education and Technology*, *28*, 341-352. https://doi.org/10.1007/s10956-019-09771-1

Tairab, H. H. (2001). Preservice teachers' views of the nature of science and technology before and after a science teaching methods course. *Research in Education*, *65*(1), 81-87. https://doi.org/10.7227/RIE.65.7

Vhurumuku, E., & Dudu, W. T. (2017). A comparison of South Africa Grade 11 learners' and preservice teachers' understandings of nature of science. *The Online Journal of New Horizons in Education*, *7*(2), 1-5.

Yalçin, S. A., & Yalçina, S. (2011). Analyzing elementary teachers' views on the nature of science according to their academic levels. *Procedia – Social and Behavioral Sciences*, *15*, 942-946. https://doi.org/10.1016/j.sbspro.2011.03.217

Zhang, Y., & Wildemuth, B. M. (2009). Qualitative analysis of content. In B. M. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 1-12). Libraries Unlimited.

REDUCING THE ABSTRACT NATURE OF CHEMISTRY THROUGH SCIENCE-TECHNOLOGY-SOCIETY INSTRUCTIONAL APPROACH

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Abstract
One of the major challenges of teaching and learning chemistry is the abstract nature of the topics/concepts. The chemistry contents through abstract deals with the individual's daily life. An instructional approach that relates the chemistry contents to the daily activities of the learner might surmount the problem of abstraction in chemistry. This paper presents the science-technology-society instructional approach as an effective approach capable of reducing the abstract nature of chemistry contents. Some recommendations are: School owners should organize and sponsor workshops for chemistry teachers on the use of STS instructional approach; Teaching resources in chemistry should as much as possible be generated from the learners' locality by the curriculum planners and teachers.
Keywords: Science-technology-society instructional approach, abstract nature of chemistry

INTRODUCTION

Science and technology occupy a position of utmost importance in modern society. The two form an integral part of every modern culture. Societies are classified as developed and underdeveloped based on their level of development and sophistication in science and technology development (Igboanugo & Egolum, 2017). This stresses the importance of science and technology in building the modern nation. Thus, science and technology are synonymous with the modern society. A major fulcrum of science and technology is chemistry.

The teaching and learning of chemistry are concerned with enhancing the learner's intellectual ability and skills in understanding and control of the natural phenomena (Igboanugo, 2018). This would pave way for both individuals' survival in the society and nation building. The understanding and control of the natural phenomena are embedded in the chemistry contents (FME, 2007). This indicates the need for careful and proper presentation of chemistry contents by the teacher in such a way that will ensure students' understanding of the contents for easy assimilation and transfer of learning.

Researchers have attested to the abstract nature of the chemistry contents (Aniodoh & Eze, 2014; Njoku, 2015). Most of the chemistry contents exist in thought and idea without having physical reality. This makes teaching and learning of chemistry difficult, which would greatly contribute to the recorded perennial learners' poor achievement and performance in chemistry (Igboanugo, 2019).The Senior Secondary School Chemistry Curriculum organized chemistry content around four themes namely Chemical world; Chemistry and environment; Chemistry and industry; Chemistry and life (FME, 2007). The themes specify the study of chemistry as science in relation to the world, the environment and the industry which are aspects of the society interlocked with technology. Igboanugo (2018) describes these

chemistry themes as science-technology-society (STS) based. The implication being that chemistry instructions that are not STS based might not bear the expected result.

Some studies have affirmed the usefulness of STS instructional approach in realizing educational objectives in sciences. Dass (2005) explored the impact of STS instructional approach on pre-service science teachers' understanding of the visions of the contemporary science education reform in the secondary schools and their attitudes towards contributing to the reform. The study among other things discovered that the pre-service science teachers agreed on usefulness of STS instructional approach for secondary school education reform. Again, Igboanugo (2018, 2019) discovered that STS instructional approach is not only effective in improving senior secondary school students' achievement and interest in chemistry but also bridges the gap between male and female achievements and interests in chemistry.

However, most secondary school chemistry teachers lack the knowledge, zeal and tactfulness in using such innovative instructional approach as the STS instructional approach. This article might be necessary for proper disposition of secondary school chemistry teachers in the use of STS instructional approach during chemistry instruction to help reduce the abstract nature of chemistry contents.

Background of STS Instructional Approach

STS instructional approach is an innovative approach that is activity-based (Igboanugo, 2019). It relates instruction to the life experiences of the student. STS instructional approach is basically a constructivist approach to teaching. The constructivists generally believe on student-centered instruction. For learning to take place, the learner must be actively involved in teaching and learning process (Udoh & Ado, 2016). This is in line with the tenets of STS instructional approach. Among the constructivist theories which are supportive of STS instructional approach are the Jean Piaget cognitive theory and Lev Vygotsky Social theory.

Tracing the historical development of STS approach, Mansour (2007) narrated that the teaching of science in the schools in the earlier decades had been by a system in which science was taught as a body of knowledge. Science therefore was taught for the scientists. The approach of teaching science as a body of knowledge made science subjects difficult to the students compared to other subjects. Only very intelligent students could study science subjects because of the abstract nature of the science concepts. Teaching of science subjects were divorced from technology and considered solely as pure rather than as applied subjects. There was little or no reference made to the daily issues experienced by the students in their environment by this teaching approach. The method of teaching, in this case, was such that the teacher supplied the answers to the students during experiments. This approach in teaching science as a body of knowledge could not cope with changes in the trends of events worldwide (Udoh, Ohaju, & Ado, 2016). Thus, changes in the trends of events worldwide must have made it clear the need for changes in science curricula and the methods of delivery.

The later method of teaching science subjects emerged from curricula developed from the sputnik and similar projects. In the curricula that were developed from these projects, emphasis in the science subjects was conceptual understanding of unifying themes and/or major theories and learning was from both experimentation and model making (Akpan, 2015). Some examples of projects developed in this manner during the late 1950s and early

1960s according to Akpan were the Chemical Materials (Chem) Study in the US and the Nuffield programs in the UK.

These programmes gave students an in-depth view of science rather than a mere collection of facts. They were amplified by sub-divisions of cognitive skills, an emphasis on inquiry skills and recognition of a hierarchy based on Bloom's taxonomy. The teaching of science worldwide was greatly influenced by such courses formed later in the 1960s which anchored on modern technology development.

There is the recognition that changes in the man-made world around us today are based on technology. Science becomes less visible and yet to obtain a more technologically literate society, there is need for people to receive a more relevant grounding in science (Mbajiorgu, 2014). This grounding involves the technology that surrounds the students and in addition, the issues and conflicts that are related to the use of that technology in society. It, furthermore, demands an understanding of science relation to technology and informed opinions on the likely advantages and disadvantages of promoting various technologies. This leads to recognition of problems, considerations of how to solve problems and an ability to make decisions based on sound judgment which brings about changes in societal values.

These changes in societal values prompted educationists to start advocating for a change in the objective to science teaching. They advocated for the consideration of science from a societal viewpoint rather than that of a scientist. In this approach, emphasis is on responsible decision making concerning any issue in the real world of the student. In a bid to adopt this approach to science teaching, a new reform in science education across the globe emerged.

For enhanced global competitiveness in the country like Nigeria and most other African countries, there is the need for transformation in the economy and social setting of our society from traditional to modern one through science and technology. Since chemistry is the fulcrum of science and technology, serious attention should be paid to its teaching and learning within the context of technology and society. This calls for attention to be paid to STS approach of instruction.

STS in Chemistry Instruction

STS approach in teaching chemistry entails the application of chemistry through technology to solve a host of problems that challenge humans within their environment. The interaction among chemistry, technology and society can be represented symbolically as shown in Figure 1 below.

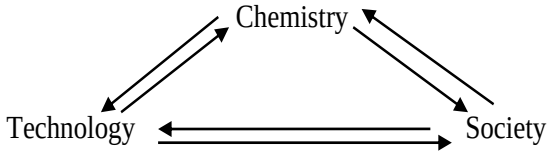

Figure 1. Interaction among chemistry, technology and society adapted from Teetito (2000).

The above inter-relatedness portrays the view that technology is the medium through which chemistry services the society. It indicates that technology is the means that is used to apply the fundamental truths of chemistry to physical, social, economical or cultural problems of man. To make life easier in the society, knowledge of chemistry is applied to produce goods and services that facilitate lives in the areas of transport, medicine, fuel power, food, pollution control, etc. Here, the technologies are the products of science. By the same

token, the social sciences of economics, banking, insurance, jurisprudence, etc. arose as a result of the exchange of goods and services which are the products of technology. Modern languages have also involved in the process of producing food, building shelters, producing clothes, moving about and exchanging goods and services with other people within and outside each society. The words that human beings use most constitute the vocabulary of technological pursuits. The idea of STS is to provide real-world connection for the student between the classroom and the society. It gives learners practice in identifying potential problems, collecting data about the problems, considering alternative solutions and consequences based on a particular decision.

Eleven features of STS that indicate human context and instructional approaches over curriculum contents are identified by National Science Teachers Association (NSTA) of America (Yager, Choi, Yager & Akcay, 2009, p.17). These features are as follows:

- Student's identification of problem with local interest and impact.
- The use of local resources (human and material) to locate information that can be used in problem resolution.
- The active involvement of students in seeking information that can be applied to solve life problems.
- The extension of learning beyond the class period, the classroom, and the school.
- A focus upon the impact of science and technology on individual student.
- A view that science content is more than concepts that exist for students to master and reproduce on tests and examinations.
- An emphasis upon process skills which students can use in their problem resolution.
- An emphasis upon career awareness, especially career related to science and technology.
- Opportunities for students to act in their communities as they attempt to resolve issues they have identified.
- Identification of ways that science and technology are likely to impact the future.
- Some autonomy in learning process (as individual issues are identified and considered)

From the features of STS listed above, it can be observed that the main aim of STS approach to chemistry teaching is to produce an informed citizenry capable of making crucial decision about their current problems and issues and taking personal or group actions as a result of these informed decisions to resolve the issues. The emphasis is on responsible decision making in the real social, economic, and cultural contexts of the students.

The STS instructional approach in teaching and learning Chemistry considers an issue as follows:

- Is it a problem?
- How did it become a problem or issue?
- What are the alternative approaches to its solution?
- What are the potential effects of applying the alternative solutions on the individual and/or the society?

From these questions, STS approach to Chemistry teaching means focusing Chemistry teaching and learning on real-life problems, which have Chemistry and technology components from students' perspective, rather than starting with science-based concepts and processes. Students' perspective implies that the contents and strategies used in STS approach to Chemistry teaching takes into consideration the entry behaviours of the learners

at whatever level they are studying. What may constitute a problem to the students may not be so to the Chemistry teacher (Njoku, 2009). Thus, the Chemistry teacher remains the motivator of learning while the learner discovers his/her strengths, potentialities and even weaknesses for perfect citizenry. The learner becomes the perfect citizen when he/she is able to utilize the Chemistry acquired knowledge and skills to solve personal or societal problems.

STS instructional approach in Chemistry teaching should be seen as a utilitarian approach. This implies that rather than starting from chemical concepts, laws, and theories the Chemistry teacher can start his or her teaching with applications of concepts, laws, and theories to real life issues in the socio-economic and cultural environment of the learners. Relevant questions and ideas that provide linkages or connections to issues in the environment and to problems of the society are used to arrive at concepts, theories, and laws of Chemistry. The Chemistry teacher should ask him or herself questions about relationship between the Chemistry content being taught and everyday activities, problems, and observation of the learners. For instance, Enedoh (2015) suggests that in teaching metals, the teacher should start by leading the students in a captivating manner to list the utility values of metals.

The student's initial knowledge of the utility value of a Chemistry topic/concept could be made known through appropriate questioning. In Njoku (2009, p.52) some questions that can connect learners' daily experiences/observation with the world of Chemistry concepts are enumerated as follows:

- What makes soup sour?
- What makes the dough rise on mixing with yeast?
- Why does gun powder burn rapidly?
- Why does coca-cola soft drink release gas when it is opened?
- Why does a gunshot explode with a bang?
- Is sand a mixture or a compound?
- What makes some unripe fruits sour to taste?
- Why does fresh palm wine produce plenty of gas bubbles (foaming rapidly) while stale one remains flat (does not produce foams)?
- Why does burning plastics smell?
- What are the chemical differences between firewood and its ash after burning? etc

These and similar questions, according to Njoku, confront the students daily in their efforts to explain and interpret events and observations in their environment. The questions are rooted in basic concepts in Chemistry although they relate to ordinary observations in the socio-economic environment of the learners. Chemistry interface with technology and the society will effectively provide solutions to such puzzles found in the students' environment in the Chemistry class which is the basis of STS instructional approach. Chemistry teachers therefore should arrange the Chemistry contents in such ways as to achieve goals of teaching Chemistry.

The Chemistry teacher using STS instructional approach is a motivator, facilitator, and a friend. He/she should be fully involved in the process of leading the students to achieve the objectives of Chemistry lessons. The teacher needs to place at the disposal of the learners all the facilities that will assist them in exploring and exploiting the environment and interacting meaningfully with materials provided for the study of Chemistry. Through STS instructional approach, Chemistry learning becomes interesting and challenging to the learner; therefore,

improvement in interest and achievement can be assured. According to Obi and Amba (2013) students' achievement in Chemistry can be improved when the topic or concept to be learnt is related even to the kitchen activities. For instance, activities taking place in the refrigerator can be used to teach change of state. Titration can be taught using juice from unripe lemon as acid, ashes of roasted plantain peels dissolved in water and filtered to serve as base and red cabbage to serve as indicator.

The following are some Chemistry concepts and matching challenging/interesting questions based on daily life experiences that can connect the learners' daily experiences/observations with the world of related Chemistry concepts:

- Properties of acids: What makes soup go sour? Why do some unripe fruits taste sour?
- Fermentation/Kinetic theory of gases: Why does corked bottle filled to the brim with fresh palm wine shatter on standing?
- Hardness of water: Why does certain water unable to lather easily with soap?
- Solubility: Why does alcohol mix easily with water while kerosene does not mix with water?
- Separation technique: Why should mixture of iron filings and sulphur be separable using the bar magnet?
- Sublimation: Why does camphor put in a box disappear after a time?
- Condensation of water vapour/Air as a mixture: Why do water droplets appear on the outer part of a glass that contains ice or very cold water?

Again, the Chemistry teacher who adopts STS approach can derive his/her lesson from issues related to products and utility orientation of Chemistry. This means making the technological contents prominent among the related basic Chemistry concepts underlying such technologies.
By this, emphasis is laid on process skills. The following can serve as examples:

- Soap: What are its uses? How is it made? What are the raw materials? How can the raw materials be obtained? Has soap any negative effects on the individual, society or environment? What are the remedies to the negative effects?
- Water: What are its uses? What are its sources? What are the types? What is its cycle? What are the sources of its impurities? How can it be purified?
- Pollution: How does our environment become polluted? What are the pollutants? What are the agents of pollution? What are the effects of pollution? How can pollution be controlled?
- Mixtures: Have you ever formed a mixture? How can you separate the components of the mixture you formed? What are the mixtures found in nature? Can you differentiate between a mixture and any substance that is not a mixture?
- Iron: what are uses of iron? What is the iron ore? In which geographical state/s can iron ore be found in Nigeria? What makes iron rust? What are the negative effects of rust? How can rust be prevented?
- Petroleum: Why is petroleum a mixture? What technique is used in oil refinery? What are the products of petroleum? What are the uses of petroleum products? Which are the oil states in Nigeria? What are the petrochemicals? What are the negative effects of petroleum in our environment and economy?
- Dilution: When a palm wine tapper adds water to the sap to get more liters of the sap, what is he/she doing to the content (concentration) of the sap? What then is the

relationship between the concentration (C) and the volume (V) of the sap as the wine tapper adds water to the sap?

From the foregoing, STS instructional approach reduces the abstract nature of chemistry by relating chemistry contents to the learner's daily experience. Also, the learner is an active participant in the course of chemistry instruction. However, most chemistry teachers insist on using the conventional instructional approach not minding the ineffectiveness of the conventional instructional approach (Igboanugo, 2018). This could be due to unawareness or ineptitude of chemistry teachers in the use of STS instructional approach.

CONCLUSION

Effort should be made to reduce the abstract nature of Chemistry concepts so that easy understanding and transfer of Chemistry knowledge for national growth is ensured. This could be achieved by relating Chemistry concepts to the learner's social environment through STS instructional approach in Chemistry instruction. Through STS instructional approach Chemistry instruction could be made part of the learner's culture. The learner will be able to translate the abstract concepts in Chemistry into technology and social realities. Thus, sensitization of teachers and stakeholders in Chemistry education on the use of the STS instructional approach might be imperative.

Recommendations

From the foregoing, the following recommendations are made:

- School owners should organize and sponsor workshops for chemistry teachers on the use of STS instructional approach
- Government agencies and professional bodies and like Ministry of Education and Science Teachers Association of Nigeria should organize seminars, workshops and encourage publications on use of STS instructional approach in chemistry instruction
- Teaching resources in chemistry should as much as possible be generated from the learners' locality by the curriculum planners and teachers
- STS instructional approach should be emphasized and incorporated into the Chemistry-teacher education curriculum in tertiary institutions of learning.

REFERENCES

Akpan, B.B. (2015). The place of science education in Nigeria for global competitiveness. *Journal of Science Teachers Association of Nigeria, 50*(1), 1-23.

Aniodoh, H. C.O. & Eze, G. N. (2014). Achieving effectiveness in secondary school chemistry classrooms using constructivist approach: a case study of physical and chemical changes. In Z. C. Njoku (Ed), STEM education and creativity: *55th Annual Conference of Science Teachers Association of Nigeria* (pp.247-252), Ibadan HEBN. press

Dass, P.M. (2005). Using science technology approach to prepare reform-oriented science teachers: The case of a secondary school method course. *Issues in Teacher Education, 3(2),* 2-12.

Federal Ministry of Education (2007). *Senior secondary education curriculum Chemistry for SS1-3*. Abuja. NERDC publishers.

Igboanugo, B. I. (2018). Interactive effects of science-technology-society instructional approach, teacher experience, gender and school location on students' achievement and interest in Chemistry. *Unpublished Ph.D. Thesis, University of Nigeria Nsukka, Enugu State, Nigeria*

Igboanugo, B. I. (2019). Effects of teacher year of experience on the use of innovative instructional approach in Chemistry instruction: A case study of science-technology-society instructional approach. *Global Journal of Education, Humanities and Management Sciences,1*(2), 32-44.

Igboanugo, B.I.&Egolum, E.O. (2017). Strategies for making science, technology and mathematics (STM). In A. S. Ifamuyiwa (Ed), STEM and society: 60*th Anniversary Conference of Science Teachers Association of Nigeria* (pp.8-12) *Abuja, The STAN Place press*.

Mansour, N. (2007). Challenges to STS education: Implication for Science Teacher Education. *Bulletin of Science, Technology and Society, 6*(27), 482-497.

Mbajiorgu, N. (2014). Science and Technology Education: Instruments for national transformation and global competiveness. *Journal of Science Teachers Association of Nigeria, 49*(1), 116-135.

Njoku, Z. C. (2009). Enhancing the relevance of Chemistry curriculum delivery using science-technology-society (STS) approach. In *Holbrook, J.&Eninyeju, P. C. (ed), Proceedings of African Regional Conference of International Council of Associations for Science Education (pp.48-54*.) Cape Town, Reach press.

Njoku, Z.C. (2015). Resolving students' learning difficulties in secondary School Chemistry. *Paper presented at the ISTE International Conference on Mathematics, Science and Technology Education. Oct.* 25th-30th, 2015 *Mopani Camp, Kruga National Park, Limpopo, South Africa*

Obi, N.C. & Amba, N.H. (2013). Kitchen resources, school location and academic achievement of senior secondary school 2 Chemistry students. *IORS Journal of Research and Method in Education, 1(*6), 56-59. www.iosrjournals.org

Teetito, A.E. (2000). Effective use of the STS approach to science teaching: A lead paper. In U.S Nzewi (Ed) *Proceedings of Science Teachers Association of Nigeria, STS panel workshop on effective use of STS approach to science teaching*, (21-36), Ibadan, STAN.

Udoh, N.M.; Ohaju, J.O. & Ado, B.I. (2016). Extent of utilization of computer assisted instruction (CAI) by science teachers in senior secondary schools for effective instructional delivery in Abak Local education committee. In Z. C. Njoku (Ed) *56th Annual Conference of Science Teachers Association of Nigeria* (pp.39-43), *Nsukka,University Press*.

Yager, R.E., Choi, A., Yager, S.O. & Akcay, H. (2009). Comparing science learning among 4th-, 5th-, and 6th-grade students: STS versus textbook-based instruction. *Journal of Elementary Science Education, 21*(2), 15-24.

INFLUENCE OF PRESCHOOL PRACTITIONERS' DEMOGRAPHIC CHARACTERISTICS ON THEIR CLASSROOM DISCIPLINE PRACTICES: A QUANTITATIVE RESEARCH APPROACH

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Abstract
The successful control of children's behavior in the classroom with various discipline strategies has been a key source of concern among preschool practitioners. Despite the importance of classroom discipline in managing children's disruptive behavior, there appears to be a knowledge gap regarding the impact of preschool teachers' demographic characteristics on their discipline practices. As a result, the impact of preschool teachers' demographic traits on their classroom discipline techniques was quantified in this study within the context of assertive discipline technique and authoritarian behavioural theory. The study used an ex-post facto research design with a sample of 156 preschool practitioners in Enugu State's Nsukka Education Zone. Data was collected using a preschool practitioners' discipline practices questionnaire developed by the researchers and adequately validated. Using the Cronbach alpha method, the internal consistency reliability index of the questionnaire items was found to be 0.89. The information gathered were analyzed using descriptive and inferential statistics. The outcomes of the study revealed that the preschool teachers' age and marital status had a substantial ($p < .05$) impact on their classroom disciplining techniques. As a result, it was determined that the age and marital status of preschool teachers have a significant impact on their classroom discipline practices. It was thus recommended that teachers age and marital status should be prioritized by the Local Government Education Authority when recruiting preschool teachers
Keywords: Classroom discipline, Classroom management, Discipline practices, Demographic characteristics, Quantitative research, Preschool practitioners

INTRODUCTION

Discipline in schools, particularly in preschools and primary schools, has long been a source of worry for early childhood educators around the world (Okeke, Ugwuanyi, Okeke, Ugwu, Ngwoke, Ifelunni, Aye & Nnamdi, 2021). This has been the situation since the use of corporal punishment in the discipline of in-school children was abolished (Okeke et al., 2021). It has been noticed that one of the issues of international concern in which teachers are instructed on how and why children's behavior should be regulated in their classrooms is classroom discipline (Ho, Grieshaber & Walsh, 2017). Teachers that employ detentions and suspensions as discipline measures are common in most schools, even though they have been proved to be unsuccessful in reducing classroom misbehavior (Fadus, Valadez, Bryant, Garcia, Neelon, Tomko & Squeglia, 2021). A study was done to investigate in-school children's experiences with a variety of behavior management tactics used by preschool teachers in response to their behavior (Gansen, 2020). Positive discipline as a school-level disciplinary practice/culture has been found to help alleviate disciplinary inequities present in some preschool classrooms (Gansen, 2020).

According to Garro, Giordano, Gubi & Shortway (2021), applying prejudice and exclusionary discipline might be problematic, however adopting consultative discipline practice can result in positive classroom behavior management. Empirical data indicates that politicians, educators, and academics favor restorative disciplinary techniques that focus on mending harm rather than penalizing misconduct (Lustick, 2017). Teachers that utilize positive behavior intervention and support, such as providing opportunities to respond to children's classroom behavior, utilizing behavior specific praise, and using pre-corrections, among other things, produce superior learning environments, according to Kennedy, Hirsch, Rodgers, Bruce and Lloyd (2017). According to Gregory and Roberts (2017), most teachers will issue official discipline referrals to disruptive pupils, who will then be requested to leave the classroom and report to the administration offices for necessary discipline actions to be taken. According to Gansen (2019), classroom disciplinary interactions play a crucial effect in children's early socialization. In a similar line, gendered disciplinary responses to children's misbehavior in preschool classes have been linked to gendered ideas among preschool teachers (Gansen, 2019). Monnat, Lounsbery, Mckenzie and Faye (2016) discovered that demographic variables at the school level, such as racial/ ethnic and socioeconomic makeup, as well as urban-rural status, influenced children's school physical activity. Positive views toward harsh discipline, instructors' teaching experiences, stress, and other demographic characteristics are all drivers of teachers' discipline practices, according to the findings (Masath, Hindze, Nkuba & Hecker, 2021). Teachers' expectations were found to have a substantial impact on their discipline practices in school, regardless of race, with pupils who were held to lower standards by their teachers receiving more punishment than their counterparts who were held to higher expectations by their teachers (Santiago-rosario, Whitcomb, Pearlman & Mcintosh, 2021). The types of punishment tactics employed on school students were shown to be significantly influenced by family structure and race (Fadus et al., 2021). According to the findings, kids of colored origin, particularly Black pupils, had significantly greater rates of school discipline than White students (Girvan, McIntosh & Santiago-Rosario, 2021).

The preceding demonstrated that teachers' and learners' demographic factors have an impact on how they use classroom discipline practices. However, a study of related literature revealed that few studies on the subject have been done, with the majority of them taking place in the United States of America. It was heartbreaking to learn that none of these research studies had been undertaken in Africa, let alone Nigeria. This study was prompted by a gap in the literature. This research explored the influence of preschool practitioners' demographic characteristics on their classroom discipline practices. Specifically, this research sought the influence of

1. age of preschool practitioners on their classroom discipline practices
2. marital status of preschool practitioners on their classroom discipline practices

Research questions

The following research questions were posed for the study

1. What is the influence of age of preschool practitioners on their classroom discipline practices?
2. What is the influence of marital status of preschool practitioners on their classroom discipline practices?

Hypotheses

Ho_1: Age of preschool practitioners had no significant influence on their classroom discipline practices.

Ho2: Marital status of preschool practitioners had no significant influence on their classroom discipline practices.

Theoretical Background

According to Canter (1976), utilizing the assertive discipline technique and authoritarian behavioural theory, classroom management can be enhanced. This can be accomplished by creating an environment in the classroom that fosters mutual respect and equality between the teacher and the pupils. The foundation of this approach is for teachers to develop prevention measures to prevent students from exhibiting disciplinary difficulties or misbehavior. This is usually accomplished by teachers issuing instructions based on the learners' expectations at the outset. According to Canter, this technique accidentally improves the classroom management of disruptive and attention concerns. Furthermore, assertive discipline includes a focus on classroom norms, efforts to provide positive feedback based on respect for the teachers' instructions, and a consistent implementation of discipline measures to reduce disciplinary problems in the classroom. This hypothesis is important to this study since the researchers wanted to learn about preschool teachers' classroom discipline practices in the post-corporal punishment period.

METHOD

Design of the study

For this study, an ex-post facto research design was used, which is a type of quantitative research. The researchers were able to investigate the causal linkages between the independent factors (age and marital status) and the dependent variable using this approach because the independent variables were not manipulated. The independent variables in this case cannot be changed because they existed before to the investigation.

Participants

A total of 156 preschool teachers from the Nsukka Education Zone in Enugu State, Nigeria, took part in the study. Using a simple random sampling procedure, this sample was drawn from the population of 1,768 preschool practitioners in the Nsukka Education Zone. In the first stage, a simple random selection procedure was employed to select 24 primary schools from the study area's total population of primary schools. Following that, preschool teachers at the sampled schools were randomly selected using a simple random sampling technique. This method of sampling was employed to ensure that every preschool teacher had an equal chance of participating in the study.

Measure

The data were gathered via a questionnaire prepared by the researchers on the discipline practices of preschool teachers. The questionnaire consisted of 34 questions that gathered information on the participants' demographics as well as classroom discipline tactics. To put it another way, the questionnaire was divided into two sections: section A and section B. The researchers were able to collect demographic information from the participants in Section A, and information on the preschool practitioners' classroom discipline tactics in Section B. The items of the questionnaire were structured on 4-point Likert scale of strongly agree with a weighting of 4, agree with a weighting of 3, disagree with a weighting of 2, strongly disagree with a weighting of 1.

Validity and reliability of measure

Two experts in early childhood care and education, as well as one expert in educational research, measurement, and evaluation, all from the University of Nigeria, Nsukka's Faculty

of Education, face validated the instrument/measure. The specialists were tasked with vetting the instrument's items in light of the study's goals. The validators' feedback was used to make changes to the instrument prior to trial testing. Following that, 20 preschool teachers who were not part of the study were given copies of the instrument. To establish the internal consistency dependability of the instrument's items, the data were subjected to a Cronbach alpha reliability estimate. The results of the analysis showed a reliability index of 0.89.

Ethical consideration statement

The University of Nigeria's committee on research ethics gave its permission for the study's conduct. In addition, prior to the data collection, participants were given informed consent forms to sign.

Data collection procedure

Permission letters to access the study locations were obtained in a timely manner from the Headteachers of each of the schools involved in the study. Visits to each of the schools involved in the study allowed for data collecting. As a result, an on-the-spot technique of administering the instrument was chosen. In other words, copies of the instrument were sent to participants at their respective schools, and they were given 30 minutes to respond to the items before being collected.

Data analysis

To answer the study questions and test the relevant hypotheses, the data was analyzed using mean and analysis of variance. The research questions were answered using the mean, whereas the hypotheses were examined using analysis of variance at 5% probability levels.

RESULTS

Research Question One: What is the influence of age of preschool practitioners on their classroom discipline practices?

Table 1. Mean analysis of the discipline practices scores of preschool practitioners based on their age

Age	n	Mean	Std. Deviation
20-26 years	29	89.41	29.82
27-30 years	45	102.46	16.71
31-35 years	33	106.72	16.48
36 years and above	58	105.34	17.07
Total	165	102.03	20.43

Table 1 showed that the 20-26 years preschool practitioners had mean score of (M = 89.41, SD = 29.82), 27-30 years preschool practitioners had mean score of (M = 102.46, SD = 16.71), 31-35 years preschool practitioners had mean score of (M = 106.72, SD = 16.48), while 36 years and above preschool practitioners had mean score of (M = 105.34, SD = 17.07). This showed that the 31-35 years preschool practitioners had the greatest mean discipline strategy followed by 36 years and above preschool practitioners.

Ho_1: Age of preschool practitioners had no significant influence on their classroom discipline practices.

Table 2. Analysis of variance of the influence of age of preschool practitioners on their classroom discipline practices

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5989.898	3	1996.633	5.144	.002
Within Groups	62497.883	161	388.186		
Total	68487.782	164			

Table 2 revealed that age of preschool practitioners had a significant influence on their classroom discipline practices, F (3,161) = 5.144, p = .002. Thus, the null hypothesis was rejected, $p < .05$. Besides, Table 3 indicated that the mean difference between the mean score of the 31-35 years preschool practitioners and 20-26 years preschool practitioners contributed most to the significant influence of age on their classroom discipline practices.

Table 3. Post Hoc pairwise comparison tests for the significant influence of age

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
20-26 years	27-30 years	-13.05287*	4.69170	.030	-25.2328	-.8729
	31-35 years	-17.31348*	5.01487	.004	-30.3324	-4.2946
	36 years and above	-15.93103*	4.48091	.003	-27.5638	-4.2983
27-30 years	20-26 years	13.05287*	4.69170	.030	.8729	25.2328
	31-35 years	-4.26061	4.51548	.781	-15.9831	7.4619
	36 years and above	-2.87816	3.91398	.883	-13.0391	7.2828
31-35 years	20-26 years	17.31348*	5.01487	.004	4.2946	30.3324
	27-30 years	4.26061	4.51548	.781	-7.4619	15.9831
	36 years and above	1.38245	4.29605	.988	-9.7704	12.5353
36 years and above	20-26 years	15.93103*	4.48091	.003	4.2983	27.5638
	27-30 years	2.87816	3.91398	.883	-7.2828	13.0391
	31-35 years	-1.38245	4.29605	.988	-12.5353	9.7704

*. The mean difference is significant at the 0.05 level.

Research Question Two: What is the influence of marital status of preschool practitioners on their classroom discipline practices?

Table 4. Mean analysis of the discipline practices scores of preschool practitioners based on their marital status

Marital status	n	Mean	Std. Deviation
Single	45	101.20	20.71
Married	115	105.95	13.85
Divorced	5	78.80	33.74
Total	165	103.83	17.33

Table 4 showed that the preschool practitioners who are single had mean score of (M = 101.20, SD = 20.71), those who are married had mean score of (M = 105.95, SD = 13.85), while those who are divorced had mean score of (M = 78.80, SD = 33.74). This implies that preschool practitioners who are married had the greater mean discipline practices among others.

Ho2: Marital status of preschool practitioners had no significant influence on their classroom discipline practices.

Table 5. Analysis of variance of the influence of marital status of preschool practitioners on their classroom discipline practices

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3963.799	2	1981.900	7.084	.001
Within Groups	45322.783	162	279.770		
Total	49286.582	164			

Table 5 revealed that marital status of preschool practitioners had a significant influence on their classroom discipline practices, F (3,161) = 7.084, p = .001. Thus, the null hypothesis was rejected, $p < .05$. Besides, Table 6 indicated that the mean difference between the mean score of the preschool practitioners who are married and those who are divorced contributed most to the significant influence of marital status on their classroom discipline practices

Table 6. Post Hoc pairwise comparison tests for the significant influence of marital status

(I) Marital Status	(J) Marital Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Single	Married	-4.75652	2.94107	.241	-11.7135	2.2004
	Divorced	22.40000*	7.88487	.014	3.7487	41.0513

(I) Marital	(J) Marital	Mean	Std.	Sig.	95% Confidence Interval	
Married	Single	4.75652	2.94107	.241	-2.2004	11.7135
	Divorced	27.15652*	7.64113	.001	9.0818	45.2313
Divorced	Single	-22.40000*	7.88487	.014	-41.0513	-3.7487
	Married	-27.15652*	7.64113	.001	-45.2313	-9.0818

*. The mean difference is significant at the 0.05 level.

DISCUSSION OF FINDINGS

The impact of preschool teachers' age and marital status on their classroom discipline techniques was investigated in this study. Because no such study had been undertaken in the research area and most portions of the African content, this investigation was required. The study's findings revealed that the preschool teachers' age and marital status had a substantial impact on their classroom discipline techniques. In this context, it was discovered that younger preschool teachers do not use classroom discipline practices as effectively as older preschool teachers. Similarly, married preschool teachers were shown to use classroom discipline practices more effectively than single and divorced preschool teachers. These findings are consistent with previous research that revealed that demographic factors of learners and teachers have an impact on teachers' classroom discipline techniques.

Masath et al. (2021) supported these findings by demonstrating that positive views toward harsh discipline, instructors' teaching experiences, stress, and other demographic characteristics all influence teachers' discipline practices. Monnat et al. (2016) discovered that demographic variables at the school level, such as racial/ ethnic and socioeconomic makeup, as well as urban-rural status, influenced children's school physical activity. Preschool teachers' gendered ideas are significantly associated with gendered disciplinary responses to children's misbehavior in the classroom (Gansen, 2019). Regardless of race, teachers' expectations were found to have a substantial impact on their disciplinary practices in school, with pupils who were held to lower standards receiving more punishment than their peers who were held to higher expectations (Santiago-rosario et al., 2021). The types of punishment tactics employed on school students were shown to be significantly influenced by family structure and race (Fadus et al., 2021). According to a similar study, children of colored background, particularly Black pupils, had significantly greater rates of school discipline than White students (Girvan et al., 2021).

CONCLUSION

The researchers found that the age and marital status of preschool teachers are key factors of their classroom discipline techniques based on the findings of this study. As a result, it is critical that those criteria be prioritized by the Local Government Education Authority when recruiting preschool teachers. This will go a long way toward attracting preschool teachers who will employ classroom discipline procedures effectively and without difficulty.

REFERENCES

Fadus, M. C., Valadez, E. A., Bryant, B. E., Garcia, A. M., Neelon, B., Tomko, R. L., & Squeglia, L. M. (2021). Racial Disparities in Elementary School Disciplinary. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(8), 998–1009.

https://doi.org/10.1016/j.jaac.2020.11.017

Gansen, H. M. (2019). Push-Ups Versus Clean-Up: Preschool Teachers' Gendered Beliefs, Expectations for Behavior, and Disciplinary Practices. *Sex Roles*, *80*(7–8), 393–408. https://doi.org/10.1007/s11199-018-0944-2

Gansen, H. M. (2020). Disciplining Difference(s): Reproducing Inequalities through Disciplinary Interactions in Preschool. *Social Problems*, *847*, 1–22. https://doi.org/10.1093/socpro/spaa011

Garro, A., Giordano, K., Gubi, A., & Shortway, K. (2021). A Consultation Approach to Target Exclusionary Discipline of Students of Color in Early Childhood Education. *Contemporary School Psychology*, *25*(1), 124–135. https://doi.org/10.1007/s40688-019-00258-9

Girvan, E. J., McIntosh, K., & Santiago-Rosario, M. R. (2021). Associations between community-level racial biases, office discipline referrals, and out-of-school suspensions. *School Psychology Review*, *50*(2-3), 288-302. https://doi.org/10.1080/2372966X.2020.1838232

Gregory, A., & Roberts, G. (2017). Teacher Beliefs and the Overrepresentation of Black Students in Classroom Discipline. *Theory into Practice*, *56*(3), 187–194. https://doi.org/10.1080/00405841.2017.1336035

Ho, J., Grieshaber, S. J., & Walsh, K. (2017). Discipline and rules in four Hong Kong kindergarten classrooms: a qualitative case study. *International Journal of Early Years Education*, *25*(4), 409–423. https://doi.org/10.1080/09669760.2017.1316242

Kennedy, M. J., Hirsch, S. E., Rodgers, W. J., Bruce, A., & Lloyd, J. W. (2017). Supporting high school teachers' implementation of evidence-based classroom management practices. *Teaching and Teacher Education*, *63*, 47–57. https://doi.org/10.1016/j.tate.2016.12.009

Lustick, H. (2017). *" Restorative Justice " or Restoring Order ? Restorative School Discipline Practices in Urban Public Schools*. https://doi.org/10.1177/0042085917741725

Masath, F. B., Hinze, L., Nkuba, M., & Hecker, T. (2021). Factors contributing to violent discipline in the classroom: findings from a representative sample of primary school teachers in Tanzania. *Journal of interpersonal violence*, 08862605211015219. https://doi.org/10.1177/08862605211015219

Monnat, S. M., Lounsbery, M. A. F., Mckenzie, T. L., & Faye, R. (2016). Associations between demographic characteristics and physical activity practices in Nevada schools. *Preventive Medicine*, 6–11. https://doi.org/10.1016/j.ypmed.2016.08.029

Okeke, C. I., Ugwuanyi, C. S., Okeke, C. C., Ugwu, G. C., Ngwoke, A. N., Ifelunni, C. O., ... & Nnamdi, E. T. (2021). Teaching Engagement and Preschool Practitioners' Disciplining Practice in Post-Corporal Punishment Era: A Correlational Quantitative Evaluation. *International Journal of Psychosocial Rehabilitation*, *25*(02), 1345–1354.

Santiago-rosario, M. R., Whitcomb, S. A., Pearlman, J., & Mcintosh, K. (2021). Associations between teacher expectations and racial disproportionality in discipline referrals ☆. *Journal of School Psychology*, *85*(February), 80–93. https://doi.org/10.1016/j.jsp.2021.02.004

ENSINO HÍBRIDO NAS ESCOLAS SECUNDÁRIAS MOÇAMBICANAS: PROGRESSOS E DIFICULDADES

HYBRID TEACHING IN MOZAMBICAN SECONDARY SCHOOLS: PROGRESS AND DIFFICULTIES

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ABSTRACT

In this period of the Covid-19 pandemic in which schools, in order to continue with teaching and learning process and with quality, were forced to reinvent themselves, there is an urgent need to reflect on the implementation of hybrid education in Mozambican secondary schools. To carry out the work, two surveys were prepared and applied, one by questionnaire and the other by interview. The questionnaire was addressed to 30 students from the April 7th and General of Mazicuera Secondary Schools, while the interview was applied to 4 managers from the same schools. Regarding the theoretical foundation, in the work, mention is made of the conceptualization and discussion in the view of several authors about hybrid teaching, digital platforms and teacher training. Both the results of the questionnaires as well as those of the interview confirmed that: for the two groups surveyed, they understand that hybrid teaching is the occurrence of two types of teaching, face-to-face and online, using digital information and communication platforms; there are advances made regarding the implementation of hybrid education such as, for example, electrification of schools, division of classes according to the number of room capacity and observing the minimum distance of 1.5 meters, acquisition of computers, mobilization of teachers to use whatsap both for the period of confinement and relaxation of Covid-19's prevention and transmission measures; the use of the whatsap platform worked for a period of less than 1 month and then it stopped because of the teachers' lack of internet, lack of teacher training in the use of digital platforms, and because many students do not have phones and megabytes for this purpose; the occurrence of two teaching models, in person and online, facilitate the teaching and learning process; during the confinement period almost all classes are completely stopped. In conclusion, based on the answers collected from the respondents, it can be inferred that although some progress activities have been developed that are almost not enough for the actual increase of hybrid education, in Mozambican secondary schools there are still numerous difficulties to the implementation of hybrid teaching.
Keywords: Hybrid teaching, digital platforms, training, teaching and learning.

RESUMO

Neste período da pandemia da Covid-19 em que as escolas, para dar face à continuação do processo de ensino e aprendizagem e com qualidade foram obrigadas a se reinventar, urge fazer uma reflexão sobre a implementação do ensino híbrido nas escolas secundárias moçambicanas. Para a efetivação do trabalho, foram elaborados e aplicados dois inquéritos sendo, um por questionário e o outro por entrevista. O questionário foi dirigido a 30 alunos das Escolas Secundárias 7 de Abril e Geral de Mazicuera, enquanto que a entrevista foi aplicada a 4 gestores das mesmas escolas. No que concerne à fundamentação teórica, no trabalho, faz-se menção da conceituação e discussão na visão de vários autores sobre o ensino

híbrido, plataformas digitais e formação de professores. Tanto os resultados dos questionários assim como os da entrevista confirmaram que: para os dois grupos inquiridos entendem que ensino híbrido é a ocorrência das duas modalidades de ensino, presencial e online usando plataformas digitais de informação e comunicação; existem avanços feitos relativamente a implementação do ensino híbrido como por exemplo, eletrificação das escolas, divisão das turmas consoante o número de capacidade da sala e observando a distância mínima de 1,5 metros, aquisição de computadores, mobilização dos professores para o uso do WhatsApp tanto para o período de confinamento e de relaxamento das medidas de prevenção e transmissão da Covid-19; o uso da plataforma whatsApp funcionou por um período abaixo de 1 mês e dai parou por motivos dos professores não terem internet, falta de formação dos professores no uso das plataformas digitais, e porque muitos alunos não têm telefones e megabytes para o efeito; a ocorrência dos dois modelos de ensino, presencial e online facilitam o processo de ensino e aprendizagem; no período de confinamento quase todas aulas ficam totalmente paradas.

Em jeito de conclusão, com bases nas respostas recolhidas dos inquiridos, pode-se depreender que embora tenham sido desenvolvidos algumas atividades de progressos que quase não são suficientes para que de facto se incremente o ensino híbrido, nas escolas secundárias moçambicanas ainda existem inúmeras dificuldades para a implementação do ensino híbrido.

Palavras-chave: Ensino híbrido, plataformas digitais, formação, ensino e aprendizagem.

INTRODUÇÃO

O presente trabalho sob titulo "ensino híbrido nas escolas secundárias moçambicanas: progressos e dificuldades" tem como objectivo de fazer uma reflexão sobre a implementação do ensino híbrido nas escolas secundárias moçambicanas. Ou seja, nesta fase da pandemia de Covid-19 em que as escolas do ensino geral moçambicanas , para dar face à continuação do processo de ensino e aprendizagem e com qualidade foram obrigadas a se reinventar e com modelo de ensino hibrido adaptado em consequência desta pandemia, reflectir sobre o nível de implementação deste modelo de ensino. Com efeito, a pesquisa procura responder as seguintes questões:

1. Quais são os progressos feitos no âmbito da implementação deste modelo de ensino;
2. Existirão algumas dificuldades que os professores ou alunos das escolas moçambicanas enfrentam na implementação deste modelo de ensino?

FUNDAMENTAÇÃO TEÓRICA

Plataformas Digitais

Burdinhão e Motter (2016) sublinham que o desenvolvimento tecnológico e a utilização cada vez maior das Tecnologias da Informação e Comunicação (TICs) aplicadas ao contexto educacional, torna-se pertinente o uso de novas ferramentas que promovam a interação entre estudantes e professores. O intuito é possibilitar novos recursos de ensino e aprendizagem, sendo que um deles é o aplicativo de comunicação WhatsApp que permite troca de mensagens de textos, imagens, músicas, vídeos, etc. Este aplicativo é muito utilizado no contexto social, no entanto como estratégia educativa, ainda são poucos que aderem por medo ou falta de conhecimento que essa ferramenta pode ser útil nas aulas tanto dentro como fora da sala de aula.

De acordo com Lacerda (2011), na sociedade do mundo contemporâneo a grande necessidade existente é a promoção de uma aprendizagem cada vez mais significativa, pertinente,

interativa e de acordo com o contexto da realidade vivida pelo aluno. De fato, não basta apenas transmitir o conhecimento produzido de forma tradicional, é preciso chamar a atenção do alunado, haja visto que as tecnologias digitais já fazem parte da sua vida social. Existem várias inovações tecnológicas digitais que são utilizadas como ferramentas de comunicação instantânea móvel como o WhatsApp, Google Talk (Hangout), Skype, Viber, Telegram, Facebook Messenger, entre outros.

Neste período da pandemia da Covid-19 em que as escolas, para dar face à continuação do processo de ensino e aprendizagem e com qualidade foram obrigadas a se reinventar, nas escolas secundárias moçambicanas, para cobrir o modelo de ensino híbrido (presencial e online), adaptou-se o uso da plataforma digital WhatsApp.

De acordo com Burdinhão e Motter (2016) , utilizar o aplicativo de comunicação WhatsApp como recurso didático metodológico se torna viável para o processo de ensino-aprendizagem, na medida em que possibilita a ação comunicativa e auditiva entre os estudantes.

Paczkowski et al. (2018) referem que o WhatsApp é definido como um aplicativo digital multimodal, multiplataforma, com alto grau de usabilidade. A educação online se traduz em práticas educativas que podem ocorrer em ambientes formais e não formais, presenciais ou não, mediados por tecnologias móveis. A criação de um grupo de WhatsApp como ferramenta educacional pode servir como uma extensão da aula presencial.

A utilização do WhatsApp é contínua durante o processo de comunicação, fato que pode aproximar aluno e professor durante a construção do conhecimento no processo de ensino- V Encontro Nacional de Ensino de Ciências da Saúde e do Ambiente Niterói/RJ, 2018 Campus da Praia Vermelha/UFF 3 aprendizagem, facilitando assim a transmissão do conhecimento e discussão dos tópicos apresentados em aula. Mesmo com todas as vantagens e facilidade de acesso e de uso do aplicativo WhatsApp, sua utilização como ferramenta educativa precisa ser cautelosa, pois se faz necessário uma capacitação prévia dos professores que irão trabalhar com essa ferramenta, pois há desvantagens significativas na utilização do aplicativo como a falta do foco de alguns integrantes do grupo, compartilhamento de informações não condizentes ao conteúdo da disciplina e a não conexão de alguns integrantes do grupo à internet de forma integral (Almeida, 2015; Sarker, 2015; PISA, 2016). De acordo com Barbosa e Da Silva (2018), Este último ponto talvez seja a maior desvantagem desse processo, pois pode ocasionar a falha de todo um planeamento inicial para que todos participem do processo.

O Ensino Híbrido

Felician (2016) salienta que a sociedade globalizada é marcada pela revolução científica, inovações e descobertas, e a escola como espaço privilegiado de compartilhamento de diferentes saberes, deve estar atenta a essas transformações, se adequar as mesmas, e principalmente saber aproveitar os recursos que estão disponíveis, entre eles as novas tecnologias que mediada com o projeto pedagógico resulta em um ensino muito prazeroso e inovador e também consegue atender aos anseios dos jovens e adolescentes que nasceram nessa era chamada “digital”. Dentro do contexto educacional as “novas tecnologias”, ou tecnologias da informação e comunicação (TIC), trazem a sala de aula, novos desafios e novas maneiras de aprender.

Hoffmann (2016) salienta que as atividades desenvolvidas com a tecnologia devem ser perspectivadas como novas oportunidades educativas, não devendo usá-las como um único meio, mas integrá-las num todo, ou seja, integrando-as nas rotinas de trabalho da sua sala,

contudo, oportunizando igualmente espaços a novos projetos e a novas formas de construção de saberes. Nesse contexto, o ensino híbrido torna-se um meio, não com um único objetivo, um meio para construir conhecimento e explorar um mundo virtual. Assim, o ensino híbrido apresenta práticas que precisam ser difundidas para que haja mudança na forma de fazer educação, ou seja, sendo protagonista da sua aprendizagem, através de aulas diferenciadas. De acordo com o mesmo autor, o ensino híbrido traz duas vertentes: uma sustentada, ou seja, em que há o tradicional aliado a uma nova prática e neste modelo está a Rotação por estações, os Laboratórios Rotacionais e a sala de aula invertida. Já a outra vertente traz um modelo mais disruptivo em relação ao tradicional e no mesmo podemos destacar os modelos Flex e A La Carte, Virtual Enriquecido e Rotação Individual.

Christensen, Horn e Staker (2013), afirmam que o ensino híbrido é um programa de educação formal no qual um aluno aprende, pelo menos em parte, por meio do ensino on-line, com algum elemento de controle do estudante sobre o tempo, lugar, modo e/ou ritmo do estudo, e pelo menos em parte em uma localidade física supervisionada, fora de sua residência.

Na visão de Hoffmann, o ensino híbrido requer uma formação do professor. Uma formação para que o professor possa colocar em prática este modelo de educação e ter êxito levando os educandos a terem uma aprendizagem significativa. Assim, no ensino híbrido, um curso de capacitação para os professores é capaz de promover aprendizagem ativa e permitir que as pessoas adquiram novas informações sobre a temática e obtenham feedback sobre seu desempenho.

Segundo Fischer (2012), essa capacitação deve abranger três áreas de estudo que, são essenciais para a coevolução entre aprendizagem, novas mídias e novas organizações de aprendizagem:

1. Aprender/Trabalhar/Colaborar: explorar as formas de aprendizagem com a tecnologia e sobre ela bem como as formas de trabalho e colaboração por meio das tecnologias de informação e comunicação;
2. 2. Novos espaços de aprendizagem: explorar diferentes designs que permitam o trabalho colaborativo, suportado por recursos computacionais, em que se trabalham em múltiplos campos para aprendizagem;
3. Novas Mídias e tecnologias: apresentar diversas interfaces que podem fazer parte das técnicas de ensino, bem como seus principais métodos de uso. Sendo que, diversas opções estão disponíveis para capacitação de professores nessa área.

Formação de professores

De acordo com Nuñez e Tobón (2018), a prática docente mediada pelas TIC deve ser compreendida a partir da evolução do processo ensino-aprendizagem, através da abordagem das possibilidades que a tecnologia permite, no sentido de abrir o espaço de formação a novas opções que dinamizem o espaço-tempo mais para além da presença física. Núñez et al. (2019) sublinha que isso só é possível se os professores compreenderem o significado do uso das tecnologias, reconhecendo sua utilidade em suas próprias experiências pedagógicas de preparação de materiais, manipulação de informações digitais, apresentação de conteúdos ou comunicação com seus alunos. Com efeito, Echeverri (2014) defende que a maior dificuldade relacionada ao uso das TIC pelos professores é o tempo necessário para a adaptação das ferramentas, preparação dos temas, dedicação e compromisso com a formação, educação e formação neste sentido, questão que implica um desafio no global

Concordamos com De Azevedo (2014) ao afirmar que, quando falamos da temática da formação de professores, estamos inevitavelmente a ter em consideração a formação inicial e também a formação contínua, considerando que estas se interligam, sequencialmente, no percurso a realizar ao longo de toda a carreira profissional pelos docentes.

Assim, na perspectiva de Padrao (2018), a formação assume um papel determinante no desenvolvimento pessoal, social e profissional promovendo a compreensão das características e tendências de evolução do atual contexto socioeconómico, cultural e profissional. O professor constitui-se, assim como uma peça chave para a construção de uma escola bem-sucedida, ou seja, uma escola onde há equidade, autonomia, responsabilidade, avaliação, partilha e reflexão. Um professor de excelência sabe que não pode fazer tudo sozinho. Por isso coopera com os seus pares com vista a chegar ao objetivo comum: fazer com que os alunos aprendam (Cardoso, 2013:28). O que vai ao encontro dos quatro pilares da educação para o século XXI, segundo o Relatório da Comissão Internacional presidida por Jacques Delors, publicado em 1996: Aprender a conhecer, aprender a fazer, aprender a ser, aprender a viver juntos. Sendo o quarto pilar (aprender a viver juntos) o exercício pleno da cidadania, cujos restantes têm por objetivo que este seja um dado efetivo (Cardoso, 2013:47)

METODOLOGIA USADA

Para a efetivação do trabalho, foram elaborados e aplicados dois inquéritos sendo, um por questionário e o outro por entrevista. O questionário foi dirigido a 30 alunos das Escolas Secundárias 7 de Abril e Geral de Mazicuera, enquanto que a entrevista foi aplicada a 4 gestores das mesmas escolas.

RESULTADOS E DISCUSSÕES

Tanto os resultados dos questionários assim como os da entrevista confirmaram que: para os dois grupos inquiridos entendem que ensino híbrido é a ocorrência das duas modalidades de ensino, presencial e online usando plataformas digitais. existem avanços feitos relativamente a implementação do ensino híbrido como por exemplo, eletrificação das escolas, divisão das turmas consoante o número de capacidade da sala e observando a distância mínima de 1,5 metros, aquisição de computadores, mobilização dos professores para o uso do whatsap tanto para o período de confinamento e de relaxamento das medidas de prevenção e transmissão da Covid-19; o uso da plataforma whatsApp funcionou por um período abaixo de 1 mês e dai parou por motivos dos professores não terem internet, falta de formação dos professores no uso das plataformas digitais, e porque muitos alunos não têm telefones e megabytes para o efeito; a ocorrência dos dois modelos de ensino, presencial e online facilitam o processo de ensino e aprendizagem; no período de confinamento quase todas aulas ficam totalmente paradas.

CONCLUSÃO

Em jeito de conclusão, com bases nas respostas recolhidas dos inquiridos, pode-se depreender que embora tenham sido desenvolvidos algumas atividades de progressos que quase não são suficientes para que de facto se incremente o ensino híbrido, nas escolas secundárias moçambicanas ainda existem inúmeras dificuldades para a implementação do ensino híbrido.

REFERÊNCIAS

Barbosa, S. L. & Da Silva, A. L. G. (2018). Utilização do aplicativo whatsapp como ferramenta de ensino e aprendizagem no curso de licenciatura em ciências naturais do INFES/UFFV Encontro Nacional de Ensino de Ciências da Saúde e do Ambiente. Rio de Janeiro.

Burdinhão, V. Dos S. & Motter, R. M. B (2016). WhatsApp como recurso didático pedagógico no processo ensino-aprendizagem de Inglês: Cadernos PDE. Paraná.

Christensen, C. M.; Horn, M. B. & Staker, H. (2013). Ensino híbrido: uma inovação disruptiva? Uma introdução à teoria dos híbridos.

De Azevedo, J. J. F. M. (2014). Projecto de formação continua de professores de educação visual em regime b-learning (Dissertação de mestrado - Universidade de Lisboa-Instituto de Educação). Lisboa.

EcheverrI, E.J. (2014). Percepción de los profesores de las carreras del área de la salud de la Universidad CES Medellín sobre el uso de las nuevas tecnologías de la información y comunicación en los procesos de enseñanza (Tesis maestría en educación). Medellín: Universidad San Buenaventura.

Felician, L. A. S. (2016). O uso do whatsapp como ferramenta pedagógica: VIII encontro nacional de geógrafos. Brasil.

Hoffmann, E. H. (2016). Ensino híbrido no ensino fundamental: possibilidades e desafio. (Projecto de curso de especialização em educação na cultura digital - Universidade Federal de Santa Catarina). Brasil.

Núñez, C. & Tobón, S. (2018). Sujeto y teletrabajo: identidad, mediaciones tiempoespacio y requerimientos contemporáneos. En Molina, C., Villegas, G., Carantón, I.J. & Núñez, C. El teletrabajo como tendencia contemporánea: estructuras, procesos y sujetos (pp. 101-138). Medellín: Sello editorial Universidad de Medellín.

Núñez, C., N; Gaviria-serrano, J. M. ; Tobón, S. ; Guzmán-calderón, C., E. ; Herrera, S., R. (2019). La práctica docente mediada por TIC: una construcción de significado: Revista Espacios.

Padrão, M. Da C. (2018). Inovar na Escola Atual: Avaliar para Aprender na Diversidade através do Portefólio. (Dissertação de Mestrado – Instituto Politécnico de Setúbal, Escola Superior de Ciências Empresariais). Portugal.

Paczkowski, I. M.; Pazinato, M. S.; Salgado, T. D. M.; Passos, C. G. (2018) . A utilização do WhatsApp como recurso didático no ensino de Química: 38º EDEQ – encontro de debates sobre ensino de Química. Brasil.

EXPLORING SOUTH AFRICAN UNIVERSITY STUDENTS' IDEAS AND EXPERIENCES OF MATHEMATICAL WRITING

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ABSTRACT

This case study examined the kinds of mathematical writing South African university-level students during the corona virus lockdown. The study sought to answer the questions: (a) How did the students use and perceive their mathematical writing during their online learning? (b) How did the students' change their mathematical writing as their audience changed? The students first identified mathematical ideas in their everyday lives and record their own mathematical learning experiences. Then, they wrote to their teacher in one activity while on the other activity they were writing to their peers. The data were analysed using discourse theory, audience theory, and transactional distance theory. Data analysis focused on the structure and usage of language when responding to their mathematical writing assignments. The results of the study suggest that students engaged in different kinds of mathematical writing elements. Subjects made many writing choices when writing to a specific audience. As the audience changed, the syntax, diction, and tone of the writing changed. It is recommended that expanding the different kinds of audiences will improve the students' mathematical writing. The lockdown assignment has been an effective tool for motivating the students to understand the content and the relevance of mathematics in their everyday lives, while improving their mathematical communication skills.

Keywords: Audience, Communication, Mathematical thinking, Mathematical writing, Written discourse analysis.

INTRODUCTION

In the United States, the National Council of the Teachers of Mathematics (NCTM) suggests that rather than writing seen as an add-on to mathematics instruction, it should be seen as an integral part of learning mathematics (NCTM, 2008). In the *Principles and Standards for School Mathematics*, NCTM asserts that "Students who have opportunities, encouragement and support to write in mathematics classes reap the dual benefit: they communicate to learn and learn to communicate" (NCTM, 2008, p. 60).

The benefits of linking writing with mathematics are cited in numerous books and periodicals. One of the most cited pedagogic reasons for using writing in the mathematics classroom is to improve students` understanding and provide teachers with insight into their students' thinking (Morgan, 1998, 2001). Teachers who ask their students to write mathematically can gain insight into their students` mathematical thinking, and diagnose their students' misconceptions while evaluating their teaching techniques (Martinez & Dominguez, 2018). Also, writing can be a vehicle through which mathematical context and text are negotiated to construct mathematical knowledge. It not only communicates, but it also develops a mathematical understanding (Wallace et al., 2004). Therefore, students can learn mathematical concepts more effectively and with a deeper understanding when writing approaches are utilized (Kuzzle, 2013). Researchers claim that writing sustains students`

development of communication, reasoning. Consequently, students deepen their mathematical knowledge and extend their thinking (Kiuhara et al., 2020). Writing engages the imagination, the intellect, and the emotions. All are powerful tools for learning mathematics (Bell, 2014). During the writing process, students can learn how logical expression of mathematical ideas and concepts are developed and how to logically structure their thought as they think on the paper (Freitag, 2010).

Many students see mathematics as abstract, a truth derived from indisputable authority external to themselves. They have a sense of "powerless in its presence" as it is presented to them as absolute truth, unsullied by subjectivity or human struggle (Zhe, 2012, p. 14). As a result, they become anxious in mathematics class. Teachers often ignore or disregard these anxieties, when in reality, students and their perspectives need to foreground the instruction (Bell, 2014). One way to minimize this anxiety is to get students to write about their experiences in learning mathematics (Beard, 2021). It is best to turn to a more familiar and often more comfortable mode of learning, such as writing, in order to provide a sense of security to a math-anxious student (Sternglass, 2017). By using exploratory writing in mathematics classrooms, students are empowered to own their learning. The teacher acts as a catalyst to learning rather than being a custodian of mathematical facts and figures. Students reflect on what is written and the interaction with their reader and the mathematical content. Therefore, it is an appropriate vehicle for interactive learning and teaching mathematics. Through constant reflection and revisions, writing in mathematics allows crystallisation and generation of mathematical concepts (Sternglass, 2017). Mathematical learning requires a rigorous and interactive classroom. One way to achieve this learning environment is to give students mathematics writing activities involving their daily experiences (Ginsburg et al., 2008).

Problem Statement

Learning mathematics requires an ability to communicate, and that communication needs to be developed. (Morgan et al., 2014). When one engages in mathematics, the idea is to communicate mathematical reasoning and ideas clearly to the next person or to themself (Sfard, 2001). In South Africa, students who want to become mathematics teachers must enrol in the teaching of mathematics education courses. The component of these courses is varied depending on institutions of higher learning. While the benefits of content writing are widely recognised, there is a lack of studies focusing on the benefits of mathematical writing for South African students. While there are opportunities in South African mathematics education courses for students to learn mathematical content, there are few to no opportunities for students to learn to communicate the mathematics that they are learning. This lack of exposure to mathematical writing is because school mathematics has contained relatively little writing of scripted words, which, for many students, has been a reason for its appeal (Pimm, 2019).

Therefore, the study sought to answer the following questions:

- How did the students change their mathematical writing as their audience changed?
- How did the students use and perceive their mathematical writing during their online learning?

LITERATURE REVIEW

Written language is comprised of text. The meaning of these components is dependent on their contexts (Harris, 1995; Rotman, 2000). For example, "**:**" is two vertical dots. In English class, "**:**" means a colon, while in mathematics class, "**:**" means a ratio. The symbol did not change; they are still two vertical dots. The same can be true with an image. "→" is an image

of an arrow. However, in English class, this image is used to denote that the line of text needs to be indented. In mathematics class, it can mean “a ray” or an “axis.” The image didn’t change; it is still an arrow. In both situations, the meanings of the symbol and image changed because the context changed, in this case, different subject areas. To fully understand what is written, it is necessary to know its context.

Focusing on spoken data, Gee (2015) makes a difference between “discourse” (with a small d) versus “Discourse” (with a large D). In the first word, “discourse,” he states that its focus is only on the words that are spoken. With “Discourse,” it not only includes the words but also the context of where it is spoken. The language will change in different social situations. The same words may be spoken, such as “I’m tired,” but the connotation may differ. The denotation of “I’m hungry” is clear. However, if a person said, “I’m tired” in the beginning of the school day, it means different than when the student says it after the last bell has rung. “Discourse” considers not only the words themselves, but also the setting, circumstances, and the others within the speaker’s vicinity.

There is a relationship between mathematics and language learning, and writing can be used as a tool to develop the learning of both mathematics and natural language. Mathematics is a language, and it should be taught the same way a second language is taught. Similar to other languages, mathematics has its own grammar, vocabulary, idioms, conventions, syntax, sentence, and paragraph structure (Setati, 2005). Mathematics and traditional languages share attributes such as uniform rules and symbols; understanding increases with practise. Abstractions are used to communicate, and translations and interpretation are required for novice learners. Therefore, meaning is influenced by the order of the symbols, and communication requires encoding and decoding. The possibilities of expressions are infinite (Wakefield, 2000). Mathematics as a language displays features of highly technical vocabulary such as dense noun phrases and implicit logical relationships. The rules of argumentation obeyed by mathematicians are unique to the formal language of mathematics. Mathematical concepts are constructed and are often difficult to articulate in ordinary language. Thus, mathematical symbolism was developed to express meaning that go beyond what ordinary language can express (Morgan, 1998). There are mathematical terms that either do not exist or have a different meaning in natural language such as root, integral, point, and function. Thus, to fully understand a written text, one needs to have an idea or knowledge of the context.

THEORETICAL FRAMEWORK

This study draws from the communication framework which suggests that the goal of all mathematics instruction is for students to not only solve a mathematical problem, but also to think and communicate as mathematicians (NCTM, 2000). To become mathematicians, students must be literate and fluent, negotiating all aspects of mathematical language. Students must learn when, how, and why that language is used within a specific situation.

Communication in Mathematics

Many mathematics teachers feel that there is "no writing" in mathematics. However, the reality is that mathematics is a written language, and like all languages, it has essential qualities to it. All mathematical writing is comprised of three elements: symbols, nominalization, and images (Seo, 2015; 2019). Symbols are marks on a surface, and that mark's meaning is determined by its context (Harris, 1995; Rotman, 2000). For example, 4-8 and 8-4 use the same symbols (4, -, 8), but the meaning of each combination is different. The most common symbols are numerals and mathematical functions, such as addition (+)

and multiplication (x). Other symbols include logograms, symbols that represent an idea, and ideograms, symbols that represent a function or activity (Seo, 2019). Nominalizations are words that are mathematically specific. These words may have multiple meanings, depending on the mathematical context (Seo, 2015; 2019). Finally, there are images. Images comprise all mathematical writing that is not symbols or nominalization. Common images are a number line and graphs (Seo, 2015; 2019). When students write mathematically, they use one or more of these elements simultaneously. It is necessary to identify these elements to determine not only what students are trying to say but also how they say it and in what context.

Audience Theory

When people write, they attend to their audiences. The syntax, diction, and tone will change (Ede & Lunsford, 1984). Syntax is the way the sentences are written. Diction is the words that are used within the sentence. Tone is the way the text sounds or the mood it conveys (Stein, 1980). For example, the way people explain the events of an occasion will sound differently when they write to a friend, their grandparent, or to their boss. To the boss, the syntax and diction may be more formal and academic while to the friend, they may use slang and other informal writing conventions. Even though the event hasn't changed, the way the meanings are conveyed has been differentiated.

Writing cannot occur in isolation. Russian philosopher Bakhtin (1981) stated that all writers attend to three audiences. The first audience is to the reader. This audience is the most obvious. As previously stated, when writing, the syntax, diction, and tone will change as the reader changes. Second audience is to the paper. The writer will focus their attention on the paper (or computer screen). Third is the audience to oneself. In this situation, the writer will read to themself and will pay attention to the writing elements (Bakhtin, 1981).

Theory of Transactional Distance

Transactional distance as distinguished from physical distance refers to the psychological or communicative space that separates the instructor from the student in the transaction between them, occurring in the structured or planned learning situation (Moore, 1997). Learning occurs via transactional relationships between the teachers and students, students and students, and students and content. How these relationships are managed determines the transactional distance. With high transactional distance, there will be a low level of connectedness between the learner and the learning environment. The reverse is also true. With low transactional distance, there may be a high level of connectedness (Moffet & Mill, 2014). In this study, there is an emphasis on the students' experiences in mathematical writing while learning at a distance from their institutions. This theory sheds light on the factors that contribute to the communication gap between the students and teachers, student and content, and student and student. Thus, Moore's Theory of Transactional Distance has a direct bearing on online learning. It explains and quantifies the learning relationship between instructor and student in the online-learning situation, where there is a substantial physical and/or temporal distance between the two.

METHODOLOGY

This case study was conducted within an interpretive paradigm. An interpretive paradigm helps to describe and understand how people make sense of their world, their lives and what things mean to them (Rowley, 2014). The interpretive paradigm is suitable to understand how students use and perceive their mathematical writing during their online learning. The

case for this study is fourth-year Bachelor of Education students from one South African university.

The population of this study was 75 fourth-year students (47 females, 28 males) who were taught by the primary investigator (first author) in a Bachelor of Education Mathematics course at a South African university in Tshwane, Gauteng Province. There were 46 students who came from rural areas. The fourth-year students were purposefully selected because they are in the final year of study and will be practice teaching soon. This study used stratified random sampling. It enables one to "divide the population into significant strata based on a number of attributes thereby ensuring that the resulting sample will be distributed in the same way as the population in terms of the stratifying criteria" (Van Rijnsoever, 2017, p. 12).

Instruments

Data were collected through analysing students' daily journals and administering an open-ended questionnaire to the participants. Prior to using the instruments, they were checked by experts in the field of mathematics education. First, copies of the questionnaire were given to stakeholders at the university. Stakeholders gave feedback on the clarity and accuracy of the tool. Once revisions were made, the final questionnaire was given to the students. Their agreement of the instrument's purpose showed its reliability.

The first instrument was a questionnaire. It asked the subjects to respond to their experiences of writing in their mathematics course and how these experiences shaped their views about their mathematical learning. Then, the students were asked to write mathematical explanations to first their teacher, and then to a friend. This method is adapted from Seo (2009), and she determined its reliability at that time.

Data Collection and Analysis

In collecting data, ethical issues were taken into consideration. For instance, research participants were told that although they agreed to be part of the study, they could withdraw at any stage, were not obliged to answer all the questions, and were ensured anonymity and confidentiality. To assure participants of anonymity and confidentiality, a consent form was issued stipulating what they were entitled to during and after this study. Only pseudonyms are used in reporting the findings of this study. The study received ethics clearance from the university where the data was collected.

All of the data is valid because the subjects wrote their responses directly to their teacher-researcher. None of the writing samples needed to be transcribed, and all of the students attested to their work. Therefore, member checking was not necessary.

Data were analysed in two phases. Phase 1 data analysis focused on the structure and usage of language when responding to a mathematical assignment. Phase 2 analysis focused on how the students writing changed as the target audience changed.

The data was analysed in a manner that reveals relationships, patterns and trends that could be found within it. All qualitative data were coded to examine common themes and patterns (Adu, 2019). This data was analysed via Discourse Analysis and audience theory. Using Gee's (2015) definitions of "discourse" and "Discourse," discourse analysis usually focuses on spoken text, but in this study, the focus is exclusively on written text. Writing is a producing activity, and its goal is to communicate thoughts from one individual to another. To truly comprehend what students are saying within their texts, it is necessary to understand

the context from where the text originated. For example, rural and urban students live in very different environments. What may be available to the urban student may not be available to the rural student. In this case, the "Discourse" is not the same. For this analysis, the Discourse/context is on rural areas. Therefore, because the Discourse/context is the same, the analysis focuses on their “discourse,” the syntax, diction, and tone, of their writing. The discourse theory encouraged writers to write for a specific audience. Effective and efficient writers communicate with audiences in mind.

RESULTS

There were 46 rural students. Of these students, 44 submitted mathematical writing samples, and 38 submitted the student questionnaire.

Types of Mathematical Communication

The data showed that the students engaged in different kinds of mathematical communication. Students used all three elements of mathematical communication: symbols, images, and nominalizations when giving their answers to the mathematical assignment.

Symbols. All students used symbols in their mathematical explanations. The most common symbols that they used are numerals and logograms. As seen in Figure 1, this student, Dimpho, used numerals to designate the days and cases, and logograms to designate mathematical procedures. For example, to explain the "standard deviation," she incorporated an equation into the feedback. Equations are convenient when explaining a mathematical function because they are concise and easier to manipulate. However, in many cases, knowledge of equations does not mean that the student truly understands the mathematical function it represents (Morgan, 1998). Figure 1 shows that this student possesses the mathematical understanding since he gave accurate values for each mathematical concept.

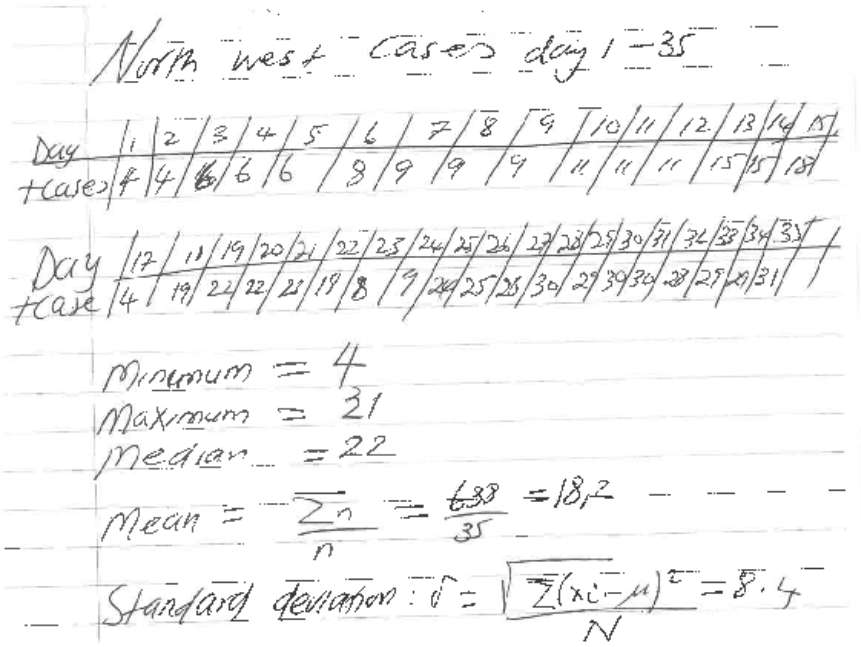


Figure 1. *Example of Dimpho's Use of Numerals and Logograms*

Nominalizations. As previously stated, nominalizations are highly condensed mathematical vocabulary. For example, in Figure 1, Dimpho wrote "Standard deviation √." Individuals who are not familiar with this mathematical word would not know that "standard deviation" means "a quantity calculated to indicate the extent of deviation for a group as a whole" (Stein, 1980). However, Dimpho understands that he is writing to his instructor, thus his audience will understand his communication. Nominalizations are only effective when the writer and audience have the same knowledge about mathematical vocabulary (Seo, 2019).

Images. In addition to symbols, students used images as examples to clarify their mathematical explanations. In Figure 1, Dimpho drew a table. This table was used to not only convey the mathematical message but also to organize their data. By putting the values in a table, Dimpho can more easily identify the trends.

Another common image is graphs. Like tables, graphs organize the data in a concise way. It allows the student to convey much information as one source (O'Halloran, 2008). In Figure 2, Angela illustrated the trends of the epidemic by region, the date, and the number of cases. As seen in this image, the student explained three kinds of information, as opposed to a table that can only explain two kinds of information.

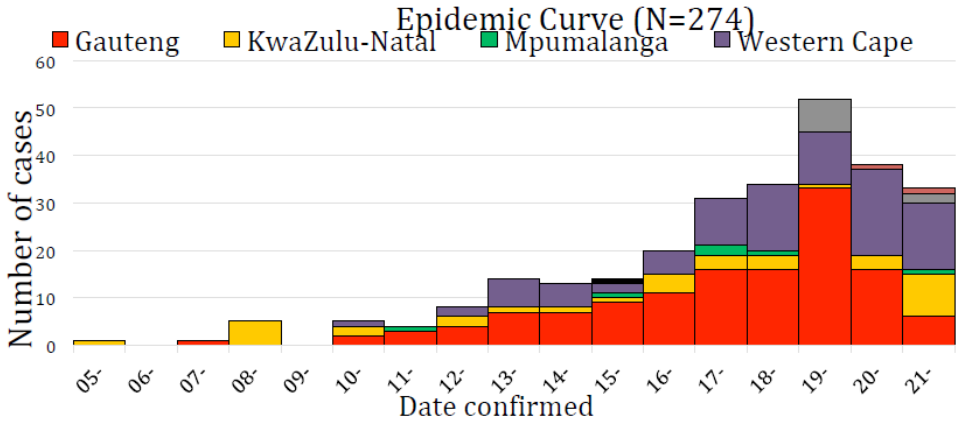


Figure 2. *Example of Angela's Use of a Graph*

In another visual image, Angela constructed a circle graph (See Figure 3).

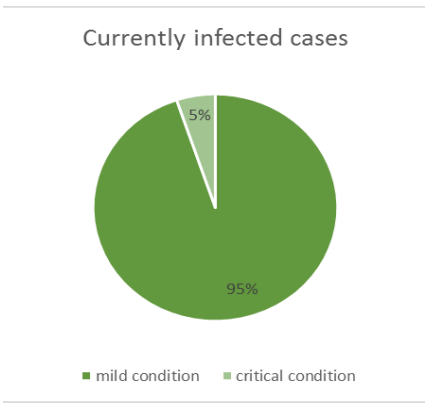
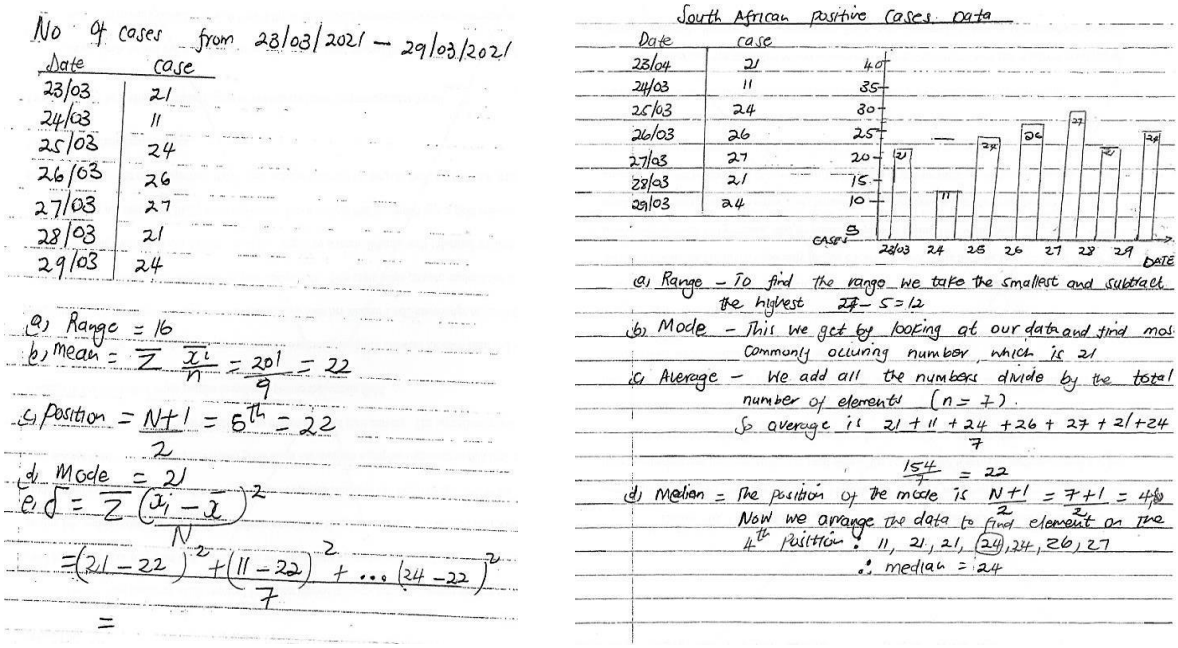


Figure 3. *Angela's Use of a Circle Graph*

Unlike a bar graph, a circle graph is simpler and easier to understand. They are often used to show a comparison or the proportion of one group to another (O'Halloran, 2008). In this case,

Angela succinctly showed the proportion of individuals with mild coronavirus conditions and those in critical condition.

Addressing Their Audiences. Throughout the study, the students attended to their audience when completing the writing assignments. As the audience changed, the tone of the writing changed. As with other studies (Seo, 2009; 2019), when the mathematics teacher is the intended audience, students primarily used symbols and images. The symbols, in the form of equations, explained the mathematical knowledge while the images were used as a tool to organize their mathematical thinking, their writing had fewer details when the writing was directed to their mathematics teacher. Figure 4 gives examples of student's writing to her mathematics teacher and to a peer:



Written to a Mathematical Audience Written to a Non-Mathematical Audience

Figure 4. *University Student's Writing Samples to Two Audiences*

When examining these two writing samples, it is clear that the syntax, diction, and tone changed as the audience changed. Syntax is how and where the words are placed (Stein, 1980). In these two samples, symbols and images were used, but they were used differently. To the mathematics teacher, she used the symbols and images as a means of organizing the information. With the non-mathematical audience, she used the same symbols and images, but in this case, they were used as explanatory devices. They were used to help clarify the mathematical meanings. Diction is the choice of words used (Stein, 1980). What is most notable is the use of pronouns in the non-mathematical audience sample. This student wrote "This we get…" and "We add all the numbers…" In both instances, the word "we" indicates that the writer is inviting her reader into understanding the text, as if they are working together. Tone is how the writing sounds (Stein, 1980). The use of pronouns provides a personal touch to the text. The text to the mathematics teacher can be seen as austere while the text to the non-mathematical audience is warmer and more inviting.

Overarching Themes

Analysis of the data showed that three overarching themes emerged: student motivation, mathematical communication, and relevance to daily experiences. Students perceived their experiences positively.

Student Motivation. The most common theme that emerged was student motivation to learn mathematics. Participants reported that the learning of mathematics through mathematical writing motivated them to learn, and they feel that with more writing opportunities in mathematics the subject will not be as scary. According to Dimpho,

> *My project did not feel like I was doing mathematics, many words but, iyooooo, was making more sense and I love it, I so much understood what I was doing*

This connection between writing and learning shows how the act of writing involves processes that are fundamental to learning and writing. It does not only mirror the process of learning, but it also supports the learning (Hartman, 2001; Vygotsky, 1962). National Council of Teachers of Mathematics (NCTM) in the United States stated that effective communication is the heart of mathematics. Without communication, the mathematical information become stagnant and ineffective (NCTM, 2000).

Mathematical Communication. The NCTM standards focus not only on the mathematical knowledge that students acquire, but also on how that knowledge is conveyed in oral and written form (NCTM, 2000). NCTM lists "Mathematics as Communication" as its second standard after "Mathematics as Problem Solving." In this case, 32 students (70%) reported that this mathematical writing project enabled them to learn how to communicate mathematics ideas using text. According to Mothokwa,

> *Although it was difficult to find mathematics on everyday reporting, it was interesting how one could write two pages of words from just the statistics displayed as just numbers*.

This view was also shared by other students. For example, Pheladi stated,

> *With the mathematical writing, I felt like I can be news reporter when I finish my school, I will be like this disease has spread over 150 countries in the World and it has infected about 740 000 people where 35 000 people have lost their lives. This means that 4.7% of the reported corona cases worldwide have been killed by this virus*.

Thus, the students asked questions about what would happen next, made predictions, and expressed doubts.

Relevance to Daily Experiences. Rural students experienced the greatest difficulty in understanding mathematics activities classified as problem-solving (Chikodzi & Nyota, 2010). Most students perform poorly for two reasons. First is teacher-dominated instructional approaches, and second is that the content is divorced from their lived contexts. This approach of teaching forces students to see mathematics as a collection of facts and procedures that must be mastered, thus not providing students with stimulating problem-solving activities enabling creativity and imagination (Gaigher et al., 2006).
The responses in this study report that this mathematics writing project was very interesting and relevant since it directly related to their situation. As Kamo stated,

> *I enjoyed the project, because it makes you think about how you use mathematics in a practical way every day helping you to think of examples you can one day use in your classroom.*

The joy of seeing mathematics as being relevant and useful was also stated by many participants. Lefa stated,

> *I loved keeping a personal reflection of my day to day experiences of lockdown. It helped me cope mentally through this period. I am also goin to print it and put it in my journal as this time period will go down in history. It also kept me aware of what was going on around us and that numbers and mathematics was used every moment, number of cases, our economy etc.*

The relevance to daily experiences shows that the transactional distance narrowed for the students. A low level of transactional distance means that there is more engagement and relevance of the mathematical content and their daily lives (Moffett & Mill, 2014). There was a true connectedness between the student, the subject, and the teacher. Both Kamo and Lefa explained the relevance of their mathematical assignment to their everyday experiences. This relevance shows how the students perceived their mathematical assignments. Also, their communicating this information lessened the gap, or the distance, between the students and the teacher.

DISCUSSION

The data was analysed in two sections. The first section focused on the different kinds of mathematical writing elements the students used, and the second section focused on overarching themes from the students' responses. While these two sections may seem incongruous, both sections are necessary to fully understand the students' mathematical knowledge.

Mathematical Writing Elements

Students used all three mathematical elements in their responses. Often, students used symbols and images to show mathematical computations. The uses of nominalizations are specific to the task. The use of scripted words allowed teachers to further understand their students' metacognitive thinking (Whitin & Whitin, 2000).

Understanding the Students' Transactional Distances

The distance in distance education is not only geographical but also pedagogical and psychological (Bolliger & Halupa, 2018). Rural students who lack motivation and sufficient resources might feel alienated while learning mathematics remotely. The COVID-19 crisis affected everyone, influencing the student's satisfaction and motivation to work on the writing project. Thus, there was low transactional distance between the students and learning content.

It provided a relevant contextual situation to their everyday lives during the lockdown. When there is more face-to-face dialogue, the transactional distance is lessened. However, when this dialogue decreases, the distance widens (Moore, 1997). By writing about their experiences, the students engaged with the mathematical content, while lessening the transactional distance between them and the content. Their discourse (words) was similar

across the data set. Students became motivated to complete the mathematical assignment; they communicated mathematically, and they determined how mathematics is relevant to daily experiences. Whether they watched television or read an internet article, they took what they learned in the classroom and applied it to their lives. Motivation, communication, and relevance is vital for students to take ownership of their knowledge.

Although there are students who had difficulties, they are outliers. In general, these rural students invested in improving their mathematical knowledge. This investment shows that the distance between what they learn in the classroom and their daily experiences and mathematical knowledge has narrowed or even intertwined.

CONCLUSION

Using mathematical writing elements gave students the opportunity to use their own experiences to make predictions, ask what is next and understand mathematical concepts using their language and experiences. They found the experience of writing mathematically as an important way of learning mathematics. The integration of mathematical language and natural language was visible in the students' writings. This activity increased student motivation and changed their views of mathematics, no longer seeing this subject as irrelevant, dead facts. South African mathematics teachers tend to shy away from pedagogical methodologies that are different or not part of their teaching training courses.

The results of this case study suggest that mathematical writing can be an effective tool for students to understand the social nature of mathematics and instil motivation to learn while improving their skills to communicate mathematically. It is also evident that students write with audiences in mind.

RECOMMENDATIONS

South African mathematics teachers need to incorporate writing exercises into their routine instruction. Mathematics teachers should not only teach students the theories and principles behind solving a given problem, but also how to explain the problems logically and clearly to broader audiences. Students should be encouraged not to narrow their potential audience because the students can assume many things about their teacher. If the audience is expanded, such as someone at or below their grade level, the quality of explanation can be improved. Teaching audience-directed writing strategies may reduce the transactional distance between the student and the university. Also, it can help students to become aware that in the "real world," there are readers (other than the teacher) who should be taken seriously.

REFERENCES

Adu, P. (2019). *A step-by-step guide to qualitative data coding*. Wales, UK: Routledge.

Bakhtin, M. M. (1981). *The dialogic imagination*. Austin, TX, USA: University of Texas Press.

Bean, J. C. (2011). *Engaging ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom*. Hoboken, NJ, USA: John Wiley & Sons.

Beard, E. (2021). *Social justice mathematics: Supporting and encouraging teaching mathematics through a social justice lens*. Kingston, Ontario, Canada: Queen's University.

Bell, E. T. (2014). *Men of mathematics*. NY: Simon and Schuster.

Bolliger, D. U., & Halupa, C. (2018). Online student perceptions of engagement, transactional distance, and outcomes. *Distance Education, 39*(3), 299-316.

Bruner, J. 1996. Frames for thinking. *Modes of Thought: Explorations in Culture and Cognition, 16*(2), 93-105.

Chikodzi, I., & Nyota, S. (2010). The interplay of culture and mathematics: The rural Shona classroom. *Journal of Pan African Studies, 3*(10), 1-15.

Deans, T. (2000). *Writing partnerships: Service-learning in composition*. Urbana, IL, USA: National Council of Teachers of English.

Dewey, J. (2008). *The later works of John Dewey, Volume 4, 1925-1953: 1929: The quest for certainty*. Carbondale, IL, USA: SIU Press.

Ede, L., & Lunsford, A. (1984). Audience addressed/audience invoked: The role of audience in composition theory and pedagogy. *College Composition and Communication, 35*(2), 155-171.

Freitag, M. (2010). Reading and writing in the mathematics classroom. *The Mathematics Educator, 8*(1), 16-21.

Gaigher, E., Rogan, J. M., & Braun, M. W. H. (2006). The effect of a structured problem-solving strategy on performance in physics in disadvantaged South African schools. *African Journal of Research in SMT Education, 10*(2), 15-26.

Gee, J. P. (2015). *Social linguistics and literacies*. UK: Taylor & Francis.

Ginsburg, H. P., Lee, J. S., & Boyd, J. S. (2008). Mathematics education for young children: What it is and how to promote it. *Social Policy Report, 22*(1), 1-24.

Harris, R. (1995). *Signs of writing*. NY: Routledge.

Hartini, T. I., Liliasari, A. S., & Ramalis, T. R. (2020). Implementing analytic mechanics learning based on multiple representations on GeoGebra Software: In forwardness to face the industrial revolution 4.0 (Mr-Geo. 4ir). *Journal of Talent Development and Excellence, 12*(1), 3940-3954.

Hartman H. J. (2001) Developing students' metacognitive knowledge and skills. In: H. J. Hartman et al. (Eds.) *Metacognition in learning and instruction. Neuropsychology and cognition* (vol 19, pp. 33-68). Dordrecht, Netherlands: Springer. https://doi.org/10.1007/978-94-017-2243-8_3

Khan, S. N. (2014). Qualitative research method: Grounded theory. *International Journal of Business and Management, 9*(11), 224-233.

Kiuhara, S. A., Gillespie Rouse, A., Dai, T., Witzel, B. S., Morphy, P., & Unker, B. (2020). Constructing written arguments to develop fraction knowledge. *Journal of Educational Psychology, 112*(3), 584-607.

Kuzle, A. (2013). Promoting writing in mathematics: Prospective teachers' experiences and perspectives on the process of writing when doing mathematics as problem solving. *CEPS journal, 3*(4), 41-59.

Marsen, S. (2019). *Professional writing*. Wales, UK: Red Globe Press.

Martínez, J. M., & Dominguez, H. (2018). Navigating mathematics and language tensions in language immersion classrooms. *Teaching and Teacher Education, 75*, 1-9.

McCrindle, A. R., & Christensen, C. A. (1995). The impact of learning journals on metacognitive and cognitive processes and learning performance. *Learning and Instruction, 5*(2), 167-185.

Moerdyk, A. P. (2009). *The principles and practice of psychological assessment*. Pretoria: Van Schaik.

Moffett, J., & Mill, A. C. (2014). Evaluation of the flipped classroom approach in a veterinary professional skills course. *Advances in Medical Education & Practice, 18*(3), 5415-5425. doi:10.2147/AMEP.S70160

Moloi, T. J., & Matabane, M. E. (2021). Reimagining the Sustainable and Social Justice Mathematics Classrooms in the Fourth Industrial Revolution. *International Journal of Learning, Teaching and Educational Research, 19*(12), 281-294.

Moore, M. G. (1997). Theory of transactional distance. In D. Keegan (Ed.) *Theoretical principles of distance education* (pp. 22-38). London, UK: Routledge.

Morgan, C. (1998). *Writing mathematically: The discourse of investigation*. London, UK: Falmer Press.

Morgan, C. (2001). Mathematics and human activity: Representation in mathematical writing. *Research in Mathematics Education, 3*(1), 169-182.

Morgan, C., Craig, T., Schütte, M., & Wagner, D. (2014). Language and communication in mathematics education: An overview of research in the field. *ZDM, 46*(6), 843-853.

National Council of Teachers of Mathematics [NCTM]. (2008). *Principles and standards for school mathematics*. Reston, VA, USA: Author.

O'Halloran, K. L. (2008). *Mathematical discourse: Language, symbolism, and visual images*. NY: Continuum.

Piaget, J. (2003). *The psychology of intelligence*. London, UK: Routledge.

Pimm, D. (2019). *Routledge Revivals: Speaking Mathematically (1987): Communication in Mathematics Clasrooms* (Vol. 4). London, UK: Routledge.

Ramachandram, D., & Taylor, G. W. (2017). Deep multimodal learning: A survey on recent advances and trends. *IEEE Signal Processing Magazine, 34*(6), 96-108.

Ritchie, C., & Thomas, P. 2013. *Successful study: Skills for teaching assistants and early years practitioners*. London, UK: Routledge.

Rotman, B. (2000). *Mathematics as sign*. Stanford, CA, USA: Stanford University Press.

Rovai, A. P., & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and Higher Education, 8*(2), 97-110.

Rowley, J. (2014). Designing and using research questionnaires. *Management Research Review, 37*(3), 308-330. https://doi.org/10.1108/MRR-02-2013-0027

Seo, B-I. (2009). Understanding the effect of audience on mathematical writing. *School Science and Mathematics Journal, 109*(2), 116-127.

Seo, B-I. (2015). Mathematical writing: What is it and how do we teach it? *Journal of Humanistic Mathematics*, *5*(2), 133-145. doi: 10.5642/jhummath.201502.12

Seo, B-I. (2019). An investigation of how 7th grade and 8th grade students manipulate mathematical writing elements. *Perspectives in Education*, *37*(2), 141-168. doi: http://dx.doi.org/10.18820/2519593X/pie.v37i2.10

Setati, M. (2005). Teaching mathematics in a primary multilingual classroom. *Journal for Research in Mathematics Education*, *36*(5), 447-466.

Sfard, A. (2001). There is more to discourse than meets the ears: Looking at thinking as communicating to learn more about mathematical learning. *Educational studies in mathematics*, *46*(1), 13-57.

Stein, J. (1980). *The Random House college dictionary*. NY: Random House, Inc.

Sternglass, M. S. (2017). *Time to know them: A longitudinal study of writing and learning at the college level*. NY: Routledge.

Van Rijnsoever, F. J. (2017). (I cannot get no) saturation: a simulation and guidelines for sample sizes in qualitative research. *PloS one*, *12*(7), e0181689.

Vygotsky, L. S. (1962). *Language and thought*. Ontario, Canada: Massachusetts Institute of Technology Press.

Wakefield, D. V. (2000). Math as a second language. *The Educational Forum*, *64*(3), 272-279.

Whitin, P., & Whitin, D. J. (2000). *Math is language too: Talking and writing in the mathematics classroom*. Urbana, IL, USA: National Council of Teachers of English.

Zhe, L. (2012). Survey of primary students' mathematical representation status and study on the teaching model of mathematical representation. *Journal of Mathematics education*, *5*(1), 63-76.

ANALYZING THE IMPACT OF POVERTY ON ACADEMIC PERFORMANCE OF ORPHAN AND VULNERABLE CHILDREN IN SOUTH AFRICA

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Abstract
Orphan and vulnerable children (OVC) might be the most stricken by child poverty than other children in Sub-Saharan Africa countries and such impacts on their academic development. Using case studies of two high schools situated in Cato Manor, KwaZulu-Natal, this study analysed the impact of child poverty on the academic performance of OVC. The study used a mixed-methods research design. It also utilised a mixed-method to collect data which included surveys for quantitative and semi-structured questionnaires for qualitative. The quantitative data from survey questionnaires were analysed using the Statistical Package for the Social Science software (SPSS Version 25). The qualitative data were analysed using thematic analysis. The main findings reveal that the type of caregiver a child is placed with after the death of parents determines his/her academic performance. In addition, lack of study materials results in poor performance of OVC. Lastly, child poverty is one of the main causes of OVC missing or dropping out of school. The authors concluded that child poverty negatively affected the academic performance of OVC in Cato Manor, South Africa. The practical implication is that programs and policies directed to OVC should be evaluated to suit the needs of the OVC that they, themselves think will work better for them.

Keywords: Child poverty; Orphan; Vulnerable children; Academic performance; Caregivers; South Africa

INTRODUCTION

Orphan and vulnerable children may be stricken by child poverty more than other children in Sub-Saharan Africa countries, impacting their academic development. Among these, orphan children endure the pain of being poor as poverty has a direct impact on their health, emotional being, psychosocial status, and general development (World Bank, 2017). These challenges call for the effective delivery of social services and the functions of social work professionals at schools. Wu, Young and Cai (2012) point out that if child poverty is not addressed at an early stage of life, its negative effect will result in a lack of competency during adulthood. According to Delany, Jehoma and Lake (2016), orphans and vulnerable children are regarded as children that have lost or been abandoned by one or both parents. Also, children that have ill parents and seek protection and care (Delany *et al.,* 2016). In this study orphans and vulnerable children are those in need of protection and assistance because they have either lost their parents or have no one who takes proper care of them. Research evidence shows that orphans and vulnerable children that are under the age of 18 seek protection and assistance the most (Mishra & Bignami-Van Assche, 2008). This article focuses specifically on the impact of child poverty on the academic performance of orphan and vulnerable children.

Child poverty does not only affect orphans' survival, growth, and education but also their employment chances when they reach adulthood. Delany *et al.*, (2016) argue that child poverty is closely associated with adult unemployment. In other words, if poor children do not receive appropriate assistance, they may grow up to be poor as their parents. Furthermore, Arora, Shah, Chaturvedi and Gupta (2015) point out that the loss of parents results in a lack of food security, shelter, and other resources for survival, which then may lead children to engage in potentially life-endangering activities like crime, prostitution, drug abuse, and unprotected sex. This argument suggests that the conditions of orphans not only have a socio-economic impact on individuals but also on the community in general.

As a child grows, their rights and responsibilities are further extended from their household to schools and communities. To ensure the rights of children are met, on top of the child support grant that every poor child in South Africa receives, the South African government through the Department of Education, has provided targeted assistance to schools to meet the needs of poor OVC. This includes R12,000 (the US $ 800) per school specifically directed at the needs of orphans OVC only (Mbatha, 2014). This money is dedicated to assisting all the OVC at school with their needs. Furthermore, orphans who meet the requirements are exempted from paying school fees, therefore, they receive free education (Dass and Rinquest, 2017; NDP,2011). To ensure that children's rights to proper nutrition are met, the government implemented the School Feeding Scheme where all the children who need food can be fed in school (Delany *et al*, 2016). In addition, the South African government provides social workers to work with children within schools to meet children's emotional needs or provides funding to NGOs that provide support to the children at school (NDP, 2011).

Previous studies on OVC focused on caregivers to obtain information about the educational needs of OVC (Blevins and Kawata, 2019; Kazeem & Jensen, 2017; Warrasally, 2015). Some of them rely on already existing data and conclude the impact of child poverty on the educational progress of orphans (Goldberg & Short, 2016, Blevins & Kawata, 2019). Other studies looked at the psychosocial well-being of OVC (Yakubovich, Sherr, Cluver, Skeen, Hensels, Macedo and Tomlinson, 2016; Skeen, Sherr, Croome, Gandhi, Roberts, Macedo & Tomlinson, 2017). Also, other studies focused on where the OVC are being raised (Gray, Ariely, Pence & Whetten, 2017; Beugre, 2019) and who raises them as the primary influence on their academic progress (Kainuwa and Yusuf, 2013). However, little is known about the impact of child poverty on the academic performance of OVC by looking from the perspective of children themselves and by identifying how their family's background influences their academic progress. To close the knowledge gap, the researcher saw the need to shift the angle from caregivers to focus on OVC and listen to their views about issues that affect their school performance.

Problem statement

The specific research problem is that within the school, orphan and vulnerable children face numerous challenges like stigma and discrimination because of their status and background. According to Cluver, Orkin, Gardner and Boyes (2012), orphans are discriminated against in their communities and at school which then results in their well-being being affected (Cluver; Hatcher & Brahmbhatt., 2016). Lingenfelter, Solheim and Lawrence (2017) mention that orphan and vulnerable children experience difficulties in paying fees, a complex school system of varying quality, and other barriers that impede achievement at school. Previous reports on the research area suggest that the extent of child poverty experienced by orphan and vulnerable children results in increased household responsibility (Zhang, Zhao, Li, Hong, Fang, Barnett & Zhang, 2009) which may then compromise children's academic progress

(Lingenfelter et al., 2017). Therefore, the main research question was: What is the impact of child poverty on the academic performance of orphan and vulnerable children in KwaZulu-Natal, South Africa? The objectives of the study are as follows:

- To analyze the relationship between orphan and vulnerable children repeating grades and the type of the caregivers;
- To analyze the extent and effects of child poverty on school performance of orphan and vulnerable children;
- To analyze the impact of child poverty on orphan and vulnerable children dropping out of school.

In this article, orphans are defined as children under the age of 18 with one or both parents deceased and who bear substantial risks of suffering emotionally, physically, and mentally when compared to other children (Lund and Agyei-Mensah, 2008). Throughout the world, children that are defined and labeled as orphans and vulnerable need assistance from every member of society.

The rationale for this article stems from the fact that children are entitled to have access to education, health, nutrition, shelter, and social service. If those basic needs are not met, then those children's rights are being abused (Arora et al., 2015, Jamieson; Berry & Lake., 2017). This article is unique because the researchers gave voice to the orphan and vulnerable children so that they can express their experiences on how their education is affected due to child poverty. After the introduction, the second section is the theoretical framework and literature review, followed by research design and methods. The fourth section presents the findings. The last section discusses the findings followed by conclusions and limitations of the study.

THEORETICAL FRAMEWORK

The study used social exclusion theory as a theoretical framework to collect and analyze the data. Social exclusion theory is linked to the breakdown in social cohesion in France, which resulted in economic inequality and a rapidly growing rate of unemployment (Aalbers, 2010). According to Delany, Jehoma & Lake (2016), social exclusion entails the deprivation of access to education opportunities, healthcare, decent sanitation, clean water, shelter, and other basic needs for well-being. Modi (2015) argues that the process of social exclusion keeps the affected or the labelled outside the structures of the society and deprives them the opportunities, privileges, and access to resources. Modi's argument means that people who are different in any way in society face the challenges of being judged and excluded. The proponents of social exclusion have extended the theory to a proposed framework for orphan and vulnerable children (Pouw & Hodgkinson, 2016). Therefore, orphan and vulnerable children experience social exclusion on many levels that affects their educational development. See Figure 1.

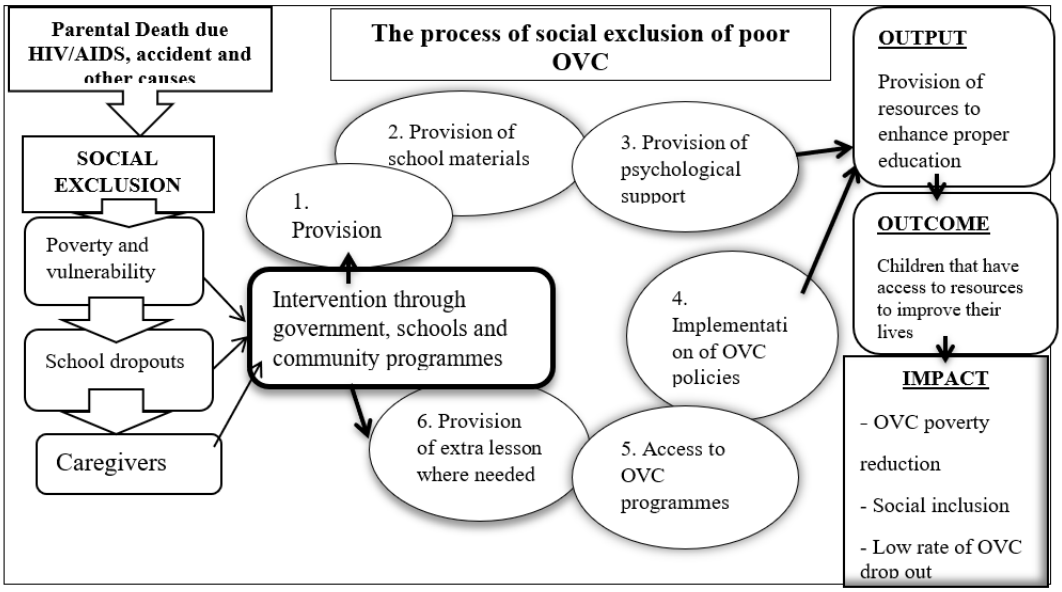

Figure 1. The process of social exclusion and inclusion of poor OVC

LITERATURE REVIEW

Causes of child poverty

Child poverty has many causes depending on regions, countries, and socio-economic context. In their study, Cantillon, Shenzhen, Handa, and Nolen (2017) analyzed child poverty by looking at the impact of great accession on child well-being and compared eleven Organisations for Economic Cooperation and Development (OECD) countries, including Belgium, Germany, Greece, Hungary, Ireland, Italy, Japan, Spain, Sweden, the United Kingdom, and the United States. These scholars found that in Germany inequality was the driving factor behind the rise of child poverty (Cantillon *et al.,* 2017). This factor causes some children to have access to resources while others do not have the same resources and opportunities.

Studies conducted by the United Nations Children's Fund (UNICEF, 2019) and President's Emergency Plan for AIDS Relief (PEPFAR, 2016) reveal that Sub-Saharan Africa countries have the highest rate of orphan and vulnerable children in the world due to Human Immunodeficiency Virus infection and Acquired Immune Deficiency Syndrome (HIV/AIDS). Causing the death of parents, (HIV/AIDS) is a major cause of the existence of orphan and vulnerable children that are facing stigma and discrimination in Sub-Saharan Africa countries (Blevins & Kawata, 2019; Sitienei & Pillay, 2019). This situation results in the death of parents leaving children poor and vulnerable.

Consequences of child poverty

In developing countries, poverty is one of the driving factors behind the high rate of dropouts at schools. Cardoso and Verner (2007) conducted a study in Brazil and found that children living in poverty and that experienced extreme hunger were more likely to have lower school attendance levels. They further state that high levels of poverty led to a high rate of teenage dropouts from school and also result in early parenthood (Cardoso & Verner, 2007). In their studies on child poverty, Zhao, *et al* (2011) and Evans (2012) reported that most children that were orphans and vulnerable isolated themselves from other children by either skipping or

dropping out because of high responsibility after parental death and the stigma they experience at school from their peers.

The consequences of the death of parents leaving children orphaned and vulnerable are significant in the school progress of a child. Using 102 national surveys in the regions of Sub-Saharan Africa, Latin America, Caribbean, and Asia. Guo, Li and Sherr (2012) conducted a study on the impact of HIV and AIDS on children's educational outcomes. They observed that in some countries the rate of enrolment in schools and also attendance frequency is very low among the orphan and vulnerable children compared to other children (Guo *et al*., 2012). Furthermore, orphan and vulnerable children have a very high rate of schooling gap where most of them are in the lower grades (Guo *et al.,* 2012). This is the result of interruptions due to parental illness and death that leads to delay in school (Guo *et al.,* 2012). The effect of HIV/AIDS on orphan and vulnerable children causes poor academic performance and these children experience discrimination and alienation that causes them to have very low self-esteem where they end up isolating themselves from others (Guo *et al.,* 2012). Therefore, close attention needs to be paid to children who are both affected and infected by HIV and AIDS as the consequences on academic performance are dire.

Furthermore, Olanrewaju, Jeffery, Crossland, and Valadez (2015) conducted a study in Uganda to investigate the factors influencing orphan and vulnerable children accessing education from 2011-2013. The study revealed that there was a reduction of 12% over these years of school attendance, this was the result of the lower level of academic performance exhibited by the orphan and vulnerable children due to uninformed caregivers (Olanrewaju *et al*., 2015). Similarly, Akwara, Noubary, Ken, Johnson, Yates, Winfrey, Chandan, Mulenga, Kolker, and Luo (2010) conducted a study on OVC in the Sub-Saharan countries and the findings revealed that children with female guardians who had either primary or higher education were more likely to attend school compared to those with guardians who were not educated. Akwara *et al. (*2010) concluded that the education level of a guardian has a massive impact on the development and outcomes of a child. This means that the chance of a child obtaining better results depends on the guardian with whom they are placed.

In the context of South Africa, children that are poor and orphaned suffer from stereotyping at school and the communities in which they live. Durante and Fiske (2017) argue that from a very young age children learn to associate themselves with others of the same class. Wealthy children do not face difficulties forming friends but poor children usually have low self-esteem and have difficulty making friends (Durante & Fiske, 2017). Regarding academic performance, Durante and Fiske (2017) further state that people in general and teachers stereotypically expect that rich children will have higher intelligence quotients compared to children with low-income backgrounds (Durante & Fiske, 2017). This results in poor children not performing at their best, not because they don't have the ability but because they know they are not expected to do any better (Durante & Fiske, 2017). This means that surviving for a poor orphan and vulnerable child is difficult because of the limited understanding people have about them.

Previous studies done in the field of child poverty and orphan and vulnerable children discovered that the driving factors behind the rise of child poverty are inequality and unemployment of parents. This results in stigma and discrimination among children where orphan and vulnerable children end up being affected academically. Previous studies show a gap of knowledge about the caregiver's role in the performance of orphan and vulnerable children at school. Therefore, the present study intends to fill the gap by analyzing the

relationship between OVC repeating grades and the type of caregivers they are placed with. This study analyses the extent and effects of child poverty on school performance and its impact on orphan and vulnerable children dropping out of school.

STUDY CONTEXT AND METHODOLOGY

The study was conducted in Durban at Wiggins secondary and Umkhumbane secondary schools of Cato Manor, KwaZulu-Natal Province, South Africa. The reason for choosing Cato Manor as a geographical area of the study is that it is known to have high levels of poverty, unemployment, HIV/AIDS, and youth drug addiction (Crime Stats SA, 2017). The researchers chose these two schools because they are the high schools in the area having a high number of orphan and vulnerable children. Cato Manor is a small township (semi-urban area) consisting of people living different kinds of lifestyles (Stats, 2011). Therefore, there was room for comparison of the information collected.

Research design and method

This study employed a mixed-method research design to analyse the real-life experiences of orphan and vulnerable children. The research design was able to accommodate both the qualitative and quantitative methodologies to get rich information about the effect of child poverty on the academic performance of orphan and vulnerable children. This type of research design provided a detailed description of the orphan and vulnerable children's lives and the area of Cato Manor where data was collected.

To achieve the objectives of the study, the researchers used a mixed-methods approach. The mixed-method approach is a research strategy that focuses on understanding the dynamics present within single settings and uses both qualitative (semi-structured interviews) and quantitative (survey questionnaire) methods to collect data (Creswell & Creswell, 2017; Hussein, 2009). The reason for utilizing both the qualitative and quantitative research methods was to enhance the reliability of the findings and creative potential of the study (Creswell, 2014; Tewksbury, 2013). Using the mixed method approach also assisted in collecting information using multiple resources and approaches to understand the effect of child poverty on orphan and vulnerable children.

The population of the study and sampling technique

The population of the study was made up of the orphaned learners, principals, and nutrition committee members from two secondary schools of Cato Manor, KwaZulu-Natal. Both schools combined made up a total of 188 orphans as population size. The sample size for this study was 100 orphan and vulnerable children because each school list of orphans contained around 100 number of enrolled orphans, where 50 were from each school. In the context of non-probability sampling, the study used a purposive sampling technique to select the participants. For the qualitative component (life stories, focus groups, and semi-structured interviews), the study employed purposive sampling (Etikan, Musa & Alkassim., 2016).

As a recruitment strategy for 100 orphan and vulnerable children, the researchers used random sampling that allowed every participant to have an equal chance of being selected (Jia and Barabási, 2013). The age range of the learner respondents was from 13 to 17 years or older. The researchers used the following five (5) criteria of which each OVC respondent was required to meet a minimum of three:

1. Should be a learner enrolled within the two selected schools;
2. Should be willing to participate in the study and give written consent;

3. The parents or guardians should also agree and give consent in writing to allow their child to participate. If the child is the head of the household, they give their consent in front of the social worker;
4. Should be an orphan whose name appears in the school list of orphans and vulnerable children;
5. Should be able to read and write since the surveys were self-administered.

While the school principals were automatically selected with their schools, the researchers selected four nutrition committee members; meaning two members from each school. There were four (4) selection criteria and each respondent had to meet a minimum of three:

1. Should be an active member of the nutrition program in the school;
2. Should have a minimum of five years working for the school or part of the school;
3. Should be willing to participate and give their consent in writing;
4. Should know how the nutrition program functions in the school;

Data collection and analysis

Firstly, for the quantitative data, survey questionnaires were distributed to 100 orphan and vulnerable children written in both isiZulu and English for children to easily understand. The questionnaire included five sections: demographics, socio-economic status, food security, academic performance, and support from external stakeholders. Secondly, qualitative data were collected using semi-structured interviews which were administered to two principals of both schools and four nutrition committee members. Thirdly, life story interviews, consisting of life experiences, were conducted on four orphans that were on the school feeding scheme in the high schools. Then lastly, focus group discussions were conducted with orphans who participated and completed the survey questionnaire. There was one focus group interview per school consisting of 10 learners per school.

The quantitative data from survey questionnaires were analyzed using the Statistical Package for the Social Science software (SPSS Version 25). The analysis of quantitative data entailed three categories which are descriptive, associative, and causative (Strydom, 2011). Firstly, the descriptive method of analysis helped obtain the distribution of orphan and vulnerable children samples across a wide range of variables, such as age, gender, race, and orphanhood status. The method produced a scope of the characteristics of distributions through frequency and measures of central tendency (Bryman, 2008). Secondly, correlational or associative analysis was used to examine the relationships between two variables (Strydom, 2011). The method helped the researchers to get an insight into relationships between the analyzed variables (Strydom, 2011). Thirdly, the causative method consisted of using factor analysis in an objective to establish the network of relationships between variables, cause, and effect of a phenomenon.

The qualitative data were analyzed using thematic analysis (Nowell, Norris, White & Moules., 2017). Firstly, the researchers generated codes that were relevant and assisted to obtain information for the research objectives. Secondly, they searched for themes and sub-themes that accommodate the codes developed to guide the analysis. Finally, there was an interpretation of the findings within themes by giving them meaning; yet codes were used to construct sentences for each objective of the study to answer the research question. Reliability is a way of assessing the quality of the measurement procedure used to collect data (Drost, 2011). To ensure that the data collected was reliable and credible, the study

utilized mixed research methods which allowed the triangulation of data from different sources in pursuit of social reality.

Ethical considerations

Several ethical considerations were taken into account to ensure that this study meets all the ethical guidelines for conducting a study with children. For the participants (orphans) a detailed consent form with explanation, aim, and objectives of the study were sent to the parents/guardians to sign for consent/allowance to involve their children in the study. During the execution of the study, interviews instruments were presented to all potential participants, both in written and verbal form.

FINDINGS

This section consists of a presentation and analysis of the data collected. It starts with presenting the social status of the orphan and vulnerable children and their educational journey. The next sub-section entails showing the relationship between grade repetition and caregivers on the educational journey of orphan and vulnerable children. Following is the extent and effect of child poverty on the academic performance of orphan and vulnerable children. Lastly, the section presents the dropout rate of orphan and vulnerable children at school as the impact of child poverty.

Demographic profile of the OVC respondents

The data in this section were collected using survey questionnaires. It is important to mention up front that the majority of the research participants (99%, 99/100) were Africans, and only 1% of them were coloured. The lack of representativity of other races is because the residents of Cato Manor are dominantly Africans with economically disadvantaged backgrounds. Figure 2 below presents the characteristics of gender by the age of the participants.

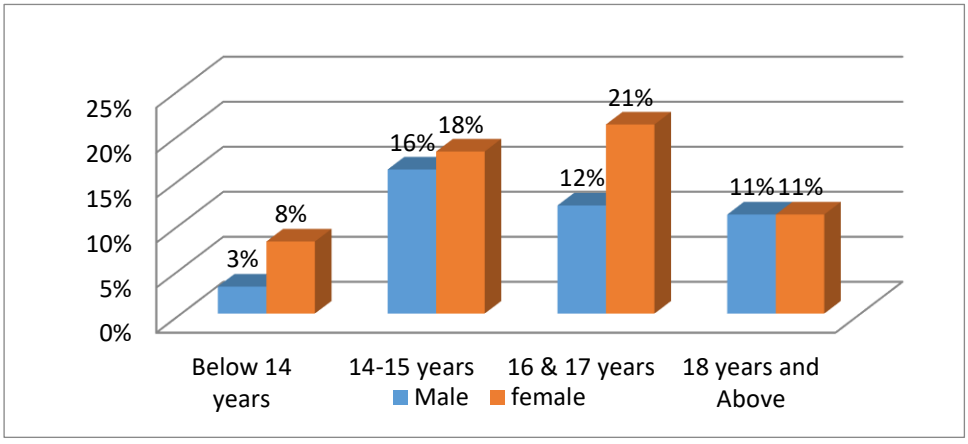

Figure 2. Characteristic of gender by age cohort

Social status of the OVC and their educational journey

There were different causes behind orphanhood and vulnerability of the orphan and vulnerable children participants. As a result, they did not experience poverty in the same way. The findings reveal that 41% (41/100) of the participants from both schools were double orphans, meaning that they had lost both parents. The second most common were paternal orphans at 24% (24/100) where children had lost the father but the mother was still alive. The next category is maternal orphans at 15% (15/100) where children had lost the mother

but the father was still alive. The findings also revealed that 10% (10/100) of the participants were social orphans. In other words, they had parents that they live with but were declared by law as unfit to take care of their children. Those orphan and vulnerable children who indicated other on their orphanhood status was 9% (9/100). These are orphans who appeared on the orphan and vulnerable children list even though they have parents but their parents provided proof that they are unable to provide for them. This can be due to many reasons since Cato Manor is a disadvantaged community with many social issues.

The Relationship between vulnerable repeating grades and the type of caregivers

The death of parents also affects the educational journey of the children. In this study, it was discovered that other factors that may affect children's progress in education were the caregivers assigned to take care of the orphan and vulnerable children. Academic disturbance was observed in vulnerable children during the study. Table 1 below presents the vulnerable children that had repeated grades versus their caregivers.

Table 1. The learners repeating grades by OVC caregivers (N=100)

Caregiver/ number of repeated grades	**never repeated a grade**		**Repeated a grade once**		**Repeated a grade twice**		**Repeated a grade 3 times**		**Repeated a grade 3 times**		**Total sample from 100 population**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**	**n**	**%**
Aunt	13	13	4	4	3	3	-	-	-	-	20	20
Uncle	1	1	3	3	-	-	-	-	-	-	4	4
Grandparents	18	18	7	7	4	4	-	-	-	-	29	29
Siblings	6	6	8	8	2	2	2	2	1	1	19	19
Orphanage	3	3	2	2	-	-	1	1	-	-	6	6
Foster care	-	-	1	1	1	1	-	-	-	-	2	2
Other	15	15	2	2	1	1	-	-	-	-	18	18
Missing	-	-	-	-	-	-	-	-	-	-	2	2
Total	56	56	27	27	11	11	3	3	1	1	100	100

Source: Study survey data

The analysis of Table 1 shows that caregivers affected the performance of a learner. Firstly, for the OVC cared by their aunts, 13% (13/100) of them never repeated a grade, while 4% (4/100) of the OVC repeated once, 3% of them repeated twice only. Secondly, for the OVC cared by their uncles, 1% of them never repeated a grade and 3% of those repeated a grade once only. Thirdly, for orphan and vulnerable children who are cared for by their grandparents, 18% of them never repeated a grade, 7% repeated a grade once and 4% repeated a grade twice. Fourthly, orphan and vulnerable children who are being cared for by their siblings, 6% (6/100) never repeated a grade, 8% repeated a grade once, 2% repeated a grade 3 times, and finally 1% has repeated a grade 4 times and more.

Among OVC who live at an orphanage, 3% (3/100) never repeated a grade, 2% repeated a grade once and 1% repeated a grade 3 times. Following are orphan and vulnerable children who are cared for by their foster parents, 1% (1/100) repeated a grade once and another 1% repeated a grade twice only. Lastly, are orphans and vulnerable children living with their single mothers, fathers, relatives, or both parents that cannot afford to provide for their child, categorized by other shows 15% OVC who never repeated a grade, 2 % repeated a grade once and 1% repeated a grade twice. These findings suggest that most children 31% (31/100)

who live with their grandparents and aunt are coping quite well at school since they are showing the highest number on OVC who never repeated a grade. However, there is also 17% (17/100) of orphan and vulnerable children cared for by aunts and grandparents that are not doing well at school as compared to other categories (see Table 1). Furthermore, the findings show that vulnerable children cared for by siblings were not coping academically since most of them had repeated grades (see Table 1). To understand this better, a further analysis was done in the qualitative component of the study to understand the reasons behind the academic struggle of orphan and vulnerable children.

During one-on-one interviews and focus group discussions, vulnerable children were asked to explain how being raised by their caregivers affects their education. This question was asked to understand the obstacles faced by orphan and vulnerable children and caregivers in terms of education. One child raised by grandparents explained her problem and said that:

> *My grandmother cannot assist me with school stuff because she is not educated and my siblings are younger than me. I end up being the one assisting them. It is hard for me to study alone at home with no assistance which is what makes me struggle academically.*

A second child explained his experience of being raised by a sibling and said:

> *My brother who is taking care of me is working and my father left money to take care of me but I do not have control over it, I get it through the adults at home. They use it to buy me what I need. That is why I've been unable to do well at school and in sport because my brother is very supportive but he doesn't afford everything I want.*

The analysis of Table 1 and two quotes reveals three areas that affected the educational journey of vulnerable children. Firstly, it reveals that a portion of vulnerable children lacked support from home especially those that were being cared for by their aunts and grandparents while a bigger portion is doing well. Secondly, vulnerable children cared for by siblings shows to be having problems academically due to a lack of finances for school-related expenses. The quantitative and qualitative findings suggest that losing the biological parents affects the academic performance of the OVC because sometimes the caregivers living with them were not fit enough to take over parenting.

The extent and effects of child poverty on school performance of vulnerable children

To determine obstacles faced by orphan and vulnerable children to perform well, in the survey questionnaire, orphan and vulnerable children were asked to mention if they lacked school materials in general such as stationery, computers, and uniform. Figure 2 presents the proportion of orphan and vulnerable children who report a lack of school materials to improve academic performance.

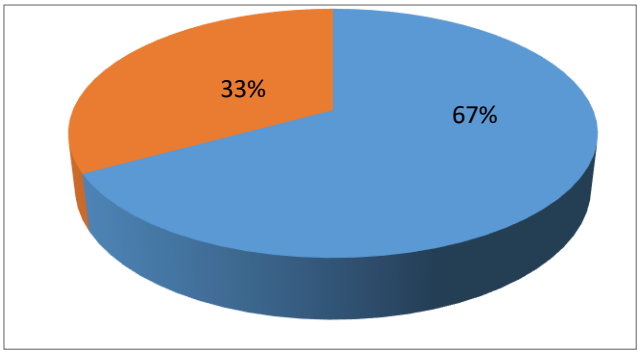

Figure 3. The lack of school material that affects the academic performance of the orphans

The analysis of Figure 3 reveals that 67% (67/100) of the orphan and vulnerable children agreed that they lacked school materials, which is why they could not perform well in their respective grades. In other words, they had difficulties in finding materials for schoolwork. However, 33% (33/100) indicated that they did not have any difficulties in finding school materials. These quantitative findings suggest that most orphan and vulnerable children lack school material, a situation that could lead to poor performance at school.

During the focus group discussions and one-on-one interviews, most orphan and vulnerable children reported that they did not have enough school materials. As a result, they reported that the situation affected their school performance. About school materials, the respondents were asked also to mention three things they needed to improve their school performance. One learner said:

> *I lack stationery sometimes, which the school does not provide. My mother sometimes does not afford to buy school material for me because she is looking after the four of us and only getting a grant for two of us. I would say that the assistance we receive from our school is not enough. I am required to buy three study guides, but so far I have managed to buy only one.*

A grade 10 learner reported his experience by saying:

> *Three major things that can assist me to do well at school are sufficient required textbooks, computers, and school study groups that I can study with after school. I have one friend that I can study with but she is not allowed to come to my house.*

A third learner reported that she was not performing well at school due to the lack of resources. She explained her situation as follows:

> *I would have good school results if only I could get all the materials, I need for school including study guides, calculators, etc. Secondly, I need financial support to buy uniforms and other school materials. Lastly, I need someone who would support me emotionally and encourage me to do better at school. I want to complete and pass my matric. But there were too many obstacles standing in my way causing me to not perform well at school.*

The analysis of these three quotes reveals three important findings of the impact of child poverty on the school performance of orphan and vulnerable children. Firstly, orphan and vulnerable children were in deep need of school materials to foster their performance at

school. Secondly, they lacked emotional support and encouragement both at home and at school which, they needed the most. Thirdly, the results reveal that the interventions provided to orphans were not effective if looking at the rate of vulnerable children who stated that they lacked school material. These findings suggest that the lack of school materials resulted in poor performance of orphan and vulnerable children at school.

The impact of child poverty on orphan and vulnerable children dropping out of school

During the data collection process, it was noted that seven orphan and vulnerable children from the schools who were on the list of participants were no longer at the school. The school principals and nutrition committee members reported that orphaned children had many challenges causing them to drop out of school. As a result, some used to disappear from the school. The school principals mentioned that some causes of dropout rate were linked to hunger, drug use, loss of motivation, and being the victims of stigma and discrimination. One school principal said:

> *I remember there was one boy from an orphanage who had an attendance problem. He would come to school with the orphanage school bus and be dropped off at the school gate. However, he used to disappear at the school gate and not enter the premises. He would come back at the school gate again to wait for the bus in the afternoon to return to the orphanage. Then we discovered that he was both using and selling drugs. He dropped out of school and I just hope the caregivers referred him somewhere where he can find assistance.*

In the focus group interviews, orphans indicated that the main cause of their school dropout was poverty and the trial to find a way to survive. One learner explained the cause of school dropout as follows:

> *Some orphans have found piece jobs like being taxi conductors to get money to buy clothes and other things. They start as taxi conductors then drop out of school and become taxi drivers, which is not a good career. Even though they like being educated, the circumstances force them to find ways to get income so that they can support their families and siblings.*

A second learner in the focus groups said:

> *The problem is that other children undermine me and I feel demotivated from coming to school. It is hard coming to school where learners make fun of you because of the old color faded uniform you wear. With low self-esteem, it is hard to even do great on my grades.*

The analysis of these three quotes reveals four main causes of orphan and vulnerable children's dropping out of school. Firstly, illicit drugs are one of the driving factors behind children dropping out. Secondly, finding means to earn a living for survival is the main factor that contributes to the high rate of dropouts. Thirdly, poverty also contributes to dropping out of orphan and vulnerable children in school. They cannot afford some school materials which results in them being demotivated to attend school because they are poor and feel ashamed to come and be with other kids. Fourthly, once orphans dropped out of school, there was no proper follow-up on them to pursue them to come back to school. These four findings suggest that the high rate of dropout is inextricably linked to poverty. A more robust system is needed

in schools to ensure that those children who are leaving school are motivated to come back and continue studying.

DISCUSSIONS

The type of caregiver is associated with the educational development of a child. In this study, it was discovered that the orphans who were cared for by uneducated grandparents and siblings suffered the most academically. As a result, the highest number of orphan and vulnerable children who were being cared for by their grandparents and siblings were more likely to have repeated grades. These findings are similar to those of Kainuwa and Yusuf (2013) in Nigeria revealed that orphans living with uneducated guardians do not get the necessary encouragement and academic support to do well in school. In the same vein, a survey study was conducted by Akwara *et al.* (2010) to identify children at risk in the era of HIV/AIDS in Sub-Saharan countries. The study revealed that children with guardians who had either primary or higher education are more likely to attend school compared to those with guardians who are not educated at all. This means that the level of education of a guardian has an impact on the educational performance of an orphaned child at school. It is widely acknowledged that in South Africa the majority of grandparents who care for children are struggling to support them academically because they are uneducated.

The lack of school materials also contributed to the poor performance of orphan and vulnerable children. The findings indicate that 67% of the interviewed orphan and vulnerable children had difficulties in finding money for school materials. The materials include school uniforms, textbooks, and computers that were not provided in their schools. These findings contradict what the government in the National Development Plan (2011) promised to improve the education of vulnerable children in South Africa. According to the present findings, the educational needs of orphan and vulnerable children are not met to a large extent due to the lack of resources, a situation which resulted in orphan and vulnerable children being excluded by other children in the school.

The cause of dropping out of school is another major finding in this study. It was discovered that some OVC took the responsibility to care for their younger siblings after the death of their parents, a fact causing their poor academic performance and dropping out of school. These findings correlate to the findings of Zhang *et al.* (2009) in the context of China that children who have lost their parents face the responsibility of caring for themselves, other siblings, sick parents, and elderly parents in their households. As a result, these children drop out of school either to take care of the household or look for a job to support the family (Zhang et al., 2009). In the context of the present study, most orphan and vulnerable children began the new lifestyle of poverty which required them to reduce what they used to get from their parents. Therefore, if the death of parents occurs, certain measures should be taken to ensure that children get adults who can care for all of them. This in turn will minimize the rate of homes headed by children and encourage vulnerable children to attend and perform well in school.

The 19% (19/100) of orphans became the heads in child-headed homes. Some orphans were reported to be dropping out of school to look for jobs so that they can take care of their siblings. Evans (2012) found similar results in the study of investigating children heading homes in Tanzania. In the study of Evans (2012), it was discovered that children heading homes were found to be facing many challenges. These included skipping or quitting school to do house chores and make means to find food for younger siblings. The present findings also correlate with those discovered by Cardoso and Verner (2007) who conducted a study in

Brazil and found that children living in poverty and experiencing extreme hunger were more likely to have lower school attendance levels. The situation resulted in a high rate of school dropout and early parenthood. A high rate of drop out was found amongst orphan and vulnerable children that were heading their homes. The present findings suggest that there were orphans and vulnerable children that did not get the necessary support after the death of their parents. The situation led orphan and vulnerable children to make drastic decisions that affect their future to make a better future for their siblings.

CONCLUSION

The findings of this study show that the extent of poverty experienced by orphan and vulnerable children indeed has an impact on their educational development. Findings show that after the death of parents, children were placed with caregivers that had a significant impact on their ability to perform in school and were thus linked to their future success. Orphan and vulnerable children who were placed with grandparents or with siblings do not perform well at school as compared to orphan and vulnerable children placed with other caregivers. This was because they were either not educated or the responsibilities placed on them after the death of their parents becomes too much for them. The findings show that after the death of parents' children tend to lack many resources, including school materials that determined academic performance. Many orphan and vulnerable children reported that the lack of school materials contributed to their poor performance. Lastly, the findings show the extent of child poverty experienced by orphan and vulnerable children leads to dropping out of school. This is the result of stigma, discrimination, and stereotyping that the orphan and vulnerable children face in school. Based on the findings, the authors conclude that the academic performance of orphans is massively affected due to the lack of delivery of social services and interventions of social work professionals in schools and communities to reduce child poverty.

The practical implication for policymakers is that programs and policies directed to orphan and vulnerable children should be evaluated to suit the needs of the orphan and vulnerable children that they think will work better for them. The implication for social work practitioners is that social workers should be empowered and form a working relationship and partnerships with schools to deliver social services to orphan and vulnerable children. There is a need to have combined project teams to address specific problem areas of orphan and vulnerable children, which should be established between the Department of Education and social work structures and practitioners.

The contribution of the article to the body of knowledge is that it provides the experiences of orphan and vulnerable children about child poverty from their perspectives. This article is unique because it demonstrates the opinions and views of orphan and vulnerable children about their experiences of child poverty and its impact on their school performance and attendance. The practical implication for policy is that the policies drawn should involve the orphan and vulnerable children since they are the ones that know what they need the most to do well academically.

LIMITATIONS OF THE STUDY

The lack of formal statistical testing about the relationship of caregiver types and the school drop-out rate was a limitation that when other researchers should include in future studies. The major limitation of the study relates to the study population. The study was conducted with young boys and girls who might not be comfortable disclosing their private information. To overcome this limitation, the researcher sent letters to the parents and guardians to grant

permission to their children to participate in the study, in that way they also trusted the study. Furthermore, the teachers were not interviewed in this study. Their roles as teachers and how they cope with orphan and vulnerable children may give the study another interesting angle and that might provide very useful information concerning orphans and their academic development.

REFERENCES

Aalbers, M. B. (2010). Social Exclusion. in R. Hutchison (ed.), Encyclopedia of Urban Studies. Thousand Oaks, CA: Sage Publications.

Akwara, P. A., Noubary, B., Lim Ah Ken, P., Johnson, K., Yates, R., Winfrey, W., & Luo, C. (2010). Who is the vulnerable child? Using survey data to identify children at risk in the era of HIV and AIDS. *AIDS care*, *22*(9), 1066-1085. https://www.tandfonline.com/doi/abs/10.1080/09540121.2010.498878.

Arora, S. K., Shah, D., Chaturvedi, S., & Gupta, P. (2015). Defining and measuring vulnerability in young people. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, *40*(3), 193-205. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4478662/ (Accessed 05 July 2021)

Beugre, A. P. W. (2019). *Deinstitutionalization of OVC In Ghana's Central Region Factors That Impact Alternative Care in Bawjiase and Surroundings.* Ghana

Blevins, B. K., & Kawata, K. (2019). The orphan impact: HIV-AIDS and student test scores from sub-Saharan Africa. *Educational Review***,** 1-24. https://www.researchgate.net/profile/BenjaminBlevins/publication/337743760_The_orn_impact_HIVAIDS_and_student_test_scores_from_subSaharan_Africa/links/5de9081d4585159aa4636864/The-orphan-impact-HIV-AIDS-and-student-test-scores-from-sub-Saharan-Africa.pdf (Accessed 05 July 2021)

Bryman, A. (2008). *Social Research Methods*, 3rd Edition. Toronto: Oxford University Press.

Cantillon, B., Chzhen, Y., Handa, S., & Nolan, B. (2017). *Children of austerity: impact of the great recession on child poverty in rich countries*. United Kindom: Oxford University Press.

Cardoso, A. R., & Verner, D. (2007). Youth risk-taking behavior in Brazil: drug use and teenage pregnancies. Bonn, Germany: Institute for the Study of Labor.

Cluver, L. D., Orkin, M., Gardner, F., & Boyes, M. E. (2012). Persisting mental health problems among AIDS-orphaned children in South Africa. *Journal of Child Psychology and Psychiatry*, *53*(4), 363-370.
https://acamh.onlinelibrary.wiley.com/doi/epdf/10.1111/j.1469-7610.2011.02459.x

Creswell, J. W. (2014). *A concise introduction to mixed methods research*. London: Sage publications.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approach*. London: Sage Publications

CrimeStatsSA. (2017). Crime Stats Simplified Pretoria: *Crime Statistics South Africa*. Pretoria

Dass, S., & Rinquest, A. (2017). School fees. *Basic education rights handbook: Education rights in South Africa. Johannesburg, South Africa: SECTION27. Available at http://section27.org. za/wp-content/uploads/2017/02*. (Accessed 05 July 2021)

Delany, A., Jehoma, S., & Lake, L. (2016). *South African child gauge 2016: Children and social assistance*. Children's Institute, University of Cape Town.

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and perspectives,* 38**,** 105. https://www3.nd.edu/~ggoertz/sgameth/Drost2011.pdf (Accessed 05 July 2021)

Durante, F. & Fiske, S. T. (2017). How social-class stereotypes maintain inequality. *Current opinion in psychology,* 18**,** 43-48. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6020691/(Accessed 05 July 2021)

Goldberg, R. E. & Short, S. E. (2016). What do we know about children living with HIV-infected or AIDS-ill adults in Sub-Saharan Africa? A systematic review of the literature. *AIDS care,* 28**,** 130-141. https://www.tandfonline.com/doi/pdf/10.1080/09540121.2016.1176684(Accessed 05 July 2021)

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics, 5*(1), 1-4. https://d1wqtxts1xzle7.cloudfront.net/55796997/Comparison_Convenience_and_Purposive_Sampling-2016_(Accessed 05 July 2021)

Evans, R. (2012). Sibling caringscapes: Time-space practices of caring within youth-headed households in Tanzania and Uganda. *Geoforum, 43*(4), 824-835. http://centaur.reading.ac.uk/27842/1/Evans_R_2012_Geoforum_Sibling_caringscapes.pdf(Accessed 05 July 2021)

Gray, C. L., Ariely, S., Pence, B. W. & Whetten, K. (2017). Why institutions matter: Empirical data from five low-and middle-income countries indicate the critical role of institutions for orphans. *Child Maltreatment in Residential Care.* Springer.379-400

Guo, Y., Li, X., & Sherr, L. (2012). The impact of HIV/AIDS on children's educational outcome: A critical review of global literature. *AIDS care, 24*(8), 993-1012. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8183108/(Accessed 05 July 2021)

Hussein, A. (2009). The use of triangulation in social sciences research: Can qualitative and quantitative methods are combined. *Journal of comparative social work, 1*(8), 1-12. https://journals.uis.no/index.php/JCSW/article/view/48(Accessed 05 July 2021)

Jamieson, L., Berry, L., & Lake, L. (2017). *South African child gauge 2017*. Children's Institute: University of Cape Town.

Jia, T., & Barabási, A. L. (2013). Control capacity and a random sampling method in exploring controllability of complex networks. *Scientific reports, 3*(1), 1-6. https://www.nature.com/articles/srep02354(Accessed 05 July 2021)

Kainuwa, A., & Yusuf, N. B. M. (2013). Influence of socio-economic and educational background of parents on their children's education in Nigeria. *International journal of scientific and research publications, 3*(10), 1-8. https://d1wqtxts1xzle7.cloudfront.net/37602723/ijsrpp2258.pdf?1431356178=&responsecontentdisposition=inline%3B+filename%3DInfluence_of_Socio_Economic_and_Educatio.pdf(Accessed 05 July 2021)

Kazeem, A. & Jensen, L. (2017). Orphan status, school attendance, and their relationship to household head in Nigeria. *Demographic Research, 36 (22)***,** 659-690. https://www.jstor.org/stable/pdf/26332145.pdf (Accessed 05 July 2021)

Lingenfelter, W. V., Solheim, K. & Lawrence, A. (2017). Improving secondary education for orphans and vulnerable children in Malawi: One non-governmental organization's perspective. *Child & Youth Services, 38(2)***,** 142-158. https://www.tandfonline.com/doi/abs/10.1080/0145935X.2017.1297201 date accessed 05 July 2021

Lund, R., & Agyei-Mensah, S. (2008). Queens as mothers: The role of the traditional safety net of care and support for HIV/AIDS orphans and vulnerable children in Ghana. *Geo*

Journal, *71*(2-3), 93-106. https://www.jstor.org/stable/pdf/41148243.pdf(Accessed 05 July 2021)

Mbatha, Z. P. (2014). *Investigating the effectiveness of orphans and vulnerable children (OVC) programs in schools: a case of Ntuzuma G-section in Durban* (Doctoral dissertation).

Mishra, V. K., & Bignami-Van Assche, S. (2008). *Orphans and Vulnerable Children in High HIV-prevalence Countries in Sub-Sahara Africa*. Calverton, Maryland: Marco International.

Modi, I. (2015). Social exclusion and inequality: Challenges before a developing society. *Sociological Bulletin*, *64*(1), 3-14. Sage Publications, Inc. https://www.jstor.org/stable/pdf/26290717.pdf(Accessed 05 July 2021)

National Planning Commission. (2011). National development plan. *Vision for, 2030*. Pretoria: Government Printer.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International journal of qualitative methods*, *16*(1) https://journals.sagepub.com/doi/pdf/10.1177/1609406917733847 (Accessed 05 July 2021)

Olanrewaju, A. D., Jeffery, C., Crossland, N., & Valadez, J. J. (2015). Access to education for orphans and vulnerable children in Uganda: a multi-district, cross-sectional study using lot quality assurance sampling from 2011 to 2013. *PloS one*, *10*(7). https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0132905(Accessed 05 July 2021)

Pouw, N. and Hodgkinson, K. (2016). Research design: The social exclusion of vulnerable youth. *Commissioned by SOS Children's Villages*.

PEPFAR. (2016). Building a Sustainable Future Report on the 2016 PEPFAR Sustainability Indices and Dashboards (SIDs). United States US President's Emergency Plan For AIDS Relief. United States: Pepfar. https://www.state.gov/wp-(Accessed 05 July 2021)

content/uploads/2019/08/Building-a-Sustainable-Future-Report-on-the-2016-PEPFAR-Sustainability-Indices-and-Dashboards-SIDs.pdf date (Accessed 04 July 2021)

Sitienei, E. C. & Pillay, J. (2019). Psycho-educational and social interventions provided for orphans and vulnerable children at a community-based organization in Soweto, South Africa. *African Journal of AIDS research, 18 (1)***,** 1-8. https://www.tandfonline.com/doi/abs/10.2989/16085906.2018.1548359(Accessed 05 July 2021)

Skeen, S. A., Sherr, L., Croome, N., Gandhi, N., Roberts, K., Macedo, A. & Tomlinson, M. (2017). Interventions to improve psychosocial well-being for children affected by HIV and AIDS: a systematic review. *Vulnerable children and youth studies, 12 (2)***,** 91-116. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5659734/(Accessed 05 July 2021)

StatsSA. (2011). Statistics South Africa. *Formal census*. Pretoria.2011.

Strydom, H. (2011). Ethical aspects of research in the social sciences and human service professions. *Research at grassroots for the social sciences and human service professions*, *4*, 113-129.

Tewksbury, R. (2013). Qualitative versus quantitative methods: Understanding why qualitative methods are superior for criminology and criminal justice. University of Louisville

UNICEF 2019. (2018). Annual Report. *For every child, reimagine*.UNICEF. https://www.unicef.org/media/74016/file/UNICEF-annual-report-2019. pdf date (Accessed 04 July 2021)

Warrasally, N. (2015). *Resiliency in the context of HIV/AIDS: a study of community caregivers' perceptions of orphans and vulnerable children in two KwaZulu-Natal districts.*

Yakubovich, A. R., Sherr, L., Cluver, L. D., Skeen, S., Hensels, I. S., Macedo, A. & Tomlinson, M. (2016). Community-based organizations for vulnerable children in South Africa: Reach, psychosocial correlates, and potential mechanisms. *Children and youth services review*, 62**,** 58-64. https://www.sciencedirect.com/science/article/pii/S0190740916300160 (Accessed 05 July 2021)

World Bank. (2017). Monitoring Global Poverty Report of the Commission on Global Poverty. International Bank for Reconstruction and Development: Washington D.C.

Wu, K. B., Young, M. E., & Cai, J. (2012). *Early child development in China: Breaking the cycle of poverty and improving future competitiveness:* The World Bank.

Zhao, Q., Li, X., Zhao, G., Zhao, J., Fang, X., Lin, X., & Stanton, B. (2011). AIDS knowledge and HIV stigma among children affected by HIV/AIDS in rural China. *AIDS education and prevention*, *23*(4), 341-350. https://guilfordjournals.com/doi/pdfplus/10.1521/aeap.2011.23.4.341 (Accessed 05 July 2021)

Zhang, J., Zhao, G., Li, X., Hong, Y., Fang, X., Barnett, D., Lin, X., Zhao, J. and Zhang, L. (2009). Positive future orientation as a mediator between traumatic events and mental health among children affected by HIV/AIDS in rural China. *AIDS care*, *21*(12), pp.1508-1516. https://drive.google.com/file/d/1jjOJ3uJSU-3CqW4XyKfXERi_Mop-FoJ-/view

ENHANCING TEACHER PRACTICE IN TIMES OF CRISES THROUGH SCHOOL-BASED TEACHER PROFESSIONAL DEVELOPMENT: IMPLICATIONS FOR RURAL-BASED SCHOOLS IN KWAZULU-NATAL, SOUTH AFRICA

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Abstract
Schools in rural contexts are confronted with unique contextual challenges that hinder the accurate implementation of school-based teacher professional development (SBTPD). The advent of Corona Virus Disease – 2019 (COVID-19) on South African (SA) shores exacerbated these challenges, particularly in rural schools. Teachers and school principals are not aptly equipped to withstand crises that negatively impact on teaching and learning. This paper examined the experiences of teachers and school principals in implementing SBTPD to enhance teacher practice in times of crises in a selected South African context. This paper was underpinned by the interpretive qualitative approach and adopted a multiple case study design. Schools were randomly selected and participants were purposively selected. Data was generated through semi-structured interviews and focus group discussions with teachers and school principals, as participants, from two schools in a selected rural circuit. Data was analysed using the thematic analysis. The findings revealed a lack of collaborative practices necessary for effective SBTPD among teachers, no desire for self-directed learning from teachers as they depended on the Department of Education (DoE) to provide workshops and were comfortable being caged within the DoE formular of teacher development. Further findings revealed a lack of leadership from the school principals in managing the implementation of SBTPD. In view of the findings, this paper suggests empowerment of teachers and school principals to design and manage their own SBTPD programmes so they can enhance their practice, particularly in times of crises.
Keywords: teacher professional development, teacher practice, crises, rural contexts

INTRODUCTION

To enhance the quality of teaching and learning in schools, teachers need to continually work on their competencies through school-based teacher professional development (SBTPD) and need to be in sync with the pioneering developments and insights in their own field. The purpose of any teacher professional development is to develop and enhance teaching practice, leading to improved learning outcomes for learners (Postholm, 2016). The advent of (COVID-19) has compounded challenges that schools in rural settings are already confronted with. Some of these challenges include, but are not limited to, unfavourable socioeconomic conditions, vulnerable political economies, fiscal incapacity, and low levels of adult education (Ebersohn & Ferreira, 2012; Hlalele, 2012; Matshe, 2014, Myende & Nhlumayo, 2020). This new crisis has exposed the shortcomings of the South African education system and forced it to step up to new unexplored territories of teaching and learning. Despite the number of policies that form a framework for teacher professional development in South Africa (SA), has not seemed to yield the desired results, which is enhanced teacher practice as well as the improvement of academic outcomes for learners. Therefore, this paper extends the body of knowledge on the use of school-based teacher professional development (SBTPD) as a tool to enhance teacher practice, particularly in rural schools. Based on their

observation, Odeku and Vondwe (2014) claim that SA still faces a major challenge related to teaching and learning because of poor or weak teacher development programmes. The chief objective of any teacher professional development programme is the enhancement of learner outcomes through teachers having to continually work on their teaching proficiencies to improve their practice (Postholm, 2016). When properly implemented, SBTPD programmes are likely to provide opportunities that may offer a more feasible, all-inclusive, and fair education even after the crises.

Statement of the Problem

A plethora of challenges that rural contexts are confronted with makes it seem impossible for schools to effectively implement and manage teacher professional development programmes (Shelile & Hlalele, 2014; Mpahla & Okeke, 2015). Teachers in rural contexts are therefore often not motivated to implement development programmes, since they do not seem to see the influence of these programmes on their teaching practices (Mpahla & Okeke, 2015). Ajibade (2016) further indicates that those mandated with the provision of support, monitoring, evaluation and overall management of professional development programmes in schools do not execute their responsibilities as they should, particularly in schools in rural contexts.

Research Question

The study responded to the following question:

What challenges do teachers and school principals experience in implementing school-based teacher professional development to enhance teacher practice in the selected rural education circuit?

LITERATURE REVIEW

This section provides literature that was reviewed regarding the enhancing of teacher practice through SBTPD in rural contexts. Three sections are discussed, which are: the rural dimension of SBTPD in South Africa, some challenges encountered in SBTPD implementation and some success factors for school-based teacher professional development.

The rural dimension of SBTPD in South Africa

Myende and Chikoko (2014) define rurality as a phenomenon in those contexts that experience various deprivations which include, but not limited to illiteracy and poverty. These deprivations have a negative impact on the attainment of quality education and the implementation and execution of other educational programmes. Mpahla and Okeke (2015) assert that rural schools are disadvantaged because of the social inequalities they experience, and this affects the effective implementation of SBTPD programmes. Teachers who teach in rural schools tend to define themselves according to the context in which they work (Pitsoe and Maila, 2012) and this negatively affect the SBTPD implementation. The implementation of SBTPD seems to be much more challenging in rural contexts than in any other context (Gardiner, 2008) as some unfavourable conditions have remained unchanged in some rural contexts. Nevertheless, even in rural contexts, teacher development is essential to obtain new pedagogical knowledge, and changing insights about the curriculum to achieve the goals of the new education developments, of which the objective is improved teacher and learner performance.

Some challenges encountered in SBTPD implementation

In post-apartheid SA, the education sector has been confronted with some major changes with a view to bring about key social and educational transformations (Myende & Nhlumayo,

2020). However, in spite of the many policies and guidelines to transform education, the area of SBTPD is still fraught with many challenges that make its implementation difficult. Some of these challenges include lack of collaborative learning among teachers, teachers' unwillingness to participate in teacher professional development activities and the everchanging curriculum design (Nhlumayo, 2020). These challenges include, among others, the lack of collaborative learning among teachers, lack of qualified personnel to manage and monitor the implementation of SBTPD and teachers' reluctance to participate in SBTPD activities.

Lack of collaborative learning results in teachers working in isolation, which is one of the inhibitors of growth in teacher professional competence. De Clercq and Phiri (2013) assert that productive learning does not happen in a vacuum. Teachers are so used to the culture of isolation that it has become normal, therefore Kafyulilo (2013) cautions that teachers should not be coerced to collaborate, rather, they should be motivated to realise the benefits of collaborating. Lack of qualified personnel to manage SBTPD implementation points to the lack of leadership in schools that can ascertain the enhancement of teacher practice through teacher professional development. In Mpahla and Okeke's (2015) study on the approaches for implementing continuing professional development plans in one rural education district, it emerged from the district officials who were sampled, that they were not qualified and did not have any credentials to facilitate and therefore could not deliver on the job. If such people are not qualified to facilitate such important programmes, the question arises as to how they manage and monitor its implementation. In their study on principals' views on teachers' professional development, Nabhani et al., (2014) found that teachers' negative attitude towards teacher professional development was an obstacle to its implementation. On one hand, this calls for strong leadership from school principals to exercise their leadership skills and motivate teachers to view teacher professional development in a new light. On the other hand, teachers must possess high quantities of intrinsic motivation in a bid to transform their attitudes.

Some success factors for school-based teacher professional development

Although there are challenges in the implementation of SBTPD to enhance teacher practice in rural schools, not all hope is lost. Some of the success factors necessary for effective SBTPD are, although not limited to, continuity, support, and monitoring and evaluation of the programme. School principals are tasked with the responsibility to ensure that teachers are involved in professional development activities on a regular basis throughout their service as teachers. However, Liu and Hallinger (2017) note, in contrast, that a dearth in quality leadership results in a lack of continuity and innovation in SBTPD implementation. The success of all SBTPD programmes in the school is dependent on the support from the school principal, who also requires support from their circuit manager and other district officials. Lack of effective leadership and lack of continuous support contributes to teachers' lack of commitment and reluctance to participate in collaboration for teacher practice (Kennedy, 2011; Thoonen et al., 2014; Liu & Hallinger, 2017). Monitoring and evaluation are necessary for the success of SBTPD implementation. Nabhani et al. (2014) assert that the lack of any follow-up activity and support from authorities is bound to make teacher professional development in the whole school and, particularly, in classroom practices unreliable and unconvincing.

THEORETICAL FRAMEWORK

This paper employed an eclectic mix of a trinity of theories to serve as a lens, with a view that it will mirror the implementation of SBTPD to enhance teacher practice, particularly in times of crises. Teacher professional development is about learning with an aim to enhance

teacher practice (Postholm, 2016) and the synergy among the theories is learning. These theories are Wenger's (1999) social learning theory, Speck's (1996) and Knowles' (1984) adult learning theory and Liu and Hallinger's (2017) theory of learner-centred leadership. Below is the discussion of each theory and its relevance for this paper.

Social learning theory

Wenger (1999) argues that learning is a form of effective and cooperative participation and is situated in social contexts that involve groups of people referred to as a community of practice. This theory delves into the deep threads of collaboration and connectivity among teachers in a school, as they teach and learn. This social participation is an essential element of effective SBTPD.

Adult learning theory

Speck (1996) and Knowles (1984) argue that adults want to shape and direct their own learning and align it to their day-to-day activities. SBTPD requires that teachers not only teach but continue to learn in their job (Postholm, 2016). Situated work embedded and contextual learning that are related to teacher's work are bound to develop and assist them in enhancing their teaching practice (Yuen, 2012).

Theory of learner-centred leadership

Liu and Hallinger (2017) argue that school leaders model, guide, promote and contribute to teacher learning and development to expand their own knowledge of managing and monitoring teacher professional development programmes. School principals have a duty to establish schools as learning organisations for teachers and a fertile ground for teacher professional development. As learning-centred leaders, school principals are directly involved in SBTPD implementation through leading, monitoring, managing, and initiating conditions that nurture educational and social learning within the school (Hallinger & Lee, 2014).

METHOD

A multiple case study design grounded in the interpretive qualitative paradigm was deemed appropriate for this study. The case study method is based on true-life situations and offers diverse perceptions, provides explanations (Merriam, 1998), and purposefully deals with interlinked situations (Yin, 2003). Adopting this mode of inquiry was based on the premise that the study was topical, and the intention was to acquire a sound understanding of how SBTPD could be used to enhance teaching practice. From two randomly selected primary schools where each school had an average of nine teachers, I relied on each of the school principals, as gatekeepers, to assemble a group of six post level one teachers to form a focus group. Teachers were purposively selected to be participants because they are the practitioners of SBTPD in their respective schools. Data was generated using focus group discussions (FGDs) with two groups, made up of six teachers, from each school and semi-structured interview with each of the two school principals. Data was analysed using thematic analysis as guided by Braun and Clarke (2006). Miles and Huberman (1994) and Creswell (2009) assert that thematic analysis is appropriate for data from different data sources.

FINDINGS

The findings reveal three critical themes that emerged from the data. Firstly, a lack of collaborative practices among teachers emerged from the data. Secondly, there was a lack of self-directed learning to implement own teacher professional development programmes among the teachers. Thirdly, it emerged that there was a lack of leadership from the school

principals as people mandated with monitoring the implementation of SBTPD. The identification for participants for this study is as follows:

School – School A and School B
Focus Group Discussions – Group A and Group B
School principals – Pa and Pb

It is worth explaining that the data presented for group A or B is a collective voice of the group participants, and recognition is made where there are dissenting voices.

Lack of collaborative practices among teachers

Across the two focus groups of teachers, it surfaced that there was a lack of intra-school and inter-school collaboration which is essential for SBTPD and to improve teacher practice particularly in times of crises. Group participants from School A revealed that some teachers were not keen on working with other teachers, they were satisfied with the work they did using the resources they had:

> *Some people do not like to work with others, sometimes it feels like a waste of time because you know the methods, you attended the TD workshops, and when you have all the material that you need for the subjects, then you are good to go.* **(Group A)**

Participants from School B revealed that the quietness and non-participative disposition of teachers during cluster meetings was a measure of how much they were willing to collaborate. Their view was as follows:

> *Sometimes we meet as PLCs and people just keep quiet and not say anything, the DH will then keep talking just to keep the session going, sometimes I feel sorry for her, people just become quiet when they have to speak up, as if they do not want to be there.* **(Group B)**

In School A again, group participants indicated that culture of isolation contributed significantly to the lack of collaboration between teachers.

> *Most of the time it's just that we are not used to this collaboration concept, it is a new thing. We get in class and teach, especially when you have all that you need, like your ATP, and teacher's guide and the learners have their textbooks, so it feels like time is wasted when you meet up with others to talk about what you do in class.* **(Group A)**

The school principals revealed that teachers were not inclined to working together, and this posed a challenge for the effective implementation of SBTPD. Teachers were not used to the culture of collaboration. *Pa* revealed that there were problems with collaboration. He said:

> *So, the problem we face is that other schools do not want to collaborate but, would rather work on their own, they just want to teach, teach and go back home and they are satisfied with that. When there are cluster meetings that are arranged, you find that some educators just do not show up. So those are the problems with collaboration.* **(Pa)**

Pb reiterated that the lack of collaboration was as a result of some teachers being comfortable working on their own.

> *Some schools and teachers are not keen on collaboration; they just want to work alone. I think because when you have all the material that you need, you will not be keen on the human resource that might be available. Some collaborative meetings are planned, and people do not show up.* **(Pb)**

The data reveals that teachers were not keen and inclined to the culture of collaborative practice, and they leaned to the traditional practices of working in isolation. Teachers succeed while working independently, but with collaboration, there is a greater chance of improvement for both teacher and learner. With collaboration, teacher practice improves resulting in schools being continue with process of teaching and learning amidst crises. Teachers need not to be forced to collaborate, but school leadership has a duty to teach and motivate teachers about the importance of collaboration through SBTPD.

Lack of self-directed learning form teachers

It emerged from the findings that teachers were not motivated to learn while in the process of teaching. Teachers assume that being qualified is the culmination of their teaching career and only relied on workshops that were provided by the Department of Education (DoE). In discussion with School A, it emerged that teachers were satisfied with Departmental workshops and were not keen to initiate their own school-based development programmes. This was their view:

> *We attend workshops and they are enough to help in enhancing our teaching skills… These workshops help especially if they are content based because when we come back to school, we are confident and deliver better and exciting lessons to our learners.* **(Group A)**

In School B, the view was that teachers wanted more than a workshop and programmes suited to their school:

> *Workshops are good and so far, they are the only solution we have to develop us in order to improve learner performance, it is just that in workshops schools are treated as if they are the same when they are not. We come from a rural school, but we are expected to deliver just like the schools which are well-developed, sometimes it is not fair.* ***(Group B)***

School principals revealed that workshops were some of the programmes that the DoE offered to schools and there were no other programmes since workshops seemed to be working fine. *Pa* said:

> *Attending workshops is good as long teachers implement what they were taught in the workshops because workshops are provided by subject advisors who are specialists in their fields. Even though the school is in a rural area, but workshops seem to be working for us so far.* **(Pa)**

From *Pb,* it emerged that although the DoE provided workshops, they were not enough to develop teachers in enhancing their teaching practice, and teachers required more than workshops to withstand any unanticipated circumstances. *Pb* said:

> *Although we have workshops, but I do not think they really serve the purpose for which they were designed. I feel like we can have or do more than that in our schools so that we do something that is customized for us and teaching and learning does not stop when there are problems.* **(Pb)**

The findings reveal that teachers enjoyed workshops because they had become used to them, but they acknowledged that workshops are not tailored to the contextual needs of their schools. When teachers engage in teacher professional development by means of workshops, they are supposed to learn and compare their teaching through observing others as they collaborate as colleagues. Although these off-site teacher professional development workshops yielded no change to teachers' traditional classroom practices and did not offer solutions to other problems that teachers faced in schools, they still went out and attended

workshops. Data reveals that teachers need to be taught how to initiate teacher professional development programmes tailored to the needs of their schools so that their teaching practice is enhanced.

Lack of leadership from school principals

From the data, it emerged that school principals were not aware of their role in managing SBTPD. The schools implemented teacher development programmes that were initiated by the DoE and school principals only had to make submissions to the DoE after tasks had been completed. There was no initiating, managing, and monitoring of teacher professional development programmes from the school principals themselves. In discussion with teachers from School A, it emerged that the school principal was not even managing the DoE teacher professional development programmes but had delegated such functions to teachers to do on their own. This was their perspective:

> *…for example, we did the sign-up for CPTD but there has been no follow-up from there, even the principal does not seem to know how to manage the implementation of this policy. We also have the IQMS which is managed by the SDT Coordinator, the principal only accepts what is submitted and takes it up to the circuit office, actually he does not seem at all interested in this.* **(School A)**

The view from School B participants resonated with the view from School A. The data from School B revealed that the school principal did not seem interested on the activities of the existent teacher professional development programmes taking place in the school. This was their view:

> *We do IQMS on our own and we only did the sign-up for CPTD after that nothing was asked from us. And it also seems like we do the IQMS because we want to get the 1% and also to make submissions. The principal also is not part of any programme except for the advocacy at the beginning of the year. Otherwise, we do not have any other programmes for development.* **(School B)**

School principals revealed that their role is more of a manager than that of a leader of the teacher professional development programmes in the school, as they represent the DoE within the school. *Pa* said:

> *I am mandated by the Department to ensure that IQMS is done and completed annually, so, mine is to ensure that it is implemented correctly, and the relevant documents are signed and submitted to the relevant office…about CPTD, that's a story for another day…because the Department is not saying anything, I guess is the reason why we are not doing anything.* **(Pa)**

Pb revealed that attending workshops by the teachers seemed to be enough since those workshops were provided by the DoE which is the employer. He said:

> *As schools we are invited by the Department to attend different developmental workshops, I ensure that teachers attend those. That is my duty as a principal and also to ensure that the IQMS is done correctly as the development programme we have for the Department as our employer.* **(Pb)**

The data presented points directly to the lack of leadership in the implementation of SBTPD to ensure that teachers improve on their practice. Schools are supposed to use the departmental programmes as a springboard to launch their own school-based programmes. In their study on the characteristics of effective teacher development, Sims and Fletcher-Wood (2021) point out that teacher professional development is effective when it is practice-based. Practice-based teacher development means that schools need to develop, lead, and manage

their own teacher professional development programmes under the leadership of the school principals. When school principals, as instructional leaders, are not capacitated to initiate, lead, direct, and manage teacher professional development programmes in their school, that points out to the lack of leadership on their part to manage SBTPD. If schools have their own SBTPD programmes, they are able to enhance teacher practice and as well circumvent the disruption of teaching and learning when unanticipated circumstances strike.

DISCUSSION OF THE FINDINGS

The study found that there was a lack of collaborative practices among teachers in the rural contexts as they are used to the culture of working in isolation. Enhancing teacher practice requires that teachers work together to ensure that teaching and learning is not compromised. Collaboration among teachers is crucial for teacher professional development, reduced workload, improved learner achievement leading to improved school effectiveness (Muckenthaler, Tillman, Weib & Kiel, 2020). Collaborative teacher practices are independent of the situatedness of the school. On their study on the impact of professional development on teacher practice, Buczynski and Hansen (2010) found that teachers were able to transfer the skills gained in professional development to their classrooms. Therefore, through collaborative practices as they implement SBTPD, teachers are able to enhance their practice and subvert the disruption of teaching and learning amidst the crises.

Findings from the study revealed that there was a lack of self-directed learning from the teachers in the researched rural context. The adult learning theory suggests that adults want to shape and direct their own learning and align it to their day-to-day activities. SBTPD is about teachers in schools ceaselessly learning to learn and how to use their learning in their everyday teaching practice, as well as becoming effective in their job (Postholm, 2016). They need to continue to learn even if they are teaching in the school; they enhance their practice, and they develop new techniques of weathering different crises that come to interrupt the teaching and learning process.

Shaked (2021) asserts that as instructional leaders, school principals have an obligation to restructure the organisation to align and support teacher's work leading to improved teacher practice. This points out to the leadership practices of school principals in leading and managing SBTPD to enhance teacher practice. Findings of the study revealed that school principals in the researched schools lacked leadership skills to lead and manage SBTPD in their schools as they relied on the programmes offered by the DoE. Teachers and school principals need to use the programmes offered by the DoE and workshops to facilitate their own school-based programmes. In a study on developing rural school leaders through transformative leadership, Mette (2021) suggests transformative coaching for rural school principals so that they are able to address issues of teacher practice and professional development leading to improved outcomes for learners and rural communities.

CONCLUSION

This paper sought to investigate the experiences of teachers and school principals in implementing school-based teacher professional development to enhance teacher practice in the selected rural education circuit. The study found that there was a lack of collaborative practices among the teachers. SBTPD thrives in collaborative environments and the lack of collaboration impedes the appropriate implementation of SBTPD with the aim of enhancing teacher practice. The study found that there was a lack of self-directed learning from the teachers, and they depended on the teacher professional development programmes offered by the DoE. There was no evidence that teachers have implemented their own programmes

beyond the DoE driven programmes. Further findings revealed a lack of leadership from the school principals to lead and manage the implementation of SBTPD programmes with the aim of enhancing teacher practice. School principals are supposed to lead, guide, direct, manage and monitor the implementation of SBTPD in their schools. There seemed to be no focus on growth, development, and enhancement of teacher practice. This was a case study, and the findings of the paper could not be generalised to the broader population, however, the study is topical as the world is confronted with crises such as COVID-19, this paper provides teachers and school principals with skills and strategies to enhance their teaching practice so that teaching and learning continues throughout a crisis.

RECOMMENDATIONS

The study recommends a capacity-building programme for teachers and school principals in rural contexts to empower them with the ability to implement SBTPD appropriately using the DoE programmes to initiate their own. Enhancing teacher practice requires that the DoE encourages and motivates teachers and school principals from schools in rural contexts to use the programmes it offers as a launchpad to develop own programmes that would benefit them. This would mitigate the challenges that interrupt teaching and learning during times of crises.

REFERENCES

Ajibade, B. A. (2016). *Implementation of school-based continuing professional teacher development programmes in the Fort Beaufort education district, Eastern Cape province, South Africa: Towards a teacher development model*. (Doctoral Dissertation). University of Fort Hare.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Buczynski, S., & Hansen, C. B. (2010). Impact of professional development on teacher practice: Uncovering connections. Teaching and teacher education, 26(3), 599-607.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage.

De Clercq, F., & Phiri, R. (2013). The challenges of school-based teacher development initiatives in South Africa and the potential of cluster teaching. *Perspectives in Education, 31*(1), 77-86.

Ebersohn, L., & Ferreira, R. (2012). Rurality and resilience in education: Place-based partnerships and agency to moderate time and space constraints. *Perspectives in Education, 30*(1), 30-42.

Gardiner., M. (2008). *Education in Rural Areas: Issues in Education Policy Number 4.* Bloemfontein, South Africa: Centre for Education Policy Development.

Hallinger, P., & Lee. M. S. (2014). Mapping instructional leadership in Thailand: Has education reform impacted principal practice? *Educational Management, Administration and Leadership 42*(1), 6-29.

Hlalele, D. (2012). Social justice and rural education in South Africa. *Perspectives in Education, 30*(1), 111-118.

Kafyulilo, A. C. (2013). Professional development through teacher collaboration: An approach to enhance teaching and learning in Science and Mathematics in Tanzania. *Africa Education Review, 10*(4), 671-688.

Kennedy, A. (2011). Collaborative continuing professional development (CPD) for teachers in Scotland: Aspirations, opportunities and barriers. *European Journal of Teacher Education, 34*(1), 25-41.

Knowles, M. (1984). *The adult learner: A neglected species (*3rd ed.). London: Gulf Publishing.

Liu, S., & Hallinger, P. (2017). Leading teacher learning in China: A mixed methods study of successful school leadership. In K. Leithwood, J. Sun, & K. Pollock (Eds.), *How school leaders contribute to student success* (pp. 279-303). Springer.

Matshe, P. F. (2014). Challenges of parental involvement in rural public schools in Ngaka Modiri Moleme District of North West province (South Africa). *International Journal of Humanities Social Sciences and Education, 1*(6), 93-103.

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.

Mette, I. M. (2021). Developing rural school leaders: Building capacity through transformative leadership coaching. *Journal of Research in Rural Education, 37*(4), 1-6.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* London: Sage.

Mpahla, N. E., & Okeke, C. I. O. (2015). The rurality of continuing professional teacher development. *Stud Tribes Tribal, 13*(1), 22-33.

Myende, P., & Chikoko, V. (2014). School-university partnership in a South African rural context: Possibilities for an asset-based approach. *Journal of Human Ecology, 46*(3), 249-259.

Myende, P. E., & Nhlumayo, B. S. (2020). Enhancing parent–teacher collaboration in rural schools: parents' voices and implications for schools. *International Journal of Leadership in Education*, 1-25.

Muckenthaler, M., Tillmann, T., Weiß, S., & Kiel, E. (2020). Teacher collaboration as a core objective of school development. *School Effectiveness and School Improvement, 31*(3), 486-504.

Nabhani, M., Nicolas, M. O. D., & Bahous, R. (2014). Principals' views on teachers' professional development. *Professional Development in Education, 40*(2), 228-242.

Nhlumayo, B. S. (2020). *The dynamics of implementing school-based teacher professional development in South Africa: A case study of one rural education circuit in KwaZulu-Natal*. (Doctoral Dissertation). University of KwaZulu-Natal.

Odeku, K. O., & Nevondwe, L. (2014). An analysis of the constitutionality guaranteed right to basic education in South Africa. *Mediterranean Journal of Social Sciences, 6*(3), 415-423.

Pitsoe, V. J., & Maila, W. M. (2012). Towards constructive teacher professional development. *Journal of Social Sciences, 8*(3), 318-324.

Postholm, M. B. (2016). Collaboration between teacher educators and schools to enhance development. *European Journal of Teacher Education, 39*(4), 452-470.

Shaked, H. (2021). Instructional Leadership in Times of Crises and the Goal of Schooling. In J. Glanz (Ed.), *Crisis and Pandemic Leadership: Implications for Meeting the Needs of Students, Teachers, and Parents* (pp. 71-82). Rowman & Littlefield.

Shelile, L. I., & Hlalele, D. (2014). Challenges of continuing professional teacher development in inclusive Lesotho schools. *International Journal of Educational Sciences, 7*(3), 673-686.

Sims, S., & Fletcher-Wood, H. (2021). Identifying the characteristics of effective teacher professional development: a critical review. *School effectiveness and school improvement*, *32*(1), 47-63.

Speck, M. (1996). Best practice in professional development for sustained educational change. *ERS Spectrum, 14*(2), 33-41.

Thoonen, E. E. J., Sleegers, P. J. C., & Oort, F. J. (2011). How to improve teaching practices: The role of teacher motivation, organizational factors, and leadership practices. *Educational Administration Quarterly, 47*(3), 496-536.

Wenger, E. (1999). Learning as social participation. *Knowledge Management Review*, *6*, 30-33.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yuen, L. H. (2012). The impact of continuing professional development on a novice educator. *Teacher Development, 16*(3), 387-398.

EXPLORING SCIENCE TEACHERS' TECHNOLOGICAL, PEDAGOGICAL CONTENT KNOWLEDGE AT TWO SECONDARY SCHOOLS IN GAUTENG PROVINCE OF SOUTH AFRICA

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Abstract
Digital technology is fast becoming highly advocated for in the teaching and learning of school curricula across the world. In response to this advocacy, the Department of Education for the Gauteng Province in South Africa, has promoted the integration of Information Communication Technology (ICT) by installing smart boards and projectors in classrooms, providing teachers with laptops and tablets to learners in selected township schools. The installed gadgets are meant to be used as instructional tools to enhance the understanding of abstract concepts and improve the quality of lesson delivery. This qualitative, multiple case study was conducted to establish the teachers' Technological Pedagogical and Content Knowledge as they use these gadgets. The participants were two Physical Science teachers and two Life Sciences (Biology) teachers from two selected high schools that used Smartboards and Tablets for teaching and learning. Lesson observations and teacher interviews were used to collect the data to establish the extent to which teachers integrated the technologies (TK) in their delivery of content (CK) and the coherence with their teaching strategies (PK). The data analysis was based on multi-level thematic process of coding to investigate relationships, differences, similarities and deduce the teachers' extent of TPaCK. Results have shown that most of the teacher participants are eager to use technologies in the teaching and learning of the two science subjects, however the lesson observation showed that they are still struggling with aligning the components of TPaCK in their teaching hence the components mostly manifested in isolation. The descriptors basic, proficient and sophisticated were used to indicate the quality of the four teachers' TPaCK where basic is when interaction is between two components only and/or when components manifest in isolation. Proficient is when there is interaction between all three components two or three times. Sophisticated is when interaction between all three components manifest more than three times and that there is limited manifestation of components in isolation. Three of the four teachers had their TPaCK level at Basic and Proficient levels and only one was at Sophisticated level. The teachers also highlighted the challenges which include lack of training in using the gadgets effectively, the learners misdirected use of the gadgets, limited or no internet access and loadshedding (electricity blackouts). The teachers acknowledge the ease of learning abstract concepts by learners when they integrate ICT.
Keywords: ICT, Life Sciences, Physical Science, Smartboards, Tablets, TPaCK.

INTRODUCTION

The use of digital technology has been influencing most aspects of people's lives inclusive of careers, social, and academic lives (Palvia et al., 2018)) and the teaching and learning has not been an exception. In response to this digital era, almost 370 schools in Gauteng Province in South Africa had Smartboards installed, and Tablets offered to learners. Most of these schools that benefitted from this digitalisation programme were in underprivileged township communities to minimise the gap of inequalities in South African Education, (Graham, Stolls & Kapp, 2020). Grimus and Ebner, (2015) point out that in the current era, teachers and

learners require prospects that simplify the process of teaching and learning, which may include ICT use. Kirova and Veselinovska (2016) define ICT in educational settings as a term used to denote all computer and communication technologies used in the teaching and learning process.

According to the Educational Strategic Roadmap, the Gauteng Department of Education has incorporated ICT promotion and the extension of ICT facilities in almost 370 schools around Gauteng Province in South Africa (Department of Education (DoE) 2018). The promotion of ICT started in Gauteng province as a pilot project with the vision of extending it to other provinces of the country as well. The Department of Basic Education (2020) envisages a way forward to expose all learners to technology in the classroom for improved teaching and learning. It is considered a necessity for learners to be exposed and utilise ICT equipment to equip them for the fourth industrial revolution since technology now has a significant impact on their daily lives. The ICT school policy (DoE,2018) emphasizes that all learners should have the opportunity to utilise ICT resources to help them develop their ICT skills and competencies. Taking all this advocacy to integrate ICT in teaching and learning, the roles of the teachers and how they engaged with the content they teach, pedagogy and technology (TPaCK) was of utmost importance. This study therefore aimed to investigate the extent to which four science teachers were teaching with technology with the aim of determining their TPaCK for promoting effective teaching and learning.

Rationale for the study

While the argument of the Gauteng Department of Education for installing smartboards was to promote effective teaching and learning, installation of ICT tools like smartboards does not always translate into effective teaching and learning (Dynarski., Agodini., Heaviside., Novak., Carey., and Campuzano (2010)). This is because, according to Voogt., Fisser., Pareja., Tondeur., and Van Braak (2012), in some instances, the ICT integration may not happen at all, may happen too slowly, or may happen with no effect on teachers' or students' learning. In addition, learners do not always reach their full potential because teachers do not have the technological, pedagogical content knowledge (TPaCK) i.e. the ability to use new technologies in alignment with appropriate teaching strategies in the classroom (Mishra & Koehler (2006)). This was the motivation for this study which sought to establish the TPaCK of Life Sciences and Physical Science teachers in Gauteng schools. The study investigated how two Life Sciences and two Physical Science teachers engaged with the content they teach, pedagogy and technology to help their learners to learn in order to determine their TPaCK. This study was prompted by the documented difficulties faced by Life Sciences teachers and learners' difficulties when dealing with abstract topics such as ecology, evolution, genetics, and biodiversity in plants and animals (DeVilliers, 2011; Sanders, 2010; Tunnicliffe & Ueckert, 2007). Laursen et al., (2010), Salloum & Abd-El-Khalid, (2010) and Stavy & Tirosh, (2000) also highlighted the difficulties experienced by Physical Science teachers and learners in topics such as stoichiometry, geometrical optics and electromagnetism. Hence it was deemed essential to consider Life Science and Physical science teachers as cases in this study. The study investigated the extent to which four science teachers were teaching with technology with the aim of determining their TPaCK for promoting effective teaching and learning.

Research Question

The question that this study addressed was: How do teachers integrate technology, pedagogy and content (TPaCK) in Life Sciences and Physical Science classrooms?

THEORETICAL FRAMEWORK

The theoretical framework for the study was the Technological, Pedagogical and Content Knowledge (Koehler & Mishra, 2008). The swift development of accessible technological tools has stimulated scholarly investigation of how Shulman's (1987) paradigm of pedagogical content knowledge might be built upon to help describe the sort of knowledge teachers need for teaching with technology. As already indicated, the phrase "technological, pedagogical and content knowledge" (TPaCK) describes "an understanding that emerges from an interaction of content, pedagogy, and technology knowledge" (Koehler & Mishra, 2008, p. 17). Such a conceptualization emphasizes that TPaCK is more than just the combination of its parts. It is an understanding that allows teachers to engage with content, pedagogy, and technology in order to develop knowledge of how technology can help students learn specific Life Sciences and Physical Science concepts. This study was therefore, underpinned by the TPaCK model which was adopted as the theoretical framework (Koehler & Mishra, 2009).

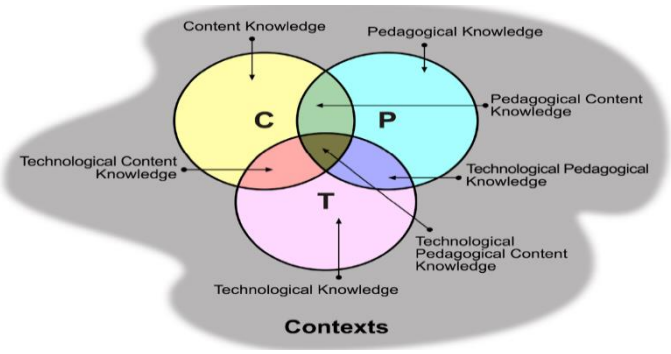

Figure 1. TPaCK framework and its knowledge components (Koehler & Mishra, 2009)

TPaCK provides the complex relationship among the domains of content, pedagogy and technology-related knowledge. Although the model consists of seven components, the focus of this study was on science teachers' TPaCK, i.e. the knowledge that manifest as a result of the integration of the three primary components namely: content (CK), pedagogy (PK) and technology (TK). I describe these components in some detail next.

Firstly, content knowledge refers to actual subject matter that is to be learned or taught. It includes curriculum content, facts, concepts, theories and procedures. McCrory (2008), argue that science teachers need to have sufficient knowledge of science to help students develop understandings of various science concepts. Secondly, pedagogical knowledge refers to knowledge of how students learn or construct knowledge, acquire skills and develop attitudes (learning theories), knowledge of methods of teaching and learning, classroom management, lesson planning and lesson implementation. Adequate pedagogical knowledge enables teachers to teach effectively a particular science concept to a particular group of students (Koehler & Mishra, 2008). Thirdly, knowledge of technology includes among other things, knowledge of devices, operating systems, software programs and hardware. It also includes knowledge of how to install and remove devices and software programs as well as knowledge of how to use the devices and software programs. Lastly, technological, pedagogical content knowledge is knowledge that is a result of the interweaving of all three primary knowledge components of technology, pedagogy and content. It is not just a combination of the other forms of knowledge, but in its synthesized form represents a new paradigm of knowledge which is required for the successful pedagogical integration of ICT (Mishra & Koehler, 2006).

METHOD

This study is located within an interpretivist epistemological paradigm and has been designed as a multiple case study. Purposive sampling was adopted. A purposive sample of two Life-Sciences and two Physical Science Grade 11 teachers were selected. The condition was that they had to be teachers from technologically equipped schools which have smartboards installed in the classrooms. The schools selected were in Tshwane South District of Gauteng Province in South Africa since some of Gauteng's formerly disadvantaged schools were used as pilot projects with the goal to expand to other provinces. Table 2 below shows the demographic profiling of the participants.

Table 1. Demographic profiling of participants

Schools	Pseudonyms	Gender/Age/Highest qualification	Teaching Experience /subject	Experience of using ICT in the classroom
School A	Themba	Male/48/PostGraduate Diploma in Education	25 years/Life Sciences	4 years
	Pilani	Male/32/PostGraduate Certificate in Education	9 years/Physical Science	3 years
School B	Thando	Female/42/Bachelor's degree	10 years/Life Science	3 years
	Marble	Female/27/PostGraduate Certificate in Education	2 years/Physical Science	2 years

The study employed two main instruments to collect data. The first instrument was the lesson observation schedule, and the second instrument was a semi-structured interview schedule. The reasoning behind using the two instruments was to triangulate the data. The lesson observations schedule captured the three components of the TPaCK model, content taught, how it was taught (PK) and ICTs used. The validation of the instruments involved consulting Life Sciences and Physical Science education experts and reviewing literature on TPaCK to check whether the questions and the aspects on the observation schedule were appropriate for addressing the research questions. A pilot study was also done with two Grade 11 teachers (one Life Sciences and one Physical Science).

The lesson observation for Life Sciences were done when the two teachers were teaching ecology, which is one of the abstract topics. Physical science teachers were observed when they were teaching the topic Electricity and Magnetism, an also challenging topic. Each teacher was observed teaching a double lesson of 80minutes. The information captured in the completed observation schedules was then used to produce narratives of what had transpired during the lesson. The teachers were interviewed immediately after the lesson observation. The interview duration was about 30minutes.

Ethics involves the moral issues implicit in the research work with respect to people directly involved in or affected by the project. I complied with ethical regulations by applying for ethical clearance with the relevant committee and the permission from the Gauteng Department of Basic Education and the principals to do research in the respective schools. Written consent from parents of all participating learners and the participating teachers was obtained. The participants were made aware of the right to withdraw from the study anytime and that confidentiality and anonymity were guaranteed in publishing the data.

Data analysis was deductive, where the components of TPaCK were used as codes.

Analysis of observations

The first data analysis step was the coding of the lesson observation narratives, focusing on technology used (TK); pedagogical strategies (PK); concepts taught and accuracy (CK). Step two involved mapping of the TPaCK components as they manifested in the teaching and learning process to produce what we have called the TPaCK Component Interaction Map using ideas from Mavhunga (2020). Step three was the determination of the quality of teachers' TPaCK. Considering that TPaCK is about the extent to which teachers transform content, by applying appropriate pedagogical strategies and technology during teaching, the level of interaction of these components was used by the authors to determine the quality of participating teachers' TPaCK. Three descriptors were used namely basic, proficient and sophisticated according to Mavhunga (2020). The term basic was used when interaction between two components only manifested during teaching and/or when components were manifesting in isolation. Proficient was used when interaction between all three components manifest two or three times and the rest of the time, components manifested in isolation. Sophisticated was used when interaction between all three components manifest more than three times with limited manifestation of isolated components. Although four narratives, one for each participant, were produced and analysed, in the section that follows, we have used observation narratives from Themba and Philani as examples to show the data analysis process.

Themba's coded lesson observation narrative

The classroom had a smartboard and a data projector installed. Themba was teaching a lesson on population ecology focusing on the water availability and quality to Grade 11 Life Sciences learners. Some of the learners had tablets with pre-loaded textbooks but they were not allowed to open them during the lesson. Instructions were given for them to use the Tablets for homework at home. The lesson began with a recap of the previous lesson. The recap was on the concept of human behaviour which is resulting in climate change. Themba touched on the following: carbon dioxide emissions, carbon footprint, deforestation, greenhouse effect and global warming and water quality and availability (CK, PK). After the recap, the lesson proceedings occurred as follows: The teacher switched on the smartboard (TK). He had pre-loaded the slides on the smartboard in the Grade 11 folder (TK). He opened the folder (TK) and started teaching by moving the slides one by one with bullet points (TK, PK, CK) whilst explaining (PK) the content (CK) and annotating (PK) thereby adding more content points (CK) on the smart board (TK, PK, CK). No further use beyond slides and annotating was done. After explaining the various concepts, Themba concluded the lesson by asking learners to give examples of what influences water quality and he added to what the learners had said (PK and CK).

Mapping of Themba's TPaCK

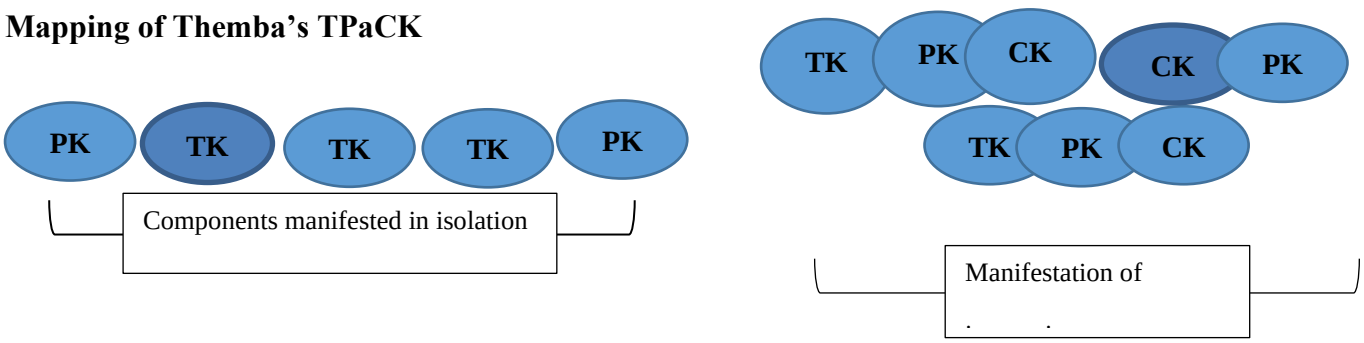

Figure 2. Component interaction map for Themba

The interaction map is showing that during Themba's lesson, there was a lot of manifestation of PK and TK components in isolation (TK, PK & CK; CK, PK) and there was manifestation of two interacting components (CK and PK) once then interaction of all three components (TK, PK & CK) on two occasions. We therefore considered Themba's TPaCK as proficient.

Pilani's coded lesson observation narrative

Pilane taught a lesson on electromagnetism to Grade 11 Physical Science learners. The learners had the tablets with pre-loaded textbooks. He firstly revised the previous work given (PK). The learners were shouting the answers as he wrote them on the board and mostly the learners seated at the front participated (PK). The lesson proceedings occurred as follows: Pilani used the smartboard to display the powerpoint presentation (TK) and used a smart marker to write on it annotating the slides (PK, CK) which helped clarify some of the concepts like magnetic flux. A simulation video was presented showing the concept of magnetic flux (TK, PK, CK), and the majority of the learners seemed to understand. He also allowed the learners to use the smartboard to show some calculations to the rest of the class (TK, PK, CK).

Pilani presented a memorandum of the previous work given but no further explanation (CK) on the given answers. During the teaching with the aid of the simulations (TK), the content was well explained (PK, CK) but when it came to calculations, there were exponents mix-up (incorrect CK presented) which neither the teacher nor the learners noticed. The teacher related to real life situation using simulations (TK, PK). The teacher showed that he is aware of the importance of different pedagogical approaches by using the discussion or collaborative method (PK), including both visual and auditory learning style (TK, PK), however not much attention was given to the learners seated at the back who were seemingly distracted by their gadgets (poor PK). Technology was used to demonstrate or simulate complex or abstract concepts (TK, PK). It was also aligned to the content taught (CK).

Technology was used to support the teaching strategy which included lecture method using annotated slides (TK, PK), Simulations and learners centred by allowing the learners to discuss basing on textbooks on their tablets and some demonstrating on the smartboard (TK, PK)

Mapping of Pilani's TPaCK

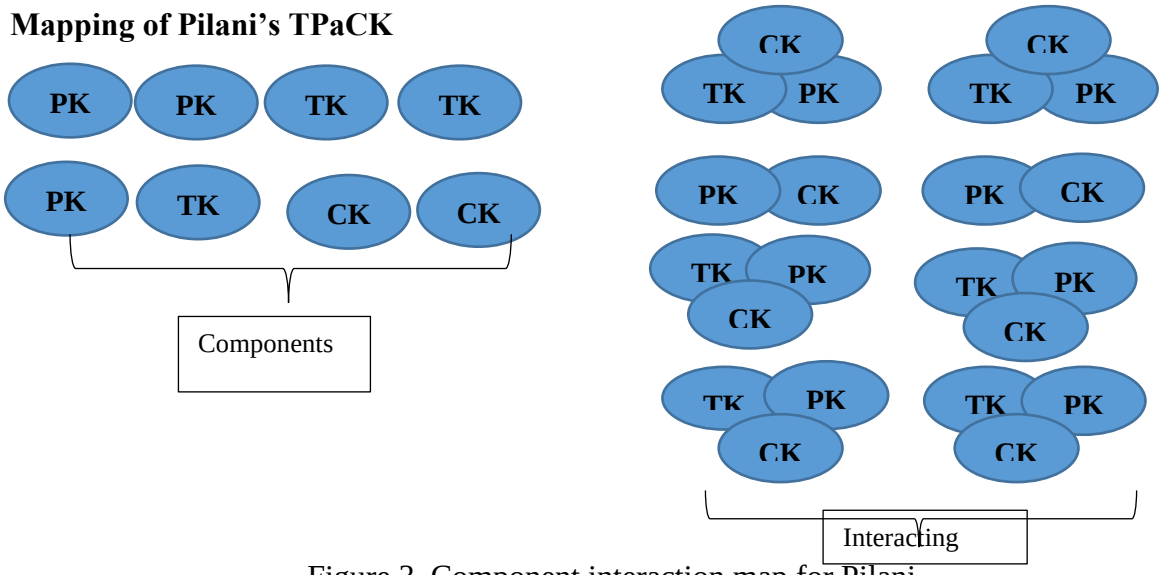

Figure 3. Component interaction map for Pilani

The component interaction map is showing three components manifesting in isolation repeatedly and on more than four occasions, there was interaction of all three components. We therefore considered Pilani's TPaCK as sophisticated.

Analysis of interviews

Having determined the teachers' quality of TPaCK, we wanted to establish the possible influence of their perspectives on their TPaCK using information from the interviews. The first step of data analysis was the transcribing of the audio interviews into text and member checking was done to increase the reliability of the data. The second step was coding of the interviews. Coding was both deductive and Inductive. It was deductive because we still focused on the various aspects of TPaCK components. It was however inductive because we also wanted to find out what their perspective was about TPaCK. Step three was categorization of codes into themes.

FINDINGS

Findings from the analysis of lesson observation narratives

The analysis of lesson observation narratives showed that Themba's TPaCK was at proficient level, Pilani's TPaCK was at sophisticated level and that of Thando and Marble was at basic level.

Findings from the analysis of interviews

Five themes emerged namely: Access to gadgets, knowledge and confidence, view of effective teaching, approaches to resource choice and use and lastly external factors. Due to word limitations, we present below the themes that emerged using data from Themba and Pilani interviews only.

As can be seen in Table 2 above, although the analysis of lesson observations had shown Themba's TPaCK to be at proficient level, the analysis of his interview showed that his use of ICTs was routine without any pedagogical reasoning informing it. His responses showed that he was still inclined to traditional teaching methods and the ICT gadgets were only considered in cases where they provided convenience rather than a consideration of the nature of the concept to be taught: *The gadgets make teaching and communication with learners easy, but learning is achieved through hands-on practicals, visuals, more homework and classwork and relating content to daily issues so the learners can relate.*

Themba did not seem to have an awareness or understanding that these traditional teaching and learning approaches could be enhanced by utilising the ICTs which were at his disposal. Electricity cuts/loadshedding was also a cause for concern although it did not seem to be the reason for not fully utilising the ICTs at his disposal.

Table 2. Themes that emerged from the analysis of interviews

Participant/Themes	Access of gadgets/impact	Confidence and knowledge: use of gadgets	View of effective teaching	Approaches to resource choice and use	External factors that impact teaching and learning
Themba	Laptop, cellphone Scale 7 gadget use Teaching made easy Improves results Install information on smartboards, Chat groups with learners and social media	I need more training. Right now all I do is just making slides and play videos on the smartboard. I can't use other features. I also need to teach learners how to operate gadgets and and to acknowledge that the gadgets are for educational purposes which I am struggling to do so I have decided that no use of tablets in my class due to indiscipline I prefer practicals to help them understand but practical work is limited due to lack of apparatus, misbehaviour, limited resources and time limitation	Learning is achieved through: hands-on practicals, visuals, More homework classwork, relating content to daily issues so the learners can relate. Use of textbooks, remedial sessions, Use smartboards to write Marks improvement in the tests Gaps: could have done a practical or give them work to watch videos on ecology, water availability and quality	Dependent on availability of: electricity or apparatus CAPS guide on resources to use Use of pictures	Loadshedding Big classes not manageable to monitor learners and what they do on tablets. Limited training on technology use
Pilani	Laptop, cellphone Scale 8 gadget use Teaching made easy Smartboard software use Snapshots for concepts	Yes, in using smartboard, cellphone Use smartboard and also for learners to demonstrate calculations on the board Use of visual simulations, videos Teach how to access installed textbooks and internet access Learners get distracted and misuse the gadgets No apparatus, its theoretical or installed simulations	Learning achieved: Simulations on magnetic flux, Faradays law; difficult to teach in abstract Use of visual simulations, videos PhET; free online physics and chemistry simulations Test or classwork Sometimes lecture, textbook or an experiment if resources allowed Gap: Could have accessed more resources already installed in smartboards but time.	Dependent on availability of: time, electricity, internet, or apparatus Relevant method to the learning outcomes	Loadshedding Limited internet access, Misuse of gadgets Gadgets theft

Unlike Themba, Pilani's TPaCK was at sophisticated level and her choice and use of the ICT was pedagogically reasoned and aligned to the nature of the content: *I used simulations to illustrate the concept of magnetic flux because it is an abstract process and difficult to understand if taught in an abstract way*. Just as with Themba, electricity cuts which then disrupt internet access were a cause for concern for Pilani but this did not deter her from using the ICTs.

Thando's TPack was at basic level and the analysis of her interview showed that although she had access to the ICT gadgets she was still in favour of and comfortable with the traditional teaching methods. She, therefore, did not see any reason for using ICT. So just as with Themba, Thando's reasoning maybe a reflection of a lack of understanding of how ICTs can be integrated into one's teaching to support traditional teaching methods and promote learning.

Marble's TPaCK was at basic level. She did not use the smart board and she indicated that this was because she didn't know how to use it. She had not received any training as she got deployed to the school after training had been completed. She however used Power Point presentations in her lessons, but she did not provide any pedagogical reasons for using PowerPoint presentations.

DISCUSSION OF FINDINGS

The findings presented above show that only Pilani displayed the pedagogical reasoning that aligned her application of TK to the nature of the content she was teaching thereby showing quality TPaCK. The other three teachers (Themba, Thando and Marble) not only showed limited TK but also showed no evidence that their application of TK was informed in any way by the nature of the content they were teaching. From the teachers' explanations, the limited TK was owed to inadequate or no training in using the smartboards that were installed in their classrooms. However, the study showed that while lack of TK was a contributing factor, it was also the lack of TPaCK i.e. the ability to use ICTs in alignment with appropriate teaching strategies in the classroom (Mishra & Koehler (2006) that saw them preferring the traditional pedagogical strategies that were devoid of any ICT support. Therefore, both the teachers' lack of TK and TPaCK compromised the effective utilisation of most of the smartboard's functionalities.

In addition to lack of TK and TPaCK, Marble also expressed her dislike of technology which contributed to her not putting much effort to learn to use the ICT gadgets. She did not see the need for switching over to smartboard use as her students were passing anyway without use of technology: *I rarely use the smartboard, so the technological part of TPaCK still needs attention and it makes me nervous, but I use the projector sometimes, as for the smartboard, I am still trying but there is no time. The teaching methods I use are still effective because the students pass.* This dislike of technology by Marble which led to non-use of the smartboard confirms Azarfam and Jabbari's findings (2012) that teachers' technophobia in the classroom can prevent them from utilising the technology to its fullest.

One pedagogical reasoning aspect which came through in all four interviews was that technology was helping them to save time. This was evident during lesson observations as all came to class will already pre-loaded slides on either the smartboard or the laptop. There was no time wasted writing notes as it used to be done when they were still using the chalkboard hence all teachers admitted that use of technology *made their teaching easy and saved time*. Heick (2020) supported this observation by stating that a teacher with TK can maximise the content taught during a lesson as more time will be spent in actual teaching and providing learners with more challenging activities.

The study also showed that teachers' TPaCK is always challenged by issues that arise when using technology in teaching. These challenging issues include malfunction of the gadgets, load shedding, which is switching off, of electricity which then requires them to always have a plan B in case it happens and weak or unavailability of Wi-Fi.

CONCLUSION AND RECOMMENDATIONS

This study investigated the extent to which four science teachers were teaching with technology with the aim of determining their TPaCK. The question that this study addressed was: How do teachers integrate technology, pedagogy and content (TPaCK) in Life Sciences and Physical Science classrooms?

Results from this study have shown that teachers in this study integrated technology in their teaching. However, the integration was mostly done to save time and not to promote effective teaching and learning. Three of the four teachers lacked the pedagogical reasoning that would enable the development of TPaCK and therefore their TPaCK was at basic and proficient level. Only one teacher Pilani, showed the ability to align the appropriate technology with the content and teaching method which made us to conclude that his level of TPaCK was sophisticated. Some challenges which compromised the teachers' TPaCK included lack of training in using the gadgets effectively and learners' misdirected use of the gadgets.

The study recommends that training of teachers on ICT use should go beyond how to use the ICT gadgets to developing pedagogical reasoning that aligns technology use with the nature of the content being taught.

REFERENCES

Azarfam, A.Y & Jabbari, Y. (2012). Dealing with teachers' technophobia in classroom. *Advances in Asian Social Science*, 2(2), 452-455

Blignaut, A. S., Hinostroza, J. E., Els, C. J., & Brun, M. (2010). ICT in education policy and practice in developing countries: South Africa and Chile compared through SITES 2006. *Computers & Education, 55*(4), 1552-1563. https://doi.org/10.1016/j.compedu.2010.06.021

Cuban, L. (2009). *Oversold and underused*. Harvard University Press. doi: 10.2307/ j.ctvk12qnw

De Villiers, R. (2011). Student teachers' views: What is an interesting life sciences curriculum? *South African Journal of Education, 31*(4), 535-548. https://doi.org/10.15700/saje.v31n4a403

Dynarski, M., Agodini, R., Heaviside, S., Novak, T., Carey, N., & Campuzano, L. (2010). WWC quick review of the report "Effectiveness of reading and mathematics software products: Findings for two student cohorts". *PsycEXTRA Dataset.* https://doi.org/10.1037/e599912011-001

Goundar, S. (2014). The distraction of technology in the classroom. *Journal of Education and Human Development*, 4(3), 211-229.

Graham, M. A., Stols, G., & Kapp, R. (2020). Teacher Practice and Integration of ICT: Why Are or Aren't South African Teachers Using ICTs in Their Classrooms. *International Journal of Instruction, 13*(2), 749-766. https://doi.org/10.29333/iji.2020.13251a

Koehler, M. J., & Mishra, P. (2008). Introducing Technological Pedagogical Content Knowledge. In AACTE Committee on Innovation and Technology (Ed.*), Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* (pp. 3-29). New York: Routledge.

Laursen, S., Hunter, A., Seymour, E., Thiry, H., & Melton, G. (2010). *Undergraduate research in the sciences: Engaging students in real science*. John Wiley & Sons.

Mavhunga, E. (2020). Revealing the structural complexity of component interactions of topic-specific PCK when planning to teach. *Research in Science Education, 50*(3), 965-986. https://doi.org/10.1007/s11165-018-9719-6

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mondal, G., Majumder, P., & Mandal, M. (2019). Effect of blended learning strategy for secondary school science students. *International Journal of Research and Analytical Reviews, 6*(1), 381-387. http://ijrar.com/upload_issue/ijrar_issue_20542795.pdf

Oluwalola, F. K. (2015). Effect of emotion on distance E-LEarning — The fear of technology. *International Journal of Social Science and Humanity*, *5*(11), 966-970. https://doi.org/10.7763/ijssh.2015.v5.588

Palvia,S., Prageet, A., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018) Online Education: Worldwide Status, Challenges, Trends, and Implications, Journal of Global Information Technology Management, 21:4, 233-241,
DOI: 10.1080/1097198X.2018.1542262

Peck, C., Hewitt, K.K, Mullen, C.A., Lashley, C.A., Eldridge, J.A. & Douglas, T.M.O. (2015). Digital youth in brick-and-mortar schools: Examining the complex interplay of students, technology, education and change. *Teachers College Record*, 117(5), 1-8

Ross, S. M., Smith, L., Alberg, M., & Lowther, D. (2004). Using classroom observations as a research and formative evaluation tool in educational reform: The school observation measure. *The school observational research in U.S. classrooms*, (144-173). https://doi.org/10.1017/cbo9780511616419.007

Salloum, S., & Abd-El-Khalick, F. (2010). A study of practical-moral knowledge in science teaching: Case studies in Physical Science classrooms. 47(8): 929-951. *Journal of Research in Science Teaching*, n/a-n/a. https://doi.org/10.1002/tea.20361

Sanders, M. (2010). *Meeting the curriculum requirement of "learner-centeredness" when teaching evolution: Giving learners and a fair deal.* Proceedings of the 17th Annual Conference of the Southern African Association for Research in Mathematics, Science and Technology Education. In: Schäfer MC & McNamara C (eds). Grahamstown: SAARMSTE.

Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the new reform. H*arvard Educational Review*, 57(1), 1-23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Stavy, R. & Tirosh, D. 2000. *How students (mis-)understand science and mathematics*. New York: Teachers College Press.

Tunnicliffe, S. D., & Ueckert, C. (2007). Teaching biology — the great dilemma. *Journal of Biological Education, 41*(2), 51-52. https://doi.org/10.1080/00219266.2007.9656061

Tondeur, J., Forkosh-Baruch, A., Prestridge, S., Albion, P. & Edirisinghe, S. (2016). Responding to challenges in teacher professional development for ICT integration in education. *Educational Technology and Society*, 19(3), 110–120.

Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & Van Braak, J. (2012). Technological pedagogical content knowledge - a review of the literature. *Journal of Computer Assisted Learning*, *29*(2), 109-121. https://doi.org/10.1111/j.1365-2729.2012.00487.x

Wellington *, J. (2005). Has ICT come of age? Recurring debates on the role of ICT in education, 1982–2004. *Research in Science & Technological Education*, *23*(1), 25-39. https://doi.org/10.1080/02635140500068419

EFFECT OF CIRCLE TIME LEARNING STRATEGY ON SOCIAL SKILLS OF CHILDREN WITH AUTISM SPECTRUM DISORDERS IN KOGI STATE, NIGERIA

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Abstract
In Idah and Ibaji education authorities in Kogi state, Nigeria, researchers looked at the impact of Circle Time Learning Strategy (CTLS) on social skills of children with ASDs. The study used a non-equivalent control group design with pre- and post-tests. CTLS was used in the treatment group, while the traditional teaching method was used in the control group. The study was directed by two research questions and two null hypotheses. The study included 98 youngsters who satisfied the ASDs criteria. The observation schedule, semi-structured interview, Children with Autism Spectrum Disorder Checklist (CASDC), and children social skills scale were employed as instruments (CSSS). Inferential statistics were used to assess the study's research questions, while the hypotheses were tested using the analysis of covariance (ANCOVA) statistic at the 0.05 level of probability. It was discovered that children with ASDs who were exposed to CTLS had a higher mean score in their social skills than those who were not. It was also discovered that male ASD children who were exposed to CTLS had higher social skills mean score than female ASD children. Finally, exposing children with ASDs to CTLS has been shown to improve their social skills dramatically. As a result, it was suggested that local government education authorities urge primary school teachers to adopt predominantly CTLS in their classrooms as an inclusive education policy enabling children with ASDs to benefit effectively from the classroom teaching and learning process.
Keyword: Autism, Circle Time Learning Strategy, Social Skills

INTRODUCTION

Many children are born with distinct abilities and skills that might help or hinder their ability to interact with others in life. Some children were born with disabilities such as impaired social interaction, communication deficiencies, and restricted or repetitive behavior patterns, which are the behavioural skills that determine an individual's functioning from childhood to maturity. Autism spectrum disorder (ASDs) is a term used by the American Psychiatric Association (APA) in 2000 to describe such children. Children with ASDs have a problem with reasoning, social interaction, and communication abilities, all of which are essential for brain development (Weiss, 2013). It is a condition that typically begins in childhood but is difficult to detect before the age of one year, though it can be detected as early as two years of age (Anuforo, 2015). Anuforo went on to say that the intellectual functioning of children with ASDs ranges from severe impairment to exceptional nonverbal cognitive skills. Male and female children of all races and geographical locations of the world are affected by ASDs, which have a significant negative impact on their families, instructors' professions, communities, and children's life skills (Autism speaks inc,2015). The ability to get along with others, make and keep friends in a harmonious manner in a society are the hallmark of excellent mental health (Adimora et al, 2021). Delay in language development or temporary regression, repeated stereotypical patterns of behavior, and social skills are all features linked to ASDs. (The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5TM) is a diagnostic and statistical manual for mental disorders.

Social skills are a multi-faceted construct that enable an individual to form and maintain meaningful social interactions with others, as well as contribute to peer belonging and positive school adjustment, and cope effectively with the entire social environment when one finds oneself alone (Darling–Churchill & Lippmann, 2016). Darling-Churchill and Lippmann went on to define social skills as "having cognizance of one's own and other people's emotions, developing care and concern for others, and so building healthy relationships, adopting responsible decisions, and dealing constructively and ethically with hard situations" (Zins et al., 2004). Social skills were divided into two categories by NASP (2015): high social skills and bad social skills. Appropriate social skills are the abilities that allow youngsters to know what to say at a specific time, how to make good decisions, and how to act in a variety of settings. These abilities are viewed as necessary for good life functioning. Children's ability to develop these abilities may influence their social and familial interactions, participation in extracurricular activities, general behavior, and academic performance in school. As they seek acceptable and secure ways to express their rage and frustration, such youngsters likely to be resilient in the face of future crises or other stressful or life-threatening circumstances.

Poor social skills are demonstrated by an individual's failure to form interpersonal relationships with classmates, parents, and teachers, as well as eliciting responses from others, which may result in peer rejection (NASP,2015). When children lack these core abilities, they have a harder time integrating into society and can have a detrimental impact on how they interact with others (Wiess,2013). Children with ASDs have trouble recognizing other people's emotions based on their facial expressions (Cefai et al., 2013), and these issues may be particular to socially significant emotions including shame, pride, and embarrassment (Williams &Happé, 2010). Children with ASDs have a short memory span, particularly in emotional and autobiographical memories (Goddard, Dritschel, Robinson, & Howlin, 2014; Lind, 2010). They also have a proclivity for hostile attributions as a result of their social difficulties (Meyer, Mundy, Van Hecke, & Durocher, 2006). Furthermore, children with ASDs have been shown to have reduced Theory of Mind (ToM) abilities (Kaland, Callesen, Mller-Nielsen, Mortensen, & Smith, 2008). Circle time learning technique (CTLS) has been proposed by researchers for the development of social skills in children with certain types of disability. (Lind, 2010; Losh & Capps, 2006, for example)

Circle Time is a teaching approach that allows both the teacher and the students to explore and address topics that are important to them, such as developing a variety of skills and attitudes such as listening, confidence, self-esteem, self-expression, moral ideals, and a sense of belonging (Chien et al., 2010). CTLS is a structured problem-solving process that ensures that all participants or subjects are on an equal footing (Chien et al,2010). CTLS allows the teacher and the class to interact with one another about topics that promote aggressive and good conduct (Leach & Lewis, 2013). CTLS refers to a series of learning activities that allow students to gather in a circle and learn together by brainstorming on topics such as weather, current events, and concept demonstrations, as well as reading a book (Enrick & Greeny, 2017). CTLS is a series of carefully planned learning activities in which the entire class gathers in a circle, either on the floor or in chairs, to study and talk in turn. This is done in order to assist children acquire a variety of skills and attitudes such as assertiveness, listening, moral values, self-confidence, and a sense of belonging, all of which can help children with weak social skills improve their social skills (Oley, Sungard & Giargner, 2014). As a result, it provides youngsters with the opportunity to study, express themselves freely, and engage with one another (Collins, 2011). However, the inference is that CTLS allows children to get

life experiences that they would not otherwise be able to obtain from their teachers in a traditional classroom setting.

In several government publications, CTLS has been endorsed as an effective method of treating children's emotional and behavioral needs (Miller & Moran, 2007). Other researchers believe CTLS can help children improve their social and emotional abilities while also increasing their social competence (McCartney & Lanphar, 2015; Glazzard, 2016). Circle time exercises boosted social interaction among a group of eight-year-old children, according to Wooster and Carson (1982). According to Canney and Byrne (2006), CTLS has a considerable impact on improving social skills in schoolchildren. Hannessey (2007) discovered that CTLS has a considerable impact on children's social abilities. Unfortunately, children with ASDs have been noticed and identified in the study areas displaying poor social skills such as an inability to communicate their feelings, an inability to ask questions of their peers, and an inability to talk assertively as they engage with one another. The teachers of these children, as well as their peers who do not have ASDs, appear to be unaware of their problems and are unable to assist them. The social abilities of these children may differ depending on their gender. Some studies have found that male children have more social skills than female children (Rasihid, Shehzadi & Yousaf, 2020), while others have found that female children have more social skills than male children (Abidi, 2010). The researchers then decide to investigate the effectiveness of circle time learning sessions that provide opportunity for children to gain the skills they need to manage their emotions, develop empathy, and form and maintain relationships. The meetings also provide a nurturing setting in which children can disclose their problems and receive assistance, reducing their pain and hurt.

According to the literature, the Circle time learning strategy has the potential to help children with certain types of disabilities improve their social skills and better comprehend the sentiments of other children than the traditional method of learning, which has been in use for some time. However, one important issue that emerges from the empirical research examined is that they were conducted in foreign nations. Furthermore, to the best of the researchers' knowledge, there are few empirical studies on the impact of the circle time learning approach in Nigeria, particularly in the fields of study. The need for this study was inspired by the disparities between the cultures in which these studies were done and the Nigerian environment and subject areas. As a result, the goal of this study was to determine the impact of a circle time learning technique on the social skills of children with ASDs.

Statement of the problem

Children with autism spectrum disorders (ASDs) have impaired social interaction, communication difficulties, and patterns of restricted or repetitive behavior, all of which are necessary behavioural abilities for healthy and fulfilling living from infancy to maturity. Unfortunately, due to weak social skills, such features obstruct their successful learning in school and their connections with others. These youngsters require an intervention approach that will enable them to live a productive life in the same way that other children do. Many studies have shown that the Circle time learning technique is effective in improving social skills in children with ASDs all around the world. However, the researchers are unsure whether such a learning technique may help children with ASDs in Kogi State improve their social skills. As a result, the study looked into the impact of the Circle Time Learning Strategy (CTLS) on the social skills of children with ASDs in the Kogi State education authority of Idah and Ibaji.

THEORETICAL FRAMEWORK

The use of CTLS in children with ASD is theoretically based on Vygostsky's 1978 social development theory, which explains how socialization influences an individual's learning process. It tries to explain consciousness and awareness as knowledge-mediated instruction as a result of interactions between people of various abilities and skills as they communicate, share ideas, and other affectionate issues through the process of each individual forming their own opinion and receiving feedback from the same group and a facilitator who serves as the zone of proximal development (ZPD).The theory's premises offered a crucial foundation for comprehending the principles of circle time activities as a learning method that emphasizes the social character of all types of new learning both inside and outside the classroom. Children with ASDs who struggle to form meaningful relationships with others may benefit from circle time activities because they will be learning skills that will help them function socially.

Purpose of the study

1. To examine the effect of CTLS on social skills of children with ASDs
2. To examine the influence of gender on social skills of children with ASDs exposed to CTLS

Research questions

1. What is the effect of CTLS on social skills of children with ASDs?
2. What is the influence of gender on social skills of children with ASDs exposed to CTLS?

Hypotheses

The following null hypotheses tested at 5% probability level:

1. There will be no significant difference in the social skills mean scores of children ASDs exposed to CTLS and those not exposed
2. There will be no significant difference in the social skills mean scores of children with ASDs exposed to CTLS.

METHOD

The study used a non-equivalent pre-test-post-test research design. The study included a total of 98 children with ASDs from the Idah and Ibaji school authorities. In addition to observation and semi-structured interviews, children with ASDs are identified by observation and semi-structured interviews. The researchers adapted and validated the Children with autism spectrum disorder checklist (CASDC) and the Children social skills scale (CSSS) from Social Skills Questionnaire for Argentinean College Students (SSQ-U) Development and Validation by Moran, Olaz and Del Prette (2015) for the study. The CASDC and CSSS were subjected to reliability test using Cronbach Alpha reliability estimate to ensure the suitability of achieving the stated objectives. CASDC was created solely to detect children with ASDs.The items on CSSS were used to ascertain the state (poor or good) of social skills of the children with ASDs. The CSSS was developed on a four-point scale of: Strongly Agree=4pionts, Agree = 3, Disagree=2, and Strongly Disagree=1.

In the experimental group, 50 children from six intact classes from Idah and Ibaji elementary schools were exposed to CTLS during therapy, while 48 were subjected to the traditional style of teaching. This was accomplished by seating the children in a circle and introducing the topic of conversation as each child tries to describe the term "socialization" in his or her own words. This enabled easy communication and interaction between the students and the

teachers. The teachers introduced the pupils to the learning stimulus and guided them through the sessions. They presented or demonstrated to the pupils' easy techniques to breaking down difficult concepts to enable comprehension and improve their social skills in the classroom, as indicated in the lesson plans. They also assisted the pupils in learning how to distinguish when one person has completed speaking before another can speak. It makes it easy for them to keep their listening role. The teachers also made sure that the kids got good feedback on their classroom interactions, which helped them enhance their social skills. This is a fantastic intrinsic motivator for children's social skills development in general.

The teacher who served as the research assistant summarized the lesson at the end of each session by conducting a general evaluation with resounding praises and applause of children with correct and incorrect responses, with the goal of improving their social skills and giving them a better image of themselves. Other youngsters who find it difficult to interact were urged to try to contribute their thoughts to the discussion. This made them feel better about the session the following week. This was done in all six of the previously listed topics. During the exercise, the teacher just facilitated the sessions to ensure that the youngsters maintained a positive classroom learning atmosphere.

The control group, on the other hand, was taught by their regular class teachers using the traditional learning approach. The researcher continued to communicate with the teachers to ensure that the treatment in each group ran smoothly. For example, in Ayigba primary school in Idah, where one of the children with ASDs refused to participate in the discussion process, which happened to be in the treatment group, the child was shown some intense care by praising him and coding before agreeing to fully participate. A similar situation occurred at Ejule Ejuebe Primary School in Ibaji, where two children were found mute nearly 15 minutes into the CTLS exercise when they were discussing community culture; it appears they never engage in such circle discussion and wanted to remain silent throughout the exercise; however, when the researchers intervened by facilitating with questions pertaining to how they greet their elders at home, which is an aspect of social skill, the children responded positively. The researchers immediately recommended teachers who were unsure what to do with such children to always attempt to pet them throughout the activity, as some of them may be shy to discuss within the type of circular seating while others may be glad to be always taught in such an arrangement. Finally, the CTLS scores acquired from the children with ASDs at this point serve as a posttest score at the conclusion of the experiment. The researchers then compared the results of the pre-test with the findings of the post-test to see what influence the new teaching technique had on their social skills.

The University of Nigeria's research ethics committee gave ethical permission for the study's conduct. Prior to the start of the trial, the participants were given informed consent forms to fill out and sign. The control and treatment groups were assigned to the eligible participants at random. The study included both children with ASDs and children without ASDs, however only the scores of children with ASDs were included in the analysis. After CTLS pre-testing both groups, the treatment group received the intervention package, while the control group did not. The pretest, which was used as a covariate in the trial, helped the researchers determine the pre-treatment entry points of the children with ASDs who took part in it. The treatment was six weeks long. This means that a lesson was planned for each week, with each session lasting 40 minutes. The researchers set a 40-minute instruction length to ensure significant learning at the end of each session. For each group, a total of twelve lesson plans were created on six topics in socialization, culture, values, parenting, transportation, and friendship, all of which are social studies concepts. Six of the lesson plans were based on the

Circle time learning strategy, while the other six were based on the traditional learning method.

Inferential statistics specifically, analysis of covariance was employed to assess the null hypotheses at the 5% probability level, while descriptive statistic (mean) was used to analyze the data to answer the research questions.

RESULT

Research Question One: What is the effect CTLS on social skills of children with ASDs?

Table 1 shows that children with ASDs in the experimenter group had mean social skill rating of 30.02 with a standard deviation of .23 while those in the control group had mean social skill rating of 31.04 with a standard deviation of .22 at the pre-test. The table also shows that children with ASDs who were exposed to CTLS had mean social skill rating of 50.2 with a standard deviation of 0.08 at the post-test while those that were not so exposed had mean social skill rating of 40.4 with a standard deviation of 0.18. Mean gain social skill of 0.20 and 0.9 for the two groups respectively imply that the children with ASDs who were exposed to CTLS had higher social skill rating than their counterparts.

Table 1. Mean and Standard Deviation of Social Skills Ratings of Children with ASD Exposed to CTLS and those not Exposed

Group	**Pre-test**			**Post-test**		
	N	Mean	SD	Mean	SD	Mean Gain
Experimental	50	30.2	.23	50.2	.08	0.20
Control	48	31.4	.22	40.4	.18	0.9

To further determine the effect of CTLS on social skills of children with ASDs and to test hypothesis 1, analysis of covariance was presented in table 2.

Hypothesis One: There is no significant effect in the mean social skills of children with ASDs exposed to CTLS and those not exposed.

Table 2. Analysis of Covariance of the Effect of CTLS on the Social skills of children with ASDs.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4.003[a]	4	1.001	47.190	.000
Intercept	6.107	1	6.107	288.004	.000
Pre-Social skills	.021	1	.021	.984	.328
Group	2.677	1	2.677	126.265	.000
Gender	.020	1	.020	.927	.342
Group * Gender	.000	1	.000	.010	.920
Error	.742	122	.021		
Total	278.623	125			
Corrected Total	4.745	124			

a. R Squared = .844 (Adjusted R Squared = .826)

Analysis of result in Table 2 shows that the probability associated with the calculated value of F (126.265) for the effect of CTLS on social skills of children with ASDs is 0.000. Since

the probability value of .000 is less than the .05 level of significance ($p < .05$), the null hypothesis was rejected. Thus, there is a significant effect on social skills of children with ASDs exposed to CTLS and those not exposed in favour of the experimental group.

Research Question two: What is the influence of gender on social skills of children with ASDs exposed to CTLS?

Table 3. Mean and Standard Deviation of Social Skills Ratings of Male and Female children with ASD Exposed CTLS

Gender	Pre-test			Post-test		
	N	Mean	SD	Mean	SD	Mean Gain
Male	21	30.02	.37	45.65	.15	15.63
Female	29	28.08	.39	40.48	.23	12.40

Analysis of data in Table 3 reveals that male children with ASDs had mean social skills of 30.02 with a standard deviation .37 at the pre-test, while their female counterparts had mean social skills of 28.08with a standard deviation of .39. The analysis of results in the Table also indicates that male children had mean social skills of 45.65 with a standard deviation of 0.15 at the post-test while their female counterparts had mean social skills of 40.48 with a standard deviation of 0.23. Mean gain social skills of 15.63 and 12.40 for male and female children with ASDs respectively indicate that male children had higher mean social skills than their female counterparts.

To further determine the influence of gender on social skills of children with ASDs, and to test hypothesis 2, analysis of covariance presented in table 2 addressed the result.

Hypothesis two: There is no significant influence of gender on social skills of children with ASD exposed to CTLS.

Analysis of results in Table 2 shows that the probability associated with the calculated value of F (0.927) for the influence of gender on social skills of children with ASDs is 0.342. Since the probability value of .342 is greater than the .05 level of significance ($p > .05$), the null hypothesis was accepted. Thus, the mean difference of male and female social skills of children with ASDs is not significant.

DISCUSSION OF FINDINGS

The findings demonstrate that children with ASDs who were exposed to CTLS had a higher mean score in social skills than those who were not (control group). As a result, when children with ASDs were exposed to CTLS, their social skills improved compared to those who were not (CTLS). Further testing of the hypothesis revealed a significant difference between the treatment and control groups, demonstrating that children with ASDs who were exposed to CTLS improved their social skills significantly more than those who were not. As a result, CTLS has been shown to be an effective strategy for improving the social skills of children with ASDs. This study's findings support those of Caney and Byrne (2006) discovered a significant effect of CT learning strategy in enhancing social skills in school children; and Hannessey (2007) discovered a significant effect of CTLS on social skills in children. In other words, CTLS was successful in improving children's social skills in schools.

Male children with ASDs exhibited greater mean social skills than their female counterparts in the study, according to the findings. This conclusion backs up a study by Rasihid, Shehzadi, and Yousaf (2020), who discovered that male children scored higher in social skills than female counterparts. In comparison to female children with ASDs in the study locations, this shows that male children with ASDs in the study areas have high social skills.

CONCLUSION

The study's findings suggest that the Circle Time learning technique is successful in improving the social skills of children with ASDs in the study areas. Furthermore, the study found that male children with ASDs in the study area had better social skills than their female counterparts who were subjected to CTLS. Many researchers have stressed the function of circle time in developing children's social and emotional abilities, therefore there appears to be widespread consensus on the benefits of circle time. Circle time has been suggested as a way for children, particularly those with ASDs, to learn to share, take turns, and collaborate well with one another.

Because CTLS skills can help children function well in groups, leading to advances in their social development across the board, curriculum planners should include the method in every primary school system, particularly in special schools. More systematic research on the effects of the circle time learning technique with other children in various parts of Nigeria is needed to improve the efficacy of its application.

REFERENCES

Abidi, B., (2010). Gender difference in social skills problem behaviours and academic competences of Iranian kindergarten children based on their parent and teacher ratings. *Precedia Social and Behavioural Sciences* (5), 1175-1179

Adimora, D. E., Adene, F.M., Omeje, M. O., Ejiofor, J. N., & Offordile, E.E. (2021). Effect of applied behavior analysis on social skills and academic achievement of pupils with autism spectrum disorder. *International Journal of Psychosocial Rehabilitation*, *25* (3)55-66 doi:10.37200/IJPR/V2513/PR330006

American Psychiatric Association (2000). Diagnostic and Statistical Manual of Mental Disorder (DSM-IV-TR)4th, Text revision edition. Washington DC: American Psychiatric Association and others: A study of autism. *Autism, 14*, 285‑304.doi:10.1177/13623613093448

Anuforo (2015) *The guardian*. Promoting education on management of autism. Retrieved from http://www.ngrguardiannews.com/2015/02/promoting-education-onmanagement-of-autism/.

Autism Speaks Inc (2015) *Relationship development Intervention:* Retrieved fromhttps://www.autismspeaks.org/whatautism/treatment/relationshdevelopmentintervention-rdi.

Canney, C., & Byrne, A., (2006), 'Evaluating circle time as a support to social skills development: Reflections on a journey in school-based research', *British Journal of Special Education, 33,* (1), 19-24. *Autism, 10*(4), 383‑402. doi:10.1177/1362361306064435

Cefai, C., Ferrario, E., Cavioni, V., Carter, & Grech, T., (2013). Effectiveness of circle time in improving social and emotional skills of preschool children. *Pastoral Care in Education, 5(*2), 1-5

Chien, N.C., Howes, C., Burchinal, M., Pianta, R.C., Ritchie,S., Bryant, D.M.,& Barbarin, O.A. (2010). Children's classroom engagement and school readiness gains in prekindergarten. Child Development,81(5),1534-1549.

Collins, B. (2011). Empowering preschool children through circle time: An illumination of practice (Doctoral Thesis), National University of Ireland Maynooth

Dawson, G., & McKissick, F. C. (1984). Self-recognition in autistic children. *Journal of Autism and Developmental Disorders, 14*(4), 383‑394.doi:10.1007/BF02409829

Darling-Churchill, K.E., & Lippmann, L. (2016). Early childhood social and emotional development: Advancing the field of measurement. *Journal of Applied Developmental Psychology, 45*(2),1-7.

Department for Education and Employment (2000), *Educational Psychology Services (England): Current role, Good practice and Future directions*, Annesley, Nottingham: Department for Education and Employment Publications

Glazzard, J. (2016). The value of circle time as an intervention strategy. *Journal of Educational Developmental Psychology, 6*(2), 207-215

Goddard, L., Dritschel, B., Robinson, S., & Howlin, P. (2014). Development of autobiographical memory in children with autism spectrum disorders: Deficits, gains, and predictors of performance. *Development and Psychopathology,* 26(1), 215‑228. doi:10.1017/S0954579413000904

Enrick, R.E. & Greeny, P., N. (2017). Impact of circle time activities on preschool children's development of motor skills and wellbeing in Texas. *Texas Journal of Child Education* 29(2)87-99

Hennessey, B.A. (2007). Promoting social competence in school aged children: The effects of the open circle time program in New York City. *Journal of School Psychology, 45*(1), 349-360

Hobson, R. P. (1986). The autistic child's appraisal of expressions of emotion. *Journal of Child Psychology and Psychiatry, 27*(3), 321–342. doi:10.1111/jcpp.1986.27.issue-3

Kaland, N., Callesen, K., Møller-Nielsen, A., Mortensen, E. L., & Smith, L. (2008). Performance of children and adolescents with asperger syndromeor high-functioning autism on advanced theory of mind tasks. *Journal of Autism and Developmental Disorders, 38*(6), 1112‑1123.doi:10.1007/s10803-007-0496-8

Leach, T., & Lewis, E. (2013). Children's experiences during circle time: A call for research-informed debate. *Pastoral Care in Education, 31*(1), 57-66

Lind, S. E. (2010). Memory and the self in autism: A review and theoretical framework. *Autism, 14,* 430‑456. doi:10.1177/1362361309358700

Losh, M., & Capps, L. (2006). Understanding of emotional experience in autism: Insights from the personal accounts of high-functioning children with autism. *Developmental Psychology, 42*(5), 809‑818. doi:10.1037/0012-1649.42.5.809

McCartney, K., & Lanphar, E. (2015). The impact of involvement in circle time on social and emotional awareness of students diagnosed with an autism spectrum disorder. *Teach Collection of Christian Education, 1*(1) 24-37

Meyer, J. A., Mundy, P. C., van Hecke, A. V., & Durocher, J. S. (2006). Social attribution processes and comorbid psychiatric symptoms in children with asperger syndrome. *Autism, 10*(4), 383‑402. doi:10.1177/1362361306064435

Milller, D., & Moran, T. (2007). Theory and practice in self-esteem enhancement: Circle-time and efficacy-based approaches-a controlled evaluation. *Teachers & Teaching, 13*(6),601-615. Doi:10.1080/13540600701683549

Moran, V. E., Olaz, F. O., & Del Prette, Z. A.P. (2015). Social skills questionnaire for Argentinean college students (SSQ-U) development and validation. *The Spanish Journal of Psychology, 18,* 1-11. doi https://doi.org/10.1017sjp.2015.92

NASP (2015) *Social Skills*: Promoting Positive Behaviour, Academic Success, and School Safety.Retrievedfromhttp://www.nasponline.org/resources/factsheets/socialskills_fs.aspx.

Oley, J., Sungard, H., Giardner, A. (2014). Effect of circle time activities on physical development of kindergartens in Bristol City, England. *Bristol Journal of Childhood Education, 9*(4), 104-125

Rasihid, T., Shehzadi, K., Yousaf, F. (2020). Development of social skills: a study comparing male and female students' social skills in public schools of Lahole. *Global Social Sciences Review* (GSSR), *(5)*3, 259-268. http://dx.doi.org/10.31703/gssr.2020(V-III).27

Vygotsky. L. S., (1978). *Mind in society*. Cambridge. MA: Harvard University Press.

Weiss, M.J., (2013). *Behavior analytic interventions for developing Social Skills in Individuals with Autism*. Retrieved fromhttp://archive.brookespublishing.com/documents/Gerhardt_social-skills.pdf

White, M., (1989). The Magic Circle: A process to enhance children's self-esteem', *Times Educational Supplement*, 30 June, p.24.

Williams, D., & Happé, F. (2010). Recognizing 'social' and 'non-social-emotions in self and others: A study of autism. *Autism, 14,* 285‑304. doi:10.1177/1362361309344849

Zins, J., Weissbert, R., Wang, M., & Walberg, H. (2004). *Building academic success on social and emotional learning: What does the research say?* New York: Teachers College Press.

TRAJECTORIES OF PLACE-BASED APPROACH IN TEACHING WRITING IN ENGLISH FIRST ADDITIONAL LANGUAGE AMONG ISIXHOSA LEARNERS

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Abstract
This study investigated the instructional effectiveness of the place-based approach (PBA) in writing in English First Additional Language (EFAL) by isiXhosa speaking learners. The basis for this study is the view that learners struggle to write in EFAL. The focus was on Grade 6 learners in a rural primary school in the Eastern Cape Province. In exploring this method, a qualitative approach through semi-structured interviews and classroom observations was adopted. Convenient and purposive sampling techniques were used to identify the school. It has been studied with two Grade 6 teachers and seven Grade 6 learners to gather data. The data were analysed using the critical discourse analysis (CDA). The data revealed that PBA helps learners to connect with their home communities while engaged with writing. Despite some limitations, the teaching programme was successful such that learners benefit from developing their English language competency. Most significantly, interviews showed that PBA was effective in improving learners' writing skills and that the learners benefited to a greater extent in content and language use. The study suggests that there is an opportunity to develop learning material that connects the learners with their environment and there is a need for training teachers in this area.
Keywords: Place-based approach, teaching, writing, English First Additional Language, isiXhosa speaking learners.

INTRODUCTION

The Eastern Cape, with vast extensive rural areas, is one of the poorest provinces in South Africa. Rural schools are isolated and underdeveloped, and the communities frequently exhibit low socioeconomic conditions and a lack of essential infrastructure such as roads, power, and information and communication technologies (Mohangi et al. 2016). Rural schools are still the heart of their communities, and they are typically the safest places to be in towns that are struggling financially due to economic shifts and widespread poverty (Sherman, 2011). Most importantly, rural communities depend on the local school to participate in local community events and to collaborate with other public sectors, organisations and individuals (Hlalele, 2013). Hlalele (2012) further states that the rural school has become the lifeblood of the communities, and this demands the schools unite with the communities in which they are located. This means therefore that the place where the school is situated influences teachers' and learners' interactions by shaping the genres, texts, and languages used as writers. Learners, teachers, and schools, in rural settings, take on identities associated with the place. The place is therefore more than a physical environment as it comes to have meaning because of the community's connections with it. Therefore, writing about a specific place pushes learners to think about the consequences of their interactions, as well as their intended audiences and underlying goals.

The notion of utilizing writing to access, investigate can be advanced by allowing learners to express themselves, drawing upon their home principles and traditional interaction patterns (Smith & Sobel, 2010). Allowing learners to explore their experiences through writing is one technique of teaching with a culturally responsive mentality. Therefore, it is the responsibility of teachers to assist learners in identifying places that are personally meaningful to them and to involve them in meaningful work that deals with real issues and real people. Rather than attempting to fit into a foreign idea of identity, rural learners should be encouraged to create a connection to their surroundings in order to discover meaning in their communities (Azano, 2011). Learners may begin to question and test the boundaries of their identities. This might result in learners when they are educated choosing to plough back to their communities. Learners who are given the opportunity to learn how to care for and care for a place are more likely to contemplate living there and helping to solve its challenges. In other words, the PBA honours learners' voices, promotes engagement, and helps them form identities not influenced by standardization, which may act as a force of isolation. It also may inspire the community to take a more active and protective stance towards their schools.

In other words, the place is the most significant part of PBA because it gives meaningful learning to get knowledge and experience. The curriculum adapts to the reality of local communities by using the local place as a context for interdisciplinary learning (Deringer, 2017). PBA is an important part of creating healthy communities because it allows learners to identify and interpret contexts and encourages them to behave accordingly (Gruenewald, 2003; Deringer, 2017). Meanwhile, place in case of writing activity helps the learners to understand the lesson. Pompos (2015) states that place is an important influence in the writing classroom because it helps learners to better understand notions of context, personal identity, and designing writing for specific situations. Teachers should consider using PBA to teach isiXhosa speaking learners to reach out to their needs. This approach is one of the teaching strategies that focus on where learning becomes. In the context of this study, the researchers intended to get the teachers to teach in 'new' ways which might develop learners' writing skills while at the same time exposing them to their communities. It is therefore necessary for this current study to examine trajectories of PBA in teaching writing in EFAL among isiXhosa learners.

The main purpose of this study was to investigate the trajectory of using PBA in teaching EFAL to isiXhosa speaking learners. It aimed at understanding the influence place-based writing practices have on learners' community connections as evidenced in learner writing development. The goal was to develop a collaborative relationship with the teacher in order to provide place-based writing activities that would help learners better communicate their understanding of place in their writing. Two research questions guided this study:

- What are the trajectories of using PBA in teaching EFAL to isiXhosa speaking learners?
- What influence does place based writing practice have on learners' community connections?

Review of literature

Writing is one of the language skills that must be mastered by EFAL learners. Needless to say, that this is a very daunting task for learners with limited English language aptitude, which is reflected in their writing, whether by making several grammatical or spelling mistakes or lacking adequate and appropriate vocabulary to express their ideas (Mpiti et al., 2021). It is highly complex; its importance in our society today cannot be overemphasised (Mpiti & Marongwe, 2020). Most learners from rural areas can be considered struggling

writers. Teaching writing is one opportunity for learners to explore the connections between their experiences and the syllabus, especially when teachers provide purposeful connections to community and place in the classroom. Therefore, learners have to be taught writing skills so to create a basic unit of writing.

On the other hand, in making good writing, learners should use the correct grammar; choose appropriate vocabulary, displayed by handwriting, spelling, layout and punctuation. Furthermore, writing is a visible and encourageable developing process. It takes time for learners to master skills as they progress from scribbling to conventional spelling. It means that learners have to express their thoughts in writing to make readers interested in their writing. In other words, writing allows learners to express themselves while allowing teachers pedagogies that work beyond simple skill and drill. It is without saying that writing, may be utilized across disciplines to demonstrate comprehension and interaction with literature, which adds to its value in the school curriculum. As a result, writing about the place and community helps learners to think about the consequences of their interactions, their intended audiences, and their underlying goals (Mpiti et al., 2021).

When exposed to place-based writing instruction, learners write about things that matter to them and have authority and a voice in their writing (Donovan, 2016). Therefore, place-based writing allows learners to read and react to their own stories, honing critical thinking abilities as they select the most appropriate genre in which to convey their responses to stories and information. PBA, according to Beames et al. (2012), can lead to valuable positions of social capital generation among learners, the school, and the society at large. Therefore, this indicates that writing about location and community pushes learners to think about the consequences of their interactions, as well as their intended audiences and underlying goals (Mpiti et al, 2021)

Connecting schools and place

The imperative of bringing schools and communities closer together is at the heart of PBA. One of Dewey's arguments was that students were unable to use their outside-of-school experience in the classroom, nor were they able to put what they learned in school into effect in everyday life (Dewey, 1959). In this context, the researchers want to break down the distance between school and life outlined by Dewey by emphasizing "place" as a guiding concept in the selection of core curriculum material and teaching approaches in this study. Dewey's theories are supported by place-based education techniques, which are founded on the premise that the learner matters, as does the world in which he or she lives. Gruenewald (2003) defines place as "local characteristics where people live that are linked worldwide to development that affects the local context." PBA, at its best, identifies, investigates, and addresses issues of social and environmental justice on a local level for the benefit of local communities (Deringer, 2017). It is the researchers' view that places are settings brimming with beliefs, experiences, and being in places that create and construct identities. According to Linnemanstons and Jordan (2017), PBA is the process of teaching concepts in language and other topics by using the local community and environment as a starting point.

With regard to the above, PBA connects learners to their communities. It comprises of teaching-learning activities that respect the learner's environment (Eijck, 2010) and give cross-curricular concepts by integrating culture, the environment, and the local community (Smith & Sobel, 2010). Education research also suggests that involvement and interaction with place improve learning. When PBA first opened, there were several possibilities to participate in spontaneous conversation, which is important for the development of

descriptive language and communication (Knight et al., 2015). Grunewald (2003) notes that learning in place not only teaches learners what the world is actually like but helps them contextualize their own role in their communities. This paper, therefore, presents the researchers' experiences and learning from engaging teachers with PBA in teaching writing in EFAL. This created an environment in which the teachers relaxed and tried out this approach with the learners in their communities.

Place-based Approach in teaching writing

The idea of getting learners to develop writing skills through PBA is important. What learners bring to school from their homes and communities contains vital information that may be used to better understand and involve students as they interact in the classroom (Esposito, 2012). Respecting learners' social capital and the information they bring to school encourages them to connect with and welcome the world as they explore their changing identities (Esposito, 2012; Gruenewald, 2003). Esposito (2012) proposed that training writers through real tasks founded in social capital will improve both mechanics and content of the writing. Learners begin to learn how to use writing to express their understanding in a way that is not possible with reading alone. Thus, the teacher needs to provide effective teaching and learning opportunities that English Second Language learners should develop in their writing of EFAL (Mpiti & Marongwe, 2020).

PBA takes this a step further by emphasizing curricular relevance for rural students in response to the issues faced by rural schools. Furthermore, when learners learn about local difficulties, they invariably "spiral out" into bigger, global issues, "since local reality is virtually always affected by far more broad cultural, environmental, and economic influences" (Brooke, 2011, p. 164). PBA focuses on the idea that people are shaped by and shape the places and areas in which they live and interact (Gruenewald, 2003). Teachers, on the other hand, continue to require practical help that is bolstered by more in-depth and reflective assessments of how PBA might be applied to local, national, and regional settings (Beames et al., 2012). While Nicol (2010) agrees that outdoor learning has significant 'curricular potential,' he also points out the challenges that teachers encounter while teaching PBA. Therefore, offering high-quality outdoor learning experiences for learners necessitates a major investment in teacher pedagogy through ongoing and targeted professional development (Saito & Atencio, 2015).

THEORETICAL FRAMEWORK

This study is guided by two theoretical frameworks, namely critical theory (Tyson, 2014) and critical pedagogy of place (Gruenewald, 2003). Gruenewald (2003) suggested a merging of critical theory and PBA into a critical pedagogy of place. Like critical theory, a critical pedagogy of place argues that education is political and that learners should be engaged in what is called critical consciousness by Freire (1970). Gruenewald (2003) argues that this transformation is contextualized by place and capitalizes on the substantive theory of critical pedagogy by adding place as a framework for investigating the “place-specific nexus between environment, culture, and education” (p. 10). In the context of this study, learners are coming from rural schools which may lack experiential resources to keep pace with the newly defined 21st-century literacies. This gap between mainstream literacy expectations and the reality of rural schools is an appropriate place for the application of critical theory. Therefore, this theoretical framework calls for an assessing stance on the use of place to understand its potential for engaging learners in teaching writing in EFAL.

METHOD

This research study employed qualitative method, which was motivated by the need to study, real people, real problems and real place. The qualitative case study approach was also adopted which was the most appropriate research methodology to employ (Yin, 2011). The case study was centred on a single rural primary school classroom, where the researchers and classroom teachers collaborated to create, teach, and analyze the curriculum.

The researchers selected isiXhosa speaking classroom teachers and learners to investigate the trajectory of using PBA in teaching EFAL. Because of the study's qualitative character, the researchers chose participants who could provide the most information about the topic under investigation (Leedy & Ormrod, 2005).

Convenient and purposive sampling was used to identify the school as the site for data collection. The participants of this study were two isiXhosa speaking Grade 6 teachers (both females) and seven isiXhosa speaking Grade 6 learners (4 girls and three boys). At the time of the study, both teachers were teaching Grade 6. Both teachers were aged between 25 and 49 and their teaching experience ranged between 7 and 28 years. The age range of learners was between 12 and 13. Teachers were labelled as T1 and T2 and learners were labelled as L1 – L7.

The data collection included semi-structured interviews and classroom observations related documents. The use of semi-structured interviews allowed the researchers to achieve an understanding of the depth and complexity of the teachers' experiences concerning PBA. During the teaching and learning process, a detailed observation was carried out to determine how the teacher implemented and the learner learnt utilizing PBA.

A two-month project was developed by the researchers with teachers using PBA as its guiding principle and focusing largely on the crucial role of keeping our environment clean with zero tolerance of littering. Themes were grounded in EFAL subject but with a strong emphasis on place. Teaching methods for the project were dialogic. That is, the researchers and the teacher tried to keep the narrative presentation of data to a minimum and focused on keeping the learners in discussion and activities that would help them to critically examine what takes place in their communities. In addition, learners worked individually, in pairs, sometimes in a group of four depending on the task at hand. At the end, the learners created a poster that was used to educate their peers about the importance of keeping their environment clean. The project was carried out in the classroom and on the school grounds. In the context of this study, the school grounds were referred to be the learners' local community and environment as a starting point.

The guidelines of the project were as follows:

- Week 1: the researchers observed the introduction and teaching of the lesson by both teachers in different classes.
- Week 2: Learners worked in pairs to examine various types of trash on school grounds and were invited to document their observations in further detail through writing and other forms of documentation. After each session, the pairs were invited to talk about their observations and express their ideas in the classroom. Researchers encouraged learners to try the practice exercises in keeping a journal. Learners were told to hand in their journal for assessment on the last day of the week and that assessment would be based upon their attention to detail in their observations of the place.

- Week 3: classroom discussions took place and learner feedback confirmed that a session dedicated to learning some basic writing skills would have both alleviated fears early on and likely give them more confidence throughout. The researchers decided to adjust this the following time. Creating a constructive conversation about pedagogy and how teachers learn with their learners, as well as the need of being introspective and responsive to results like this one. The guidance was provided that enabled some creative writing skills. Soon the learners were able to concentrate on the nuances of the journal assignment and turn their full attention to the place itself and writing.
- Learners wrote an essay in their journals on the importance of keeping the environment clean (guidance was given).
- Week 3: learners interviewed peers on why people litter (guiding interview questions were given to learners).
- Week 4: learners wrote a report and present their findings, they were encouraged to write reflectively about their experiences in the setting. (the structure of writing the report was given)
- Week 5: cleaning campaign was conducted by teachers, researchers and learners on the school grounds.
- Week 6: classroom discussion about the campaign took place. learners wrote an essay on their experiences of the campaign (the structure of the essay was given).
- Week 7: researchers asked learners to go to their specific places outside the classroom on the school ground, close their eyes, and to sit quietly for several minutes. Then, they were allowed to create a poster of zero tolerance littering with pictures/drawings and writing. That day, learners were also given a worksheet to fill out that required them to make detailed observations of a school ground. They looked at various aspects: the plants, stones, playground, fencing, where the school is situated and how the school grounds differ after the cleaning campaign. This exercise dramatically changed the way they felt in the space.
- Week 8: For the final assignment of the project learners were asked to use their poster to teach their peers on the importance of keeping their environment clean. It had to communicate what they had learned, directly and jointly, about their place, and to communicate their critical reflection upon the learning experience itself.

After analysing the data gathered through observations and semi-structured interviews of teaching sessions the researchers identified the following themes:

- Linking PBA in teaching writing
- Learners writing skill
- Connecting with place
- Development of learner’s confidence and language competence

All participants were told that their contributions were purely voluntary. The researchers asked the classroom teachers participating to identify focus-group participants who would be willing to talk with the researchers, had parental consent for their participation in the study. Because the majority of the participants were children, informed consent from both the participants and their parents was obtained before the intervention. Teachers and learners were both informed about the study's contents, research process, and data preservation.

The raw qualitative data were collected whereby themes were being generated via data analysis and coded for meaning. The researchers familiarised themselves with the data

through verbatim transcription of the discussions. The data was analyzed using Critical Discourse Analysis (CDA) to uncover the ideological content of spoken and written discourses (Fairclough et al., 2011).

RESULTS

The following section provides the place-based project findings, interviews conducted with the participants and data gathered through observations.

Trajectories of place-based approach in teaching writing in EFAL

Linking PBA in teaching writing

Adopting a PBA challenged both teachers. Before the task, both teachers thought that PBA was not doable on the school background. T1 said *…so PBA is about coming out of our comfort zone…it is impossible to do PBA in the school".* T2 stated *"I think we cannot just bring them out. There should be intention what is the whole purpose of bringing them out?"* Both teachers expressed concern about their lack of understanding about how learning about the curriculum strand of 'building a sense of place' could occur. A numerous time was devoted to discussing it with the researchers. In other words, we develop empathy for the teachers' lack of knowledge of several fundamental concepts developed in the PBA. After deliberation and several visits by the researchers, there was a clear understanding of PBA. Firstly, the findings highlight the need to address the teachers' lack of attention paid to a particular place and its salient features that can contribute to teaching writing in EFAL. Moreover, the findings revealed how teachers themselves admit that they lack a thorough understanding of the learning goals and processes related with place-based pedagogy. It is in this vein that the researchers advocate for teachers to pay more attention to the 'place's distinctiveness, with the objective of teachers gaining a more sophisticated understanding of its cultures and links between specific places and learners, as well as between teaching and learning.

After completing the project teachers reported their appreciation of being part of the task and applying this model. T1 described, "*… I am happy that I decided to participate…we, teachers in rural areas, focus merely on teaching learners to write. Let me talk about myself, I do not need to plan as detail as this…. If learners have started to write, then we move forward… Although I must follow the syllabus, sometimes I move with the flow. Through PBA I noticed that learners as well improved in writing."*, T2 said: "*I am so grateful to be afforded this opportunity of applying the PBA into my teaching practice though I was reluctant in the beginning". It assisted me as a teacher and my learners as well are participating in class, communicating well and enjoying writing.*

Both teachers realized that integrating the learners' place into the curriculum was important. T1 commended to say: "*this learning revealed of the positive attitude of the learners, fostered their appreciation to their land, and facilitated to dig their ability of writing"*. T2 admitted "*PBA comes up a lot of positive things from learners which are often overlooked… I see the learners are very happy to learn. I appreciate their changes in terms of enthusiasm. The learners are not shy anymore to answer, even if their answers sometimes are wrong*." As she recalled, "*…this kind of learning has never been applied in schools"*. Overall, both teachers enjoyed the teaching by the implementation of PBA. The teacher stated local materials were very necessary to develop even more in teaching. They both agreed that the new sight of no littering awareness they gained through PBA was far more valuable rather than the challenges they underwent. They further showed their willingness to apply PBA in other subjects they teach.

The learners' writing skill

Through class observations, the researchers saw how teachers tried PBA using place to teach writing in EFAL. Data revealed that learners' writing skills increased. It also highlighted how learners may learn to find their identities by writing essays that were informed by their places. The learners were able to truly participate in the classroom activities by writing about what they knew. This supports the idea that writing is crucial for learner development, and that when taught through place-based writing techniques, learners may become better, more knowledgeable writers. Data also revealed that learners were also able to produce lengthier works and had fewer problems with grammatical norms and sentence structure. Their essays were at or above expectations for length compared to be before they start the project. Learners also wrote with more complexity, which may indicate a greater connection with and understanding of their topics. Again, there were changes in grammatical standards, and they grew more critical and honest about their situations. Even in this sincerity, they developed a caring voice that employed higher-level thinking to precisely describe their situations. Above all, their writing demonstrated a comprehensive knowledge that demonstrated a growing connection to their communities and the ability to convey that connection through writing. The connections to the communities were shown through the place writing about keeping their environment clean

Connecting with place

The data revealed that PBA empowered rural learners to connect with their community while engaged with writing. Findings from learners indicated various aspects like identity, respect of place, taking care of their environment. The writing demonstrated that they were very aware of their identities and how they did not always fit into the context of their school. It was clear that their sense of identity had an impact on how they interacted with their school. Providing a foundation based on the good qualities of their school community aided in the development of self–awareness, empowerment, and a stronger sense of community. Moreover, writing about what they know helped the learners genuinely engage in the classroom activities. For example, when they were asked what they have learned from this place-based project, the learners said:

L1: "What I really like kuba sifunda ngezinto ezenzekayo ekuhlaleni kwethu nesizenzayo thina. Xa sifunda ngezinto ezinjengokungcolisa kwesikolo or zero tolerance of littering sinento zokubalisa emakhaya" (*What I like is that what we are learning is based in the community and what we do. Like so when we are learning stuff like littering on school grounds or zero tolerance of littering, we have something to talk about at home*).

L3: "I have learned to connect with my peers and can interview people. When I grow up, I will be a journalist".

L4: "I learned to take care of my school; I have learners to keep my school clean and I love my school".

L6: "Mna ndifunde ukuthanda and respect my place indawo endihlala kuyo nokuyigcina iclean. Ndithanda nalento sibuya sibhale ngalento yenzekayo". (*I learned to like and respect the place I leave in and to keep it clean. I also like the fact that our writing was in line with our life experiences*).

L7: I learned to respect my school, to keep my school clean, um…to not to litter. Um…to teach others.

This supports the idea that writing is vital for learner development, and that when taught via PBA, learners may become better, more educated writers.

Development of learner's confidence and language competence

In the first week the researchers attended Grade 6 lessons as was scheduled, they observed that only a couple of learners were participating in class and some of those who were participating were timidly expressing themselves. Some learners tended to cover their face, biding hands and having heads down. Some learners could not speak audibly and one learner put his head under the desk (hiding as he was contributing to class). In a second class that was observed, the researchers noticed that some learners could not finish their sentences, others tended to forget what they wanted to say, and others could just simply not open their mouths for fear of being laughed at. In this project, discussions and presentations were structured to foster their confidence such that learners benefited from developing their English language competency.

In the eighth week, with the theme Zero Tolerance, before class, the learners were asked to present their posters and teach their peers the importance of keeping their environment clean. All of them were confident in speaking and sharing their experiences with peers. Learners who participated in the study expressed almost the same view though put across in different words. In this case, the confidence was clear because they boldly express their opinions in writing and orally. For instance, when they were asked their experiences on the place-based project, the learners said:

L2: bendisoyika ukuthetha ndidikwa nokukubhala, but now I like to talk kuba ndifunda kamnandi ngezinto endizaziyo. (*I was afraid to talk in front of the class but now I like to talk because learning was based on my experiences*).

L5: I learned new words and can write those words.

L7: I like to teach my friends; I can write and finish fast.

This boosted their confidence, maybe because the things mentioned were personal to them, so they didn't worry about making mistakes afterwards. As a result, it was established that PBA improved learners' writing abilities and other behaviours. Most significantly, interviews showed that PBA was effective in improving learners' writing skills and that the learners benefited to a greater extent in content and language use.

DISCUSSION OF FINDINGS

Linking PBA in teaching writing

The study revealed that teachers lack understanding about how learning about the curriculum strand of 'building a sense of place' could occur. It must also be raised that teachers often face substantial difficulties when attempting to teach PBA without proper training. Teachers still require practical advice that is backed up with a more in-depth and thoughtful knowledge of how PBA may be used to illustrate local, national, and regional contexts (Beames et al., 2012). Indeed, the study found that primary school teachers are frequently unprepared to plan and lead PBA lessons on their own, and that they require far more intensive training and professional development in this area. While Nicol (2010) agrees that outdoor learning has a lot of 'curricular potential,' he also points out the challenges that teachers encounter while planning and implementing PBA. Providing high-quality outdoor learning experiences for learners does necessitate a major investment in teacher pedagogy through ongoing and targeted professional development (Saito & Atencio, 2015). Gaining such knowledge is expected to improve teachers' ability to choose teaching methods and strategies that will help EFAL learners build writing skills in the target language (Mpiti & Makena, 2020).

Furthermore, it emerged from the study that both teachers realized that, integrating the learners' place into the curriculum was important. They further showed their willingness to apply PBA in other subjects they teach. They agreed that the new sight of no littering awareness they gained through PBA was far more valuable rather than the challenges they underwent. Overall, the study revealed that both teachers enjoyed the teaching by the implementation of PBA. Beames et al. (2012) propose that a PBA can result in good social capital generation within the learning group, the school, and the community at large.

Learners writing skill

Analysis of data indicated that when learners write about what they know helped the learners authentically engage in the classroom activities. Not only did the learners' writing improve when they were involved in genuine activities that mattered to them, but their classroom behaviour altered as well. Writing that's tied to place and community enables learners to think about the consequences of these interactions, as well as their intended audiences and underlying goals (Mpiti et al, 2021). Thus, the teacher must provide effective teaching and learning opportunities for ESL learners to improve their EFAL writing skills (Mpiti & Marongwe, 2020). Esposito (2012) proposed that developing writers through real activities founded in social capital will improve both the mechanics and substance of writing. This provides credence to the idea that writing is vital for learner development, and that when taught through place-based writing techniques, learners may become better, more educated writers.

Connecting with place

The data revealed that PBA empowered rural learners to connect with their community while engaged with writing. Findings from learners indicated various aspects like identity, respect of place, taking care of their environment. The writing demonstrated that they were very aware of their identities and how they did not always fit within the environment of their school. It was clear that their sense of identity had an impact on how they interacted with their school. Self–awareness, empowerment, and a stronger connection to their school were all boosted by providing a foundation founded in the good characteristics of their local community. Heightened motivation for learning is a common factor amongst outdoor learning program research (Hartmeyer & Mygind 2015). Therefore, writing that's tied to place and community enables learners to think about the consequences of these relationships, as well as their intended audiences and underlying goals (Mpiti et al., 2021).

Development of learner's confidence and language competence

The findings show that learners were able to converse and connect with their peers using oral language while also increasing their writing skills. Learners were motivated to complete set tasks on time. When PBA first opened, opportunities for spontaneous conversation, which is important for the development of descriptive language and communication, arose regularly (Knight et al., 2015). When activities were linked to outdoor sessions, it was shown that motivation to study also transferred to indoor tasks. Learners performed more work in these situations than they did in normal indoors-only activities, with more depth and quality. . Heightened motivation for learning is a common factor amongst outdoor learning program research (Hartmeyer & Mygind 2015). The learners' capacity to use true, real-world knowledge to make purposeful language choices while creating texts was critical to their progress in English. The study's findings revealed that implementing the PBA curriculum had a favourable influence on both teachers and learners.

CONCLUSION

Without being pessimistic about the merits of PBA, the researchers believe that it should be regarded as one of a number of pedagogies that have the potential to promote teaching writing in EFAL among isiXhosa learners. When PBA is integrated into teaching writing connects learners to specific places and contexts relevant in their everyday lives. However, teachers require practical guidance and proper training that is underpinned by deeper and reflective understandings of how PBA can demonstrate place as a learning environment.

Recommendations

It is recommended that the PBA be utilized to supplement a structured curriculum in order to better satisfy learners' needs while also enhancing their writing abilities. This study suggests the Department of Basic Education (DBE) to consider a locally based curriculum; it means that the system and programme should be grounded to the learner's place characteristics. The DBE may decide to develop local-based textbooks when the local-based curriculum is implemented. Local characteristics such as customs, local wisdom and knowledge, unique environment, and other learner's place aspects should all be included in textbooks. It should also include visuals of the real environment and the people that live there. Therefore, the researchers advise that future research be focused on producing teachers' unique perspectives on teaching using PBA. Moreover, it is recommended that a heightened awareness of the transfer of learning, between the outdoor and indoor learning environment with technology.

REFERENCES

Azano, A. (2011). The possibility of place: One teacher's use of place based instruction for English students in a rural high school. *Journal of Research in Rural Education*, *26*(10), 1-12. http://jrre.vmhost.psu.edu/wp-content/uploads

Beames, S., Higgins, P., & Nicol, R. (2012). *Learning outside the classroom: Theory and guidelines for practice*. London: Routledge.

Brooke, R. (2011). Voices of young citizens: Rural citizenship, schools, and public policy. In K. Donehower, C. Hogg, & E. E. Schell (Eds.), *Reclaiming the rural: Essays on literacy, rhetoric, and pedagogy* (pp. 161–172). Southern Illinois University Press.

Deringer, S. (2017). Mindful Place-Based Education: Mapping the Literature. *Journal of Experiential Education*, *40*(4), 333-348. 48. http://doi:10.1177/1053825917716694

Dewey, J. (1959). School in society. In M. Dworkin (Ed.) *Dewey on Education* (pp. 76- 78). New York, NY: Teachers College.

Donovan, E. (2016). Learning to embrace our stories: Using place-based education practices to inspire authentic writing. *Middle School Journal*, *47*(4), 23–31. https://doi.org/10.1080/00940771.2016.1202657

Eijck, M. (2010). Place-based (science) education: Something is happening here. Cultural Studies and Environmentalism, in D.J Tippins et al. (eds.), *Cultural Studies and Environmentalism, Cultural Studies of Science Education* Vol.3, doi: 10.1007

Esposito, L. (2012). Where to begin? Using place-based writing to connect students with their local communities. *English Journal*, *101*(4), 70-76. https://www.jstor.org/stable/41415476

Fairclough, N., Mulderrig, J. & Wodak, R. (2011). Critical discourse analysis. In van Dijk, T. A. (Ed.), *Discourse studies. A multidisciplinary introduction*. London: SAGE

Freire, P. (1970). *Pedagogy of the oppressed* (M. B. Ramos, Trans.). New York, NY: Continuum.

Gruenewald, D.A., 2003. The best of both worlds: a critical pedagogy of place. *Educational Researcher*, *32*(4), 3–12. https://about.jstor.org/terms

Hartmeyer, R., & Mygind, E. (2015). A retrospective study of social relations in a Danish primary school class taught in 'Udeskole'. *Journal of Adventure Education and Outdoor Learning*.

Hlalele, D. (2013). Sustainable rural learning ecologies a prolegomenon traversing transcendence of discursive notions of sustainability, social justice, development and food sovereignty. *The Journal for Transdisciplinary Research in Southern Africa, 9*(3), 561- 580. https://hdl.handle.net/10520/EJC149266

Hlalele, D. (2012). Exploring rural high school learners' experience of mathematics anxiety in academic settings. *South African Journal of Education, 32*(3), 267-278. https://hdl.handle.net/10520/EJC123106

Knight, A. M., & McNeill, K. L. (2015). Comparing students' individual written and collaborative oral socio scientific arguments. *International Journal of Environmental and Science Education,10*(5), 623–647. https://www.example.edu/paper.pdf

Leedy, P. D. & Omrod, J. E. (2005). Practical research: Planning and design 8th Ed. *Upper Saddle River*, New Jersey. Prentice Hall.

Linnemanstons, K. A. & Jordan, C. M. (2017). Learning through place: Evaluation of a professional development program for understanding the impact of place-based education and teacher continuing education needs. *Journal of Sustainability Education, 12*, 1-25. http://www.susted.org/

Mohangi, K., Krog, S., Stephens, O. & Nel, N., (2016). 'Contextual challenges in early literacy teaching and learning in grade R rural school in South Africa'. *Per Linguam, 32*(1), 71–87. https://hdl.handle.net/10520/EJC189600

Mpiti, T. & Makena, B. (2020). *Factors affecting isiXhosa learners in writing English as First Additional Language in rural primary schools*. [conference proceedings]. Pretoria, South Africa. https://www.academia.edu/download/65627443

Mpiti, T., Makena, B. & Mpahla, N. E. (2021). *Applying Place-Based Approach in teaching academic writing in a tertiary English First Additional Language context in the Eastern Cape.*[conference proceedings]. Valencia, Spain. https://orcid.org/

Mpiti, T. & Marongwe, N. (2020). Exploring factors affecting Grade 4 learners' English communicative skills in Eastern Cape Province. *International Journal of Sciences and Research*, *76*(11), 192-206. https://www.example.edu/paper.pd

Nicol, R. (2010, September). What qualifications are needed to become an outdoor teacher and what is the teacher's role? Encountering, Experiencing and Exploring Nature in Education [conference proceedings] Rateče-Planica, Slovenia. http://www.csod.si/index.php?str=345

Pompos, M. (2015). *Investigating Place in the Writing Classroom: Designing a Place Based Course with A Local Service-Learning Component*. Florida: University of Florida.

Saito, E. & Atencio, M. (2015). Lesson study for learning community (LSLC): conceptualising teachers' practices within a social justice perspective, *Discourse: Studies in the Cultural Politics of Education, 36*(6), 795-807. https://www.tandfonline.com/loi/cdis20

Sherman, J., & Sage. (2011). Sending off all your good treasures: Rural schools, brain drain, and community survival in the wake of economic collapse. *Journal of Research in Rural Education, 26*(11), 1-14. http://jrre.psu.edu/articles/26-11.pdf.

Smith, G. A., & Sobel, D. (2010). *Place- and community-based education in school.* New York: Routledge.

Tyson, L. (2014). *Critical theory today: A user-friendly guide*. Routledge.

Yin, R. K. (2011). *Qualitative research from start to finish.* New York, NY: Guilford.

DIGITAL TECHNOLOGY ROLES TOWARDS ASSISTING ENGLISH LANGUAGE DEVELOPMENT IN AN UNDERPRIVILEGED BACKGROUND

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Abstract
This study explores the effect of digital technologies as applied in a classroom environment towards language proficiency in learners emanating from an underprivileged context. Participants of the study comprised five secondary school teachers conveniently chosen from diverse schools in one district. In this qualitative investigation, a case study design was used by the authors to study phenomena that are complex as specified within the frameworks of this inquiry. To collect data, semi-structured interviews were used, thus leading to analysis and thematical interpretations. The study findings reveal that learners who are at an advantage to learn through digital infused practices were noted to have eloquently developed their language proficiencies, awareness and improved language learning skills in diverse aspects inclusive of reading. Furthermore, learners who engaged in digital technology when learning were identified to have practiced reading fluency with limited stress levels. As authors of this manuscript we conclude that it is viable for languages be learnt through the application of digital technologies for effectiveness and efficiency. We recommend that embarking on the use of e-learning devices indeed encourage readability in learners, more so that reading is regarded as one of the fundamental skills in learning. To instill proficiency in reading texts thus leading to academic success, use of digital technologies needs to be made a priority.
Keywords: Digital, Reading, Language proficiency.

INTRODUCTION

As noted by Kahn, Gary and Shen (2013), language as an important tool for communication engulfing educational development needs to be nurtured in accordance with its valuable aspects inclusive of speaking, listening, reading, and writing. Inspiring language learning settings have to be made available, thus providing learners with the necessary exposure for the expansion of all language literacy skills. To improve reading proficiency in learners hence the emergent of the digital era in the past couple of years, ascertaining an uplifted level of education led to the implementation of infusing digital technologies to maintain a reading culture in the youth of our country (Evans, Joubert & Meier, 2017).

An important factor for consideration is that in the still underdeveloped learning environments, versus privileged learning environments, research has observed that there are some students and teachers who still lack the necessary skills to engage with language instruction through e-learning devices. This limitation may pose some challenges to both teachers and students as recipients of teaching and learning, resulting in an eroded desire to pursue learning for some students (Graham, 2013). About the cultivation of these necessary language skills, Makena and Mpiti (2020) are of the same view as they pronounce that as the education process promotes independent learning, it becomes the task of the teachers to

encourage information retrieving skills from diverse information platforms made available by the libraries.

Review of Literature

For improved language proficiency, learning through e-learning platforms denotes an anticipated success for all involved. As is the case with the current South African context, remote learning has since aroused lots of anxiety, trauma and tension, more so that learners are not familiar with the English language being recognized as the medium of instruction, hence not their mother-tongue in the studied research sites (Belpaeme, Harris, DeSteno, Kory, Dickens & Jeong, 2016). This then becomes a wake-up call to all stakeholders involved in language learning not to disregard language aspects, thus avoiding a negative impact with regards to academic performance (Snow, 2002). Logistically speaking, it has been proven by research that if there is poor digital tuition, the future of learning is likely to be jeopardized.

Furthermore, learning through the use of digital technologies has since become an instructional method influencing technology towards better strategies for learning. This method has the advantage of being learner centered and learner paced, allowing learners to have control in both time and learning pace (EDUCAUSE, 2017; Fisher & Frey; 2020, Hattie, 2012). The current state of affairs if one can observe is a change in how children interrogate digital equipment. Digital technologies have since taken over the primitive ways of doing things, with children at the uppermost centre of this digital world (Xiaolin, 2017). The way they operate e-learning gadgets is really surprising! You could be amazed to observe that at very early ages they are technologically vibrant, as compared to adults. As authors of this manuscript we diverted and had a closer look at the toys they play with, things are no more the same as it used to be in the previous ages. These young learners carry along digitals like tablets and cellular phones which they easily operate without any assistance from the adults (Allen, Hartley & Cain, 2015).

However, as the sudden change in the entire world has brought an emergence of the fourth industrial revolution, there is awareness of fully engaging in technology for improvement coupled with enhanced learning strategies. Thoermer and Williams (2012) contend that there is a huge need to maintain the relationship in the use of digital technologies and processes of learning as learners engaging in such platforms have shown indications of motivated and optimistic attitudes for reading exercises. Motivated learning, language development, increased vocabulary and uplifted reading levels have been noted to be results of consistent interaction with digital technologies as outlined by Chang and Breazeal (2011).

Be that as it may, one would wonder if interactions encompassing learners within a specific community or environment have any significant input with regards to language development (Hirsh-Pasek, Zosh, Golinkoff, Gray, Robb & Kaufman, 2015). Given this stance, one would ask some questions with regards to the consequences of this emerging digital actuality for improved language proficiency. As authors we then question ourselves with regards to the actual significance for digital realism concerning language acquisition as a core human skill, specifically reading, and also whether the emergent digital learning environment has brought about some modified ways of learning languages, thereby leading to enhanced language learning for those considered as originating from disadvantaged backgrounds.

Linguistic environments have been denoted by research to have a powerful inclination in reading proficiency. Engaging through technological learning has proved to play a fast, easy

and vital role in language acquisition. It is noted that today's youth easily engage with digital gadgets like smartphones, tablets, computers and Ipads when compared to learners of the preceding generations, with the exceptions of those children not exposed to such resources in their home environments. This easy access to the mentioned digitals has an added advantage of improved technical and literacy skills as learners get exposed to diverse technology skills (Dziuban, Picciano, Graham & Moskal, 2016).

Consequently, research (Flewitt, Messer & Kucirkova, 2015; Plowman, Stephen, & McPake, 2012) contend that consistent use of digital technologies by learners leads to improved language learning as observed by their siblings. This means learners with an advantage to explore digital devices at their homes are at a better exposure for enriching their language learning levels, as against children whose homes still lack availability of such valuable resources. As authors we propose that the Staff Management Teams (SMT) in the schools investigated should purchase e-learning devices for all learners to get acquainted, thus leading to improved language proficiency. Burnett (2010) is of the same view as he acknowledges that direct interrelation with digital technologies has been found to produce results of improved and inspired reading and writing skills in language learning. Nonetheless, English language teachers are faced with the task of identifying vibrant reading strategies when using digital technologies in comparison to the traditional methods of comprehending texts directly from a hard copy or book.

As indicated in researched works above, we, highlight an important factor to be noted. Learners from the studied secondary schools are likely to perform better in learning English language through exposure to digital technologies. Schools lack the availability of such valuable assets intended to uplift reading abilities among learners. As authors, we identified an important aspect of making an inquiry on digital technology roles towards an inclined culture of reading within the South African nation generally, precisely secondary school learners (Dent & Goodman, 2015). Henceforth, this paper saw a necessity to investigate whether digital technologies played any significant role in the development of English language in underprivileged backgrounds.

THEORETICAL FRAMEWORK

The afore-mentioned arguments fall within the Digital Blooms' theory (Terrell, 2018) which pronounces how teachers are assisted in designing curriculum aimed at sharpening students in the use of technological devices such that they acquire innovative, research-related critical thinking skills. This theory on digital learning further aggravates that students are made to obtain the necessary digital skills hence exposed in the fourth industrial revolution. Puentedura, Churches and Nelson (2017) are of the same view as indicated in their Bloom's and SAMR theory tasks as they propose a need to strive for both higher order thinking skills as well as the necessary requirement on student outcomes, as SAMR is a model premeditated to acquaint teachers in ways of instilling technology-infused learning.

Both these theories imply that the emergent digital learning platforms need to be appreciated and put into full practice as learners seem to be enjoying learning languages through such platforms. As these are mostly audio-visual aids, there is great exposure in aspects like the spelling of words, this increasing vocabulary and reading levels in learners. Such e-learning devices have been noted to motivate yet uplift comprehension levels among learners.

Makena and Mpahla (2021) are also of the same view as they argue that the current state of affairs has led to people changing ways of living when compared to the past couple of years, this being depicted by the type of technology and instruments loading music, types of games played, language used and learning styles. The transition that led to technology driven learning methodologies being put in place needs English language teachers to fully engage in the use of such digitals for improved language proficiency.

METHOD

The authors in this section outline research methods and procedures that have been followed in the data collection process.

Research Approach

For this inquiry, a qualitative approach was implemented, as such authors were able to collect facts about human behaviour, thereafter premeditated the unfolding real-world situations about the case studied. Teachers' perspectives helped authors to corroborate language learning theories through the use of digital technologies (Boland, 2010).

Research Design

As the investigated case could not be considered without learning and teaching frameworks, a case study was used as it led to the availability of tools that helped in studying compound phenomena within their contexts (Fick, 2014; 2015).

Participants

The population of this research enquiry entailed teachers offering English language in the entire district as alleged by authors that they are the relevant set of participants where appropriate information regarding the problem studied could be obtained from (Brinkman, 2013; Seal, 2015). Five English language teachers as participants of this enquiry were conveniently selected from a rural school in one of the Eastern Cape Education District. Furthermore, for convenience, the authors considered proximity logistics in-between the identified site and the place of work for authors (Neuman, 2013; Fick, 2014).

Instruments

Semi-structured interviews as data collection tools containing open-ended questions were used. The same set of questions was piloted by authors to the colleagues with whom they work, to ensure trustworthiness. This practice was undertaken as the work environment for the authors themselves is rural, coupled with observing whether the instrument would give the same or identical responses when administered in the actual participants. This type of interview allowed access for secondary school teachers to engage in vigorous discussions as much as they felt. Open-ended questions permitted both authors and participants expanded chances to explore and dig deep into the investigated problem (Mackey & Gass, 2016). As both the interviewee and the interviewed engaged further and further in this exercise, there was a need for expanded periods with a range from 50 to 90 minutes as emerging dynamics not anticipated by both authors and participants kept on emerging. As such, we avoided being rigid, instead took the trend where responses led us, although some items were not identified by the interview schedule. By so doing, we granted our participants some freedom to freely share their experiences. The main emphasis on questions asked by authors centred around digital technology roles towards promoting English language development for learners in underprivileged backgrounds.

Ethical Consideration

Even before authors undertook the study, they ensured participants were addressed about the issues of giving consent that they would voluntarily take part in the study. After participants have alluded to taking part in the investigation, the authors assured them that responses would be kept anonymous and also that any participants had a right to withdraw at any stage. All this communication between authors of this manuscript and participants was not just done verbally verbally, but through written text (Fick, 2014).

Data Analyses Techniques

Data was analysed through content analysis. In this process we then identified some commonalities as well as varying differences. As authors, we engaged on grouping data into categories by making sense of multiple interpretations, thereby identifying main points which we then transcribed into themes (Miles & Huberman, 2014).

RESULTS

Findings of this study are discussed in line with the themes emerging from data: capacitation attainment from digital applications, limited parental support and non-peer interaction.

Capacitation Attainment From Digital Applications

The main finding of this enquiry was that learners from disadvantaged backgrounds displayed some positive attitudes and motivated inclination during exposure of learning English language using digital technologies. This could be noted although such learners were sharing the least available e-learning gadgets.

When one participant engaged in an interview on how learners displayed interest in reading activities pursued through using digital technological devices, he reported: *As I moved around observing how learners comprehended with the given text, I observed that more than actually engaging with the text itself, there was interest and quarrel about operating the gadget. I just smiled, passed by, ignoring what I had just seen.* This is in line with what was uttered by another participant: *When one learner lifted up her hand, I was of the impression they were indicating they are done with the task, only to discover they wanted to request for an extension of time, mentioning that they spent most of the time mingling with the computer assigned for their group. When time ultimately came for reporting, I was surprised to notice that this group had gone an extra mile. As there were new and unfamiliar words that they came across when comprehending with the text, they had also learnt by themselves on how to find either synonyms or antonyms of such words! I was so taken up by the report from the group in particular.*

Limited Parental Support

A finding on limited parental support was reported by one participant: *As I advised learners to use the least available technological devices at home, like cellular phones to improve vocabulary and spelling, some learners reported that their parents could not see necessity in permitting children with their cellular phones, with arguments that such a gadget was never meant for learning purposes, instead is solely a tool for communication.* Such a finding might be attributed to non-availability of gadgets like laptops in some learner homes coupled with some negative attitudes by parents towards digital learning.

Non-Peer Interaction

Amongst the participants, one commendably echoed: *Even when the bell rang, allowing learners to go out of the classroom for playtime, you would see them hooked onto the gadget,*

seriously engaging, not even perturbed by the loud noise outside. As I urge them to go out and relieve themselves, they had developed a tendency to disregard my instruction. To me this showed some kind of addiction that has resulted in segregating them from playing with their friends. Another participant had to contend: *The few parents who permit learners some access, have constantly reported to me that all of a sudden their children lately prefer to stay indoors, they no longer bother to have engagements with the other children next door as they are always hooked up in our laptops and tablets, claiming they are busy developing their language proficiencies.*

DISCUSSION OF FINDINGS

The general finding of this study is that learners seem to benefit and learn overwhelmingly from digital technologies with regards to language development, with specific attainment of improved reading abilities. In this instance, the findings from the analysed data on digital technology roles in language proficiency are acknowledged by Ozturk and Ohi (2018) who discovered that it could also be the task of parents to support children's learning by assisting at capacitating them with both digital and non-digital print exposures when they comprehend with tasks assigned, by so doing, this would serve as a two-way remedy, that is, having a great chat with their kids, as well as playing the mentorship roles. As authors, we deduce that little could the parents determine the level of technological implantation these young kids could be living with. You would be astonished how they interact with gadget to discover information that has not yet been unpacked in the class by their teachers!

From data collected, it came up that infusion of language learning with digital technologies has proved to produce added advantages for improved language proficiency reading skills in learners. Flewitt, Messer and Kucirkova, (2015) are of the same view when contending that as young learners grow, they acquire the necessary skills needed in language learning if they consistently engage with digital technology devices at their early ages. As authors, we opine that drastic changes be considered in learners' reading skills through consistent engagement with technological devices. Through listening and engaging with varying programmes brought about by e-learning technologies, reading proficiency is developed in learners. Moreover, interaction by teachers while learners use digital media helps in collaborating verbal dialogues, the end-result of such engagements being reading and written tasks, this denoting positivism in the intended learning outcomes. The current argument of every citizen and research nowadays centres around digital literacy practices among learners.

We absolutely cannot contest the mere fact that the world is now truly technology driven, what we are asking ourselves is just the extent to which engagement with these e-learning devices can profoundly aid all the youth in our country to read and write, as these have been the most troublesome aspects in language learning when equated with the traditional teaching and learning methods. Henceforth, out of the data collected, it was revealed that the digital age has an element of arousing quick learning abilities as compared to the previous learning methodologies. If there could be continued engagement with learners in these digital platforms there is likely to be an instilled culture of reading, thus leading to generated academic excellence.

The arguments above are in line with Digital Blooms' theory (Terrel, 2018) as it underpins investigation on digital technology functionality on assisting English language proficiency in learners from disadvantaged backgrounds. E-learning devices have been proved to be playing an essential role in developing learner reading abilities. It then becomes English language teachers' liability to motivate the availability of such digital devices and thereby ensuring that

all learners are well vexed on the use of these vital gadgets for improved language learning abilities irrespective of the backgrounds they emanate from. Conclusions and recommendations have then been outlined by the authors as a contribution towards regulating the problem.

CONCLUSION

Through this research, it has been discovered that prospects of learning languages with the application of digital technologies have proved to be vibrant. There is a vast need for learners irrespective of their backgrounds, to access all the necessary exposure in a wide variety of e-learning gadgets for improved reading capabilities as proficient readers are tantamount to efficient lifelong academics.

Recommendations

Moreover, the tremendous evolving technological learning in today's youth has led to new dynamics in learning styles as well. This is an amazing juncture as forms of learning were not like this, just a few years ago. For further research, as authors of this paper, we propose that some vigorous research on the use of digital devices be conducted with regards to health-related future consequences in those learners who are still at lower levels of learning.

REFERENCES

Allen, M. L., Hartley, C. & Cain, K. (2015). Do iPads promote symbolic understanding and word learning in children with autism? *Frontiers. Psychology*, 1(6), 138-145.

Belpaeme B., C., Harris, P. L., DeSteno, D., Kory Westlund J. M., Dickens, L. & Jeong, S. (2016). Young children treat robots as informants. *Topics in Cognitive. Science*, 2 (8), 1–11.

Boland, P. (2010). *Qualitative inquiry*. London: Sage.

Brinkman, S. (2013). *Qualitative interviewing.* New York: Oxford University Press.

Burnett, C. (2010). Technology and literacy in early childhood educational settings: A review of research. *Journal of Early Childhood Literacy*, 3 (10), 247–270.

Chang, A. & Breazeal, C. (2011). Tink R Book: shared reading interfaces for storytelling, in Proceedings of the 10th International Conference on Interaction Design and Children. *Ann Arbor*, 1 (617), 145–148.

Dent, F. V. & Goodman, G. (2015). The rural library's role in Ugandan secondary students reading habits. *International Federation of Library Association and Institutions*, 1 (4), 55-62.

Dziuban, C., Picciano, A. G., Graham, C. R. & Moskal, P. D. (2016). *Conducting research in* online and blended learning environments: New pedagogical frontiers. New York: Routledge, Taylor & Francis Group.

EDUCAUSE. (2017). Key issues in teaching and learning. Retrieved from https://www.edu/eli/initiatives/ key-issues-in-teaching-and-learning.

Evans, R., Joubert, I. & Meier, C. (2017). *Introducing children's literature: a guide to South African classroom*. Hatfield, Pretoria: Van Schaik.

Fick, U. (2014). *The Sage handbook of qualitative data analysis.* Boston: Sage.

Fick, U. (2015). *Introducing research methodology.* Boston: Sage.

Fisher, C. B. (2003). Choosing qualitative research: A primer for technology education researchers. *Journal of Technology Education*, 1 (9), 47-63.

Fisher, D. & Frey, N. (2020). Educational Leadership, *All Learning Is Social and Emotional*, 77 (5).

Fisher, D., Frey, N. & Lapp, D. (2011). Coaching middle-level teachers to think aloud improves comprehension instruction and student reading achievement. London: Routeledge.

Flewitt, R., Messer, D. & Kucirkova, N. (2015). New directions for early literacy in a digital age: *The iPad. Journal of Early Childhood Literacy,* 3 (15), 289–310.

Graham, C. R. (2013). Emerging practice and research in blended learning. New York: Routledge.

Hattie, J. (2012). *Visible learning for teachers.* New York: Routledge.

Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B. & Kaufman, J. (2015). Putting education in "educational" apps: Lessons from the science of learning. *Psychol. Sci. Public Interest,*1 (15), 3–34.

Jenkins, H. (2006) *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century.* Chicago, IL: The John D. and Catherine T. MacArthur Foundation.

Kahn, P. H., Gary, H. E. & Shen, S. (2013). Children's social relationships with current and near and future robots. *Child Dev. Perspect*, 1 (7), 32–37.

Mackey, R. & Gas, P. (2016). *Teaching intensive reading skills*. Rowley: Newbury House Publishers.

Makena, B. & Mpahla N. (2021). Enhancing English language proficiency through learning styles centered on a perception of migrating from face-to-face to remote online learning culture: a case of a rural South African university. *Multidisciplinary Journal of Sciences and Research* 1 (8), 33-40.

Makena, B. & Mpiti, T. (2020). *Role played by the library to promote a culture of reading among learners*, South Africa International Conference on Education (SAICEd): Pretoria South Africa.

Miles, M. B. & Huberman, A. M. (2014). Qualitative data analysis: An expanded source book. Thousand Oaks: Sage Publications.

Neuman, W. L. (2013). *Social research methods. Qualitative and quantitative approaches.* Thousand Oaks: Sage.

Ozturk, G. & Ohi, S. (2018). Understanding young children's attitudes towards reading in relation to their digital literacy activities at home. *Journal of Early Childhood Research*, 4 (16), 393-406. Retrieved from https://doi.org/10.1177/1476718X18792684.

Plowman, L, Stephen, C. & McPake, J. (2012) *Growing Up with Technology: Young Children Learning in a Digital World*. Abingdon: Routledge.

Puentedura, R., Churches, A. & Nelson, L. (2017). *Ongoing thoughts on education and technology*. Retrieved from http://www.hippasus.com/rrpweblog/.

Seal, C. (2015). *The quality of qualitative research.* London: Sage.

Snow, C. E. (2002). Reading for understanding: Toward a research and development program *in reading comprehension*. Santa Monica, CA: RAND.

Terrell, S. (2018). *Digital Learning Theories and Models*. Retrieved from https://www.techlearning.com/tl-advisor-blog/7-digital-learning-theories-and-models-you-should-know.

Thoermer, A. & Williams, L. (2012). Using Digital Texts to Promote Fluent Reading. *The Reading Teacher*, 7 (65), 441-445. 10.1002/TRTR.01065.

Xiaolin, Z., (2017). *Frontiers in Human Neuroscience*. Retrieved from https://www.frontiersin.org/research-topics/4776/language-development-in-the-digital-age.

IMPROVING PUPILS' ACHIEVEMENT IN SOCIAL STUDIES USING INSTRUCTIONAL MATERIALS

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Abstract
The study examined the effect of instructional materials on pupils' academic achievement in social studies in Udenu Local Government Education Authority, Enugu State. The study adopted a pre-test, post-test non-equivalent control group quasi-experimental research design. The sample size for the study was 63 primary 5 pupils drawn from two public primary schools within the area of the study. The instrument used for data collection was Social Studies Achievement Test (SSAT) with a reliability index of 0.87. The data collected were analyzed using mean and analysis of covariance (ANCOVA). The study revealed that instructional materials had a significant effect on pupils' achievement in social studies. Based on this, it was, therefore, recommended among others that teachers should always apply the use of instructional materials for enhanced teaching and learning of social studies.

Keywords: Achievement in social studies, Instructional materials, Pupils, Quasi-experiment

INTRODUCTION

Man has continually craved for an enjoyable, good, secure, and safe society, an enabling environment to participate, function actively, and contribute meaningfully in the community. This desire seems to be satisfied in the study and knowledge of social studies. Corroborating to this, Olayinka (2016), stated that social studies refine the sensibilities of the individuals leading to a better and enjoyable society. Similarly, Sulaiman (2020) stated that social studies focus on the relationship between man and his environment. To this end, social studies reforms man into a responsible and good citizen. Nevertheless, it has been difficult to realize these lofty aims of social studies due to lack of qualified and committed teachers and scarcity of instructional aids culminating in pupils' lack of interest and motivation (Meziobi et al., 2012). Omale (2017) smartly pointed out that the gross insufficiency of instructional materials teachers' unwillingness to utilize available teaching resources has impacted negatively on pupils' achievement.

Instructional materials seem to be essential educational tools for improved teaching-learning activities, as they add flavour to classroom activities leading to the active participation of both learners and instructors. To this end, Instructional materials are provisions teachers use to make abstract concepts real thus making teaching-learning activity pleasurable (Tuimur & Chemwei 2015). Jonavsky and Brooks (2021) noted that instructional material is an apparatus teachers use to make a logical presentation of lessons to learners. Furthermore, in a study that investigated the necessity of instructional materials, Tety (2016), discovered that instructional materials are keys to academic success for both teachers and learners.

Still concerning the status of instructional materials in academic achievement, Igiri and Effiong (2015), in a study on the impact of instructional materials on teaching and learning of biology in senior secondary schools in Yakurr LG A and discovered that there is a significant

difference in the academic achievement of students that were exposed to instructional aid during lessons compared to those that were not, and that instructional aides are not gender sensitive. In another but related study, Bukoye (2018) discovered that inadequate deployment of instructional aids in Nigerian schools accounts for students' poor performance in examinations. Likewise, Agbo et al. (2019) in a study on the overview of the relevance of instructional materials in early childhood education discovered that instructional materials are indispensable in early childcare centres.

Mesue (2018) in a study on the importance of instructional materials in Nurse Education in the North West and South West Regions of Cameroon found out that instructional materials helped sustain the teachers and nursing students interests in projects. In a similar but separate study, Buer (2019) in a study on Instructional material and its kinds revealed that instructional aids enhance students' skills acquisition and aptitudes. Previously, Kanno and Onyeachu (2018) in a study on instructional resources for teaching special needs children in Abia state, Nigeria found out that instructional materials make the teaching-learning process fun for special needs children and that the scarcity of instruction materials remains a huge obstacle in the education and learning for children with disabilities.

Furthermore, Rahmawati (2017) in a study on the importance of instructional material found out that instructional materials are primary tools in teaching and learning foreign languages and that when properly employed offers myriads of benefits to foreign language teachers and learners. However, Onajite et al (2019) in a separate but similar study revealed that business studies teachers in Ekiti state, Nigeria do not utilize instructional materials in their classroom activities, thus endangering the academic achievement of their students. Following the same trend, Ruano (2020) in a related but separate empirical study discovered that instructional materials help students' in the application of theories and generate opportunities for evaluation in biology. Nevertheless, Owoh (2016) in another study titled, the relevance of instructional materials in the successful implementation of electrical installation and maintenance works curriculum at technical school level in Enugu state discovered that, instructional material play significant role in the academic achievement of students in technical schools, but that teachers in technical schools are not well trained in the use of instructional materials. Similarly, Yusuf (2017) in a study on the availability and use of instructional materials in teaching economics in senior secondary schools in Kano state, Nigeria observed that instructional materials are available for teaching economics in Kano state but poorly utilized by economics teachers leading to students poor performance both in internal and external economics examinations.

Statement of the Problem

Poor performance and low academic achievement of pupils are becoming an enigma and a source of worry to educators and stakeholders in the Nigerian education sector. Researchers, educators, and pupils themselves have been disconcerted by this ugly trend. The surging incidences of unsocial and antisocial behaviours in society have been linked to poor achievement in social studies in primary schools. Schoolteachers seem unable to inculcate national values, quality human interactions, values of good citizenry among others that characterize personal integrity inherent in teaching and learning social studies. Looking at the above situation, one wonders if instructional materials could help teachers achieve the objectives of social studies. Against this backdrop therefore, this study sought to investigate the role of instructional materials on the academic achievement of pupils in social studies.

Hypotheses

The study was guided by the following hypotheses tested at 0.05 level of significance:

Ho_1: There is no significant difference in the mean achievement scores of pupils in the experimental and control groups

Ho_2: Treatment and gender do not have a significant interaction effect on pupils' achievement in social studies.

METHOD

The study adopted a quasi-experimental research design utilizing the pre-test, post-test non-equivalent control group design. The population comprised all the primary five pupils in all the 1,223 public primary schools in Enugu State. A sample of 63 primary 5 pupils from two public primary schools selected through a simple random sampling procedure was used for the study. Two (2) intact classes were assigned to control and experimental groups, in each of the two (2) primary schools. This came to a total of 32 pupils in the control group and 31 pupils in the experimental group. These numbers were made up of 29 males and 34 females. There were 14 males and 18 females in the control group while the experimental group had 15 males and 16 females.

The instrument used in the study is a researcher-made instrument titled Social Studies Achievement Test (SSAT). The instrument was a 20-item multiple test with options derived from means of transportation and communication in Nigeria. It was drawn through the guide of a table of specifications. The minimum and maximum scores obtainable from the test are 0 and 40 for each correct answer attracted 2 marks. Three experts validated the instrument, one each from science education, childhood education, and measurement and evaluation, their inputs were considered as the instrument was restructured.

The reliability of the instrument was determined by administering the instrument on a group of 15 pupils outside the study sample through the test-retest method within two weeks. The data were analyzed using Pearson Product Moment Correlation Coefficient that gave a reliability coefficient of 0.85. The two groups were given a pre-test to determine their cognitive experiences before the treatment. Thereafter, the experimental group was taught by their regular teacher, who already was trained on the use of instructional materials. The control group was taught the same concepts by their regular teacher using the conventional method of chalk and board. This programme lasted for 6 weeks after which the pupils were given a post-test which was rearranged version of the pre-test. The data collected were analyzed using mean and ANCOVA statistical tools to answer the research questions and test the null hypotheses.

RESULTS

The results were presented based on the study's research questions and hypotheses.

Research Question One: What are the mean achievement scores of pupils taught social studies using instructional materials and those taught without instructional materials?

Table 1. Mean analysis of the achievement scores of experimental and control groups

		Pretest		**Posttest**		**Mean gain**
Treatment	N	Mean	Std. Deviation	Mean	Std. Deviation	

Experimental	31	21.16	3.47	34.28	6.27	13.12
Control	32	20.85	3.01	21.48	3.29	1.53

Table 1 showed that the experimental group had mean achievement score of (M = 21.16, SD = 3.47) at the pretest while that of the control group was (M = 20.85, SD = 3.01). On the other hand, the mean achievement score of the experimental group at the posttest was (M = 34.28, SD = 6.27, while that of the control group was (M = 21.48, SD = 3.29). Thus, the mean gain scores of 13.12 and 1.53 for the experimental and control groups respectively show that the experimental group had higher mean achievement score at the posttest than the control group.

Ho_1: Pupils' achievement mean scores are not significantly different in the experimental and control groups

Table 2. Analysis of covariance of the difference in the mean achievement scores of experimental and control groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2317.480[a]	3	743.2610	12.064	.000	.432
Intercept	1078.679	1	2067.978	54.121	.000	.417
Pretest	11.329	1	11.329	.333	.556	.003
Treatment	3205.082	1	3205.082	87.121	.000	.533
Gender	1.834	1	1.834	.052	.720	.001
Treatment * Gender	8.237	1	8.237	.248	.618	.003
Error	2779.312	67	24.044			
Total	74774.000	63				
Corrected Total	6306.892	62				

a. R Squared = .542 (Adjusted R Squared = .518)

Table 2 shows that instructional materials impacted significantly on pupils' academic achievement in social studies, F (1, 67) = 89.121, p = .000 with an effect size of 0.533. Thus, the null hypothesis was rejected since $p < .05$. This means that 53.3% change in the achievement of pupils in social studies is due to their exposure to instructional materials.

Ho_2: Treatment and gender have no significant interaction effect on pupils' achievement in social studies.

Table 2 revealed that there existed no significant interaction effect of treatment and gender on pupils' achievement in social studies, F (1, 67) = .248, p = .618. Hence, the null hypothesis was not rejected since $p > .05$. This is to say that pupils' achievement in social studies as a result of exposure to the treatment conditions has nothing to do with gender.

DISCUSSION OF FINDINGS

Research question one sought to find the mean achievement scores of pupils taught social studies using instructional materials and those taught without instructional materials. The result in table one, the pupils in the experimental group had mean achievement scores of 34.28 and a standard deviation of 3.47, while the pupils in the control group had mean

achievement scores of 21.48 and a standard deviation of 3.01. Thus, from table 1 above, the pupils taught social studies using instructional materials had a mean achievement score higher than those taught social studies with the traditional method of instructions. This is an indication that pupils taught using instructional materials perform better than those taught using traditional methods. Hence, using instructional material in the teaching-learning process involves the pupils thereby enhancing the pupils' academic achievement. The findings of the study validate the findings of Igiri and Effiong (2015), and Agbo et al. (2019), who found out that there existed a significant difference in academic achievements of students that were exposed to instructional aid during learning activities in relation to those that were not.

The result of research question two showed that the male participants in the experimental group had mean achievement scores of 31.36 in the post-test while the female participants' mean achievement scores in the post-test was 30.70. This indicates that the male participants had slightly higher posttest mean achievement scores than the female participants did. However, as table 2 revealed gender has no significant effect on the achievement of pupils in social studies. This finding supported the finding of Igiri and Effiong (2015) who discovered that instructional aides impact equally on male and female students. The finding also corroborated the finding of not in references (2016) who found out that instructional materials have no interaction effect on gender of students who were exposed to improvised instructional material.

CONCLUSION

One may, therefore, state that instructional materials boost pupils' achievement in social studies. It was observed that the pupils that were taught social studies using instructional materials achieved more than their counterparts who were taught without instructional material. It was also concluded that gender is not a variable to be taken into consideration while using instructional materials in the teaching-learning process.

Recommendations

Based on the above findings the researchers recommend that:

1. There should be adequate provision of instructional materials to primary schools for efficient teaching of social studies.
2. Workshops and training should be organized for teachers on the need to use instructional materials while teaching social studies.

REFERENCES

Agbo, A. O., Vereshe, R. A., Odije, M. E. & Ugwo, J. O. (2019). An overview of the relevance of instructional materials in early childhood care education. *International Journal of Science and Research Methodology, 12*(1), 129-142.

Buer, R. (2019). Instructional material and its kinds. https://www.slideshare.net/RyanBuer/instructional-material-and-its-kinds

Bukoye, R. O. (2018). Utilization of Instruction Materials as Tools for Effective Academic Performance of Students: Implications for Counseling. Presented at the 2nd innovative and Creative Education and Teaching International Conference (ICETIC2018), Spain, 20-22 June 2018.

Igiri, C. E., & Effiong, O. E. (2015). Impact of instructional materials in teaching and learning of biology in senior secondary schools in Yakurr LG A. *International Journal*

of Social and Humanistic Sciences, 62, 27-33. https:// doi.org/10.18052/www.scipress.com/ILSHS.62.27

Jonavsky, A. & Brooks, A. (2021). Instructional materials: Definition, examples & evaluation. https://study.com/academy/lesson/instructional-materials-definition-examples-evaluation.html

Kanno, T. N. & Onyeachu, J. A. E. (2018). Instructional resources for teaching special needs children in Abia state, Nigeria. *International Journal of Technology and Inclusive Education (IJTIE), 7*(2),1381-1421. https://infonomics-society.org/pdf

Mesue, M. E. (2018). The importance of instructional materials in Nurse Education in the North West and South West Regions of Cameroon: The Nurse Teacher's perspective. *International Journal of Humanities Social Sciences and Education (IJHSSE), 5*(3), 68-84. http://dx.doi.org/10.20431/2349-0381.0503007

Meziobi, D. I., Oyeoku, E. K. & Ezegbe, B. N. (2012). Challenges of social studies educators for effective teacher preparation and implementation of universal basic education programme in Nigerian junior secondary schools. https://files.eric.ed.gov/fulltext/ED538839.pdf

Okobia, E. O. (2011). Availability and teachers' use of instructional materials and resources in the implementation of social studies in junior secondary schools in Edo State, Nigeria. https://www.researchgate.net/10.5539/res.v3n2p90

Olayinka, A.B. (2016). Effects of instructional Materials on secondary schools students' academic achievement in social studies in Ekiti State, Nigeria. *World Journal of Education, 6* (1), 32-39 http://dx.doi.org/wje.v6n1p32

Omale, A. (2017). Assessment of Instructional Resources in Teaching Social Studies in Selected Secondary Schools in the Eastern Senatorial District of Kogi State, Nigeria. *Scholars Journal of Arts, Humanities and Social Sciences, 5* (1), 45-51. http://saspjournals.com/wp-content/uploads/

Onajite, G. O., Olanuyi, O. N., Oyerinde, D. O., Onyesom, M. & Alina, M. A. (2019). Teachers Utilization of Instructional Materials for Effective Teaching of Business Studies in Junior Secondary Schools in Delta State. *Mediterranean Journal of Social Sciences 10*(6), 27-37.

Owoh, T. M. (2016). Relevance of instructional materials to the successful implementation of electrical installation and maintenance works curriculum at technical school level in Enugu state. *International Journal of Education and Research, 4*(9), 289-300. https://www.ijern.com/journal/2016/September-2016/25.pdf

Rahmawati, W. (2017). The importance of instructional material. http://pascapbi-3a.blogspot.com/2017/01/the-importance-of-instructional-material.html

Ruano, K. (2020). What is the main purpose of instructional media? https://findanyanswer.com/what-is-the-main-purpose-of-inshttps://findanyanswer.com/what-is-the-main-purpose-of-instructional-mediatructional-media

Sulaiman, Y. S. (2020). Social studies. Definitions.net. STANDS4 LLC, 2021. https://www.definitions.net/definition/social+studies.

Tety, J. L. (2016). Roles of instructional materials in academic performance in community secondary schools in Rombo District, Tanzania. https://core.ac.uk/download/pdf/83632862.pdf

Tuimur, H. N. & Chemwei, B. (2015). Availability and use of instructional materials in the teaching of conflict and conflict resolution in primary schools in Nandi North District, Kenya. *International Journal of Education and Practice, 3*(6): 224-234. https://files.eric.ed.gov/fulltext/ED560670.pdf

Yusuf, A. W. (2017). Availability and use of instructional materials in teaching economics in senior secondary schools in Kano state, Nigeria. *Journal of Teaching and Teacher Education, 6*(1), 59-64.

UNRAVELLING JOURNEYS OF OPPRESSION IN HIGHER EDUCATION: AN AUTOBIOGRAPHY ON THE BECOMING OF A WOMAN ACADEMIC

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Abstract
This article provides an autobiographical narrative of me as a woman in academia at a national university in South Africa. The article explores the pervasive forms of gender inequality that I am encountering as well as the struggles I am facing while overcoming these obstacles in my professional life. I attempt to make sense of my experiences related to gender inequality as a historically marginalised woman by asking the following question: *How can I use my experiences as a woman in higher education to challenge gender inequality.* The article has two parts. In the first part, the research design and methodology offer an understanding of representations of narrative, identity, memory, and time. In the second part, I draw on my autobiography. Autobiographical research has the potential to change the learning, values and identities of individuals, institutions, and the larger society. Analysing my own experiences offered me a deeper understanding of events in my own institution of higher education. My experience allows me to see this as an essential part of the evolution of my institution, which can be placed in the historical, socio-political, economic, and cultural context of my country. This new insight has the possibility to assist women academics to strengthen our sense of self and our solidarity.
Keywords: autobiographical research, gender inequality, identity, South Africa, woman academics

INTRODUCTION

In the context of higher education (HE), there is a need for academics to build on social cohesion to improve the quality of human relations. In this article, I intend to offer a sense of myself through autobiography. I recollect pervasive residues of gender inequality and social discrimination at my university. I do this to offer a deeper understanding of my subjugation as a woman and to open possibilities to enhance social cohesion.

In South Africa, the complex discourses and practices of colonial and apartheid regimes have a profound impact on black people in the country (Black people is a generic term which means Africans, Coloureds, and Indians in South Africa). Race and gender issues continue to be salient in post-apartheid South African society (Seekings, 2008) despite policies mandating transformation in the country. South Africa's patriarchal history has resulted in gender discrimination being added to the layers of social domination in the country. The aim of the article is to offer understandings of pervasive forms of gender oppression, which especially historically marginalised women in HE are subjected to. In view of this, women academics must regain a sense of what it means to be human (Subreenduth, 2013).

Life-history research aims to understand stories against the background of wider socio-political and historical context and processes (Biesta, Hodkinson & Goodson, 2005). As suggested by Abrahão (2012), I understand life history as a methodology in autobiographical research. Furthermore, Abrahão (2008a, as cited in Abrahão, 2012, p.30) claims that

"[a]utobiographical research uses various empirical sources (life narratives, oral stories, documents – both official and personal – diaries, memorials, epistles, videos, photos) and techniques (triangulation of information and in-depth analysis of the sources)". Abrahão (2012) suggests that what is important in life narratives is to interpret context, the dimension of the construction of self, using selective memory and the three-dimensional nature of the narrated time.

The macro and micro contexts from which the story of an individual and group are to be narrated are of importance. According to Santamarina & Marinas (1994, p.272), "[t]he understanding of context implies a process in which the subjects '(re)update, (re)elaborate the meaning, the collective ideological positions of the vital processes of the stories". I employ autobiographical research to contribute to social cohesion and academic identities in HE, connecting with broader social, cultural, and political discourses. More specifically, I employ autobiography as a research method to make sense of my experiences, at present and in the past, imagining better human relations, relating gender oppression/inequality in my space of one of South Africa's national universities. I reflect on my experiences as a woman academic, through telling my life narrative, in order to develop my identity and connect with others with the same or different experiences and possibly tighten social cohesion in university spaces and larger society.

South Africa is still a young democracy, with its fair share of challenges regarding discrimination and social domination in all spheres of life. One of these challenges is the unequal treatment of women in society. Subsequently, the goal of this article is to give prominence to women in HE. In this context, it is crucial that gender inequality is constantly addressed so that social cohesion can be obtained. The White Paper on Education and Training (Department of Education, 1995) stipulates that the phenomenon of gender inequality in South Africa has a long history and complex causes, the origin of which can be found in the patriarchal culture of the South African society. In addition, the Ministerial Committee on Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions was tasked to investigate discrimination in public HE institutions, with a particular focus on racism (Soudien et al., 2008). The focus was on racial discrimination; however, other forms of discrimination, for example gender, ethnicity, and disability, were also considered. In the report, the writers note that there is a misalignment between university transformational policies and the life-world experiences of staff and students. The suggestion is that this situation must be changed. Furthermore, women in HE can show leadership in tackling gender issues. The place to begin is within the university itself, which will lead towards social cohesion in HE institutions. Given this background, I problematise women issues in HE by addressing two questions: 1) What are the challenges that I, as a woman in HE, experience relating to gender discrimination towards women? and 2) How can my life story help in addressing the social domination of women in HE towards social cohesion? Responding to these two questions, I attempt to contribute ways in which women can address challenges regarding the domination of men over women in the context of HE. Furthermore, through the method of autobiography, I attempt to use my own voice and draw on personal and professional experiences to move towards an inclusive approach to research in which the voices of others can also be heard and respected (Walker, 2017).

Problem statement

According to ministerial reports, the indication is that women in public HE institutions in South Africa still experience persistent forms of gender oppression. After nearly three decades of democracy, women still suffer the consequences of gender oppression.

Autobiography and identity

An autobiography guides an individual towards a process of potentialities in becoming a fuller person, where authentic identities of the self can be formed (Jones, Sambrook, Henley & Norbury, 2012). Colbeck (2008) views identity as a developmental process for the self. According to Egan-Robertson (1998), it is postulated that identity is unfixed, fluid, co-constructed and reconstructed over time. Through autobiography, writing about ourselves means to better discover but also to proceed to build personal identity. It starts from recalling past experiences to memory, particularly remembering professional and personal events, the way you view yourself and your world (Spreizer, 2009). Through recollecting past experiences, one can find your way back to the plot of your existence; therefore, autobiographical writing enhances one's identity and self-awareness. Aleandri and Russo (2015) note that although we are reminded of unpleasant and painful memories, it can lead us to relive that moments and, in doing so, we can get rid of those burdens in order to leave the past behind. The latter authors suggest that through recalling and writing, we manage to externalise our internal suffering and pain. For that reason, we look with new eyes to the past and present, imagining a more bearable future.

Coffey (2014) claims that the use of autobiography as a method in research has become more recognised in social science research over the past decades. Women telling their stories and offering their life perspectives provide a deeper understanding of their lived experiences, in this case of being subjected to male dominance at work. Autobiography has become a widespread approach to capture invisible or muted voices, particularly those of marginal groups (Coffey, 2014). Aleandri and Russo (2015) opine that autobiography is based on own-life storytelling and/or writing to better understand own lived experiences and an own-growth continual process, in constructing personal identity that is lifelong and life wide. Significantly, this kind of research is grounded in the personal and subjective perceptions and lived experiences of individuals. These experiences are entangled in social, cultural, historical, and natural events, movements, trends, and values of the world. Richardson (2008) claims that experience and memory are open to contradictory interpretations governed by social interests and dominant discourses. In other words, an individual remaking memory and constructing identity is influenced by the prevalent social interest and moral values of a particular time.

Memory and time in autobiography

Different elements are essential in life narratives. The elements are also intertwined. In the following section, I discuss the concepts of memory and time as related to autobiography. Memory is an important element of autobiographical research. The researcher works to (re)construct elements of analysis that may help in understanding the object of study (Abrahão, 2012). I use the technique of memory to capture meanings in social life that are not easily discovered, the meaning of the historical time, of a story of the various processes of construction and of individual identity in my social context – as a marginalised woman in academia (Santamarina & Marinas, 1994). Richardson (2008, p.1414) claims that the individual telling the narrative is both the site and subject for remaking memory.

In narrative research, the time element plays a key role as well, where the past, the present and the future are intertwined. The researcher reflects (in the present) on a particular event (in the past) and tries to make sense of what was happening with her-/himself and make conscious decisions to move forward (into the future). Ricoeur (1995) points to the correlation between time and narrative and causes researchers to inquire about the origin of a

historical narration of a historical consciousness, in which the present, the past and the expectation of the future mix in a three-dimensional perspective. What the latter author warns the autobiographical writer about is to be sensitive to the historical context (that is the political, economic, and socio-cultural setting) in which events take place, intertwined with time dimensions.

METHOD

The article is part of a larger research project. The autobiography in this article is presented by one individual researcher in a research team of women from different parts of Africa. The study is qualitative in nature and employs an autobiographical narrative. The autobiographical inquiry allows researchers to collect several pieces of personal as well as social data, which could allow for a deeper analysis (Aleandri & Russo, 2015). In this regard, Jones et al. (2012) claim that autobiographical approaches can provide rich empirical material and contextual information quite difficult to produce through other methods, for instance cultural norms and assumptions that are interspersed with lived experiences.

I find the research method of autobiography effective because it is important to match content to appropriate methods of inquiry; and by reflecting on one's experiences, it is possible to make connections with the experiences of others (Potts, 2007). This method of inquiry was found most appropriate to answer the main research question, namely *How can I use my experiences as a woman in HE to challenge gender inequality?*

Using the method of autobiography as a data gathering and analysis strategy, I report on my personal and professional lives, discussing who I am, where I come from and what I have become through the trajectory of my seven years so far as a woman academic at one of South African's national universities. In doing so, I describe my university life with encounters of male opposition, prejudice, and exclusion, and in the process try to set up a platform linking my experiences to social cohesion and identity building in HE institutions.

The data collected were analysed by means of the thematic model suggested by Henning (2004). Drawing from the literature review and narrative, I identified constructs and thematic ideas and coded schemes, and captured the recurring themes in order to offer a comprehensive understanding of the male dominance I experience in my workplace in an HE institution. Ethical clearance was obtained from the University of the Free State (UFS, reference number: (UFS-HSD2019/0057/0706/2908/21). Trustworthiness in my writing is obtained by stating my experiences as authentically as possible. Polkinghorne (1988) writes that studies using narrative inquiry establish trustworthiness through the details associated with the research process and procedures.

FINDINGS

My narrative

Growing up in a small town

I was born in a small rural town in the Western Cape province and grew up in a big family where I was one of seven siblings. For 11 years, I was the only girl in the family. With a father as the traditional head of the family and five brothers in the household, I found myself in a very protected space. As a girlchild, I was not allowed to do some of the things my brothers were permitted to do. Through my life as a girlchild, I was exposed to the traditional roles that men and women were expected to fulfil in a middle-class Coloured community. I gradually started to oppose the restrictive traditional role that women had to adhere to, later being labelled as rebellious.

Due to the restrictions of my traditional upbringing, I resorted to reading, which opened a new world to me. Reading turned into one of my biggest passions. Because I was an avid reader and diligent learner, I performed well in school. At the end of my secondary schooling, I decided to become a teacher. This choice was also because, in the apartheid years, young Coloured women and men had limited career choices. Within the first ten years of my teaching career, however, I experienced feelings of unfulfillment regarding my teaching career. Although I accomplished good results with my learners at each year end, this was not enough for me, as I felt that I did not gain much on a personal level. For a long time, I had a desire to enhance myself academically. This compelled me to further my studies, where I eventually obtained my master's degree. With this qualification, I successfully applied for a lecturer position at one of South Africa's national universities. As with others, I proceeded immediately with my doctoral studies while I was trying to establish myself in academia.

Starting my life as an academic

When I came to take up my position at my university, I identified myself as Coloured person – a woman belonging to a marginalised group in the South African society – and Afrikaans – the mother-tongue language of most Coloured people in the country. My experience of being a Coloured woman is contentious. (In most of my writing, I must explain why I am using this term).

My experiences of male domination

I entered the HE sector with a clear vision of what I wanted to become. I was ready to take up my role in HE; however, I was not at all prepared for my experience of sexism in HE. National legislation in this age fairly discriminates against male employers (Republic of South Africa, 1998). Due to the career aspirations and patriarchal ideas held by men, women are perceived as the biggest threat. As a Coloured woman, I am grouped as previously disadvantaged and therefore should receive additional measures to guide my progression in the workplace (Republic of South Africa, 1998). In my seven years in the position of lecturer, I (and other black women) have been targeted by colleagues because of receiving preferential treatment that South African women – black and white – previously did not receive when starting their careers at the university.

During my first years at the university, one of my fiercest male colleagues uttered the following words to me: "You are not going to be more than me here." Coming from a more relaxed secondary school environment, I did not comprehend the severity of his words – only later in a highly competitive workplace. This was the beginning of the victimisation of me as a person and a woman in my place of work. I could not understand what was happening to me. I was also left on my own to deal with it.

As a "latecomer" in academia at the age of 50, I worked extremely hard and fortunately had early career successes (and concomitant benefits), such as staff study funding and travel funding opportunities. I received funds from the National Research Foundation to disseminate my doctoral research nationally and internationally. This did not go unnoticed by my male and some female colleagues. As I reflect, I realise that this was possibly the reason I was subjected to severe hostility and overtly treated as an outcast. When colleagues of my own ethnic group realised the extent of my funding opportunities, I was socially excluded. Sexism was a normal part of my daily life, with the accompanying ignorance of male superiors who turned a blind eye to forms of gender domination, which made life nearly impossible for me at work. Prominent male colleagues took advantage of my inexperience in

teaching and learning, academic matters and other, even insignificant, happenings, blew it up and converted it into major issues and brought it before Human Resources.

At present, as in the past, I have noted that a male senior uses his position intentionally and unintentionally to subjugate women. The kind of oppression is so subtle that it is noticeable to no one but the women under his leadership. I think the oppression originates from the fact that some men believe that women may not outperform them and that a woman should under no circumstances challenge a man. Consequently, I constantly feel that I must protect my position, professional integrity, and reputation.

I made a conscious decision to stop the male oppression before it becomes constant. Needless to say, male oppression becomes more conspicuous to defeat me in a game I do not want to play. In the whole process, women have become the "troublemakers" when they decide that they have had enough. In the meantime, other male colleagues enjoy the opportunity to work and build on their career progression without the additional constraints some women have to endure. It seems as though in the workplace, men still have the power, protection and respect from other males and females. For me, there is a breakdown in relations at the university, where it seems as if no one cares that this is happening. Perhaps some men use these situations to advance themselves.

Lately, circumstances have become better or worse (I cannot decide if it is better or worse). This is a constant fight that I, as a woman, cannot win. Some women, like me, do not have any protection and do not receive the necessary respect that they deserve. On the surface, it seems as if there are no problems concerning gender issues or reasons to act if certain men overstep their boundaries. In a sense, I feel that the fight will never end. In certain terms, freedom still seems elusive.

POINT OF VIEW

Using autobiographical theory as a lens, the data were scrutinised, and two themes emerged. The first theme relates to the protection of women in society, which responds to research question one. The second theme alludes to Coloured women and identity, responding to questions one and two.

Protection of women in society

South Africa was, for a long time, subjected to a patriarchal system (Department of Education, 1995), implying that the father is the head of the household and the main source of domestic income. This gives him control over nearly all aspects of the household, including the women and children. Furthermore, in this male-controlled social order, men are seen as the leaders in society. I noted in my narrative that, as a girlchild, I was protected, although during my childhood years, I did not understand the intention behind and reasons for the behaviours of the male figures in my life. For certain, I did not appreciate their acts of "overprotecting" me and safeguarding my "vulnerabilities" as a girl/young woman.

The Report of the Ministerial Committee on Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions (Soudien et al., 2008) and the subsequent response from the Council on Higher Education (2009) commend institutions on the progress that was made on regulatory policies, for example transformation with respect to the requirements of employment equity. These reports further state that, unfortunately, discrimination with regard to racism and sexism is still pervasive in institutions of HE. The suggestion is that universities must do more vigorous work in order to

contribute to institutional culture regarding fair treatment of women and other previously disadvantaged groups.

In fact, as the previous-mentioned reports note, there is a misalignment between institutional policies and real-life experiences of staff (and students). This is what I want to convey in this autobiography. I write about the subjugation of women – the everyday-life injustices that women have to endure "at the hands" of men. In this sense, overt and subtle oppression is especially felt by women when other men are around. Some men, in their acts of violation, form associations with other men in their immediate environments to form stronger bonds in order to eliminate the resistance of the perceived stronger woman/women.

In democratic terms, especially in the workplace, women must take on leadership roles and attempt to change circumstances relating to gender oppression. Through taking on leadership and starting to challenge power relations, women can free themselves. Women can show men and superiors the treatment that would be acceptable for them. For instance, in the case of departmental constraints, women can use the platform to develop a more supportive and developmental approach towards harmony in their academic institutions.

Alluding to my story, I also perceive that when I consciously started to resist male oppression, I was labelled a troublemaker, and in the battle to break me down, the oppression became even more severe. As I have noted in my story, others would see what was happening and the reasons for certain things happening; however, nobody cares to help stop these kinds of oppression. Noddings (2001) writes about the care tradition. Instead of a lack of institutional will to change the oppression of women in universities, female and male colleagues can choose to become caregivers. This requires providing support to each other, forming closer relations with each other and giving care in the challenging space of HE.

As I have shown, I use the method of autobiography as a means to tell my story, particularly so that the muted voices of women can be heard (cf. Coffey, 2014) and a culture to protect women in HE can be cultivated.

Coloured women and identity

As a woman and member of a historically marginalised population group in South Africa, you are part of a designated group, in policy terms; you need additional measures to receive equal treatment as the historically advantaged groups in the country. Although, in my experience, women are getting the appointments, it becomes hard to progress as an academic if you do not have a mentor to support your continual career progression.

In the context of HE, my identity as a Coloured woman has shifted to give more thought to my Africanness. Coming from a context in the Western Cape, where the largest percentage of Coloured people in South Africa live, and where people are strongly associated with being Coloured, in the new context of a university in central South Africa, I was perceived otherwise. In a highly political context, I needed to alter how I looked at myself. I could not leave my strong association of being Coloured, but needed to add on my African identity.

As mentioned in my narrative, I entered HE with a clear vision of what kind of academic I wanted to be. My life, instead, unfolded through sexism, hostility and victimisation by men and women. What I could not understand was that most of the hatred was coming from members of my own ethnic group. As I reflect on my narrative, I realise that I was not granted the opportunity to develop as a lecturer, and not even as a scholar. In the process, I

totally lost confidence in myself and my ability to teach students. I did not know with whom I should identify and associate myself. I decided to resort to the internal fortitude and the perseverance that I had relied on throughout my life.

Overall, as a Coloured woman, a minority group in my institution, I can see where the bullying is coming from. I am marked as a major threat in the process of transformation relating to employment equity. In my experience, men are not willing to share the power and privilege they have in the workplace. In this young democracy, I must tell my story to gain the much-needed protection and respect I need. I would like to see my life experiences in this university, a traditional White institution transforming into a place of diversity, as part of how the university develops towards social cohesion in society. It is through women telling our stories, our autobiographies, that progress on inclusive institutional culture will be realised.

CONCLUSION

This is a request for more stories to be told by others in similar and different circumstances to my story. When we open spaces for these ordinary stories, we can better connect with the wider social, cultural and political contexts of others to bring about transformation in our societies. As displayed in the writing, progress in inclusive institutional culture in the context of HE is critical. Women and other groups can opt to use narratives or autobiographies to engage in dialogues to build cultures of academic identity, anti-sexism, and gender equality to educate others in meaningful ways towards shared values and community building. In a sense, 'narratives of social cohesion and academic identities in HE', can be used to make the harmonious relations between diverse people in the same community visible.

REFERENCES

Abrahão, M. H. M. B. (2012). Autobiographical Research: Memory, Time and Narratives in the First Person. *European Journal for Research on the Educational Learning of Adults, 3*(1), 29 – 41. https/DOI10 3384/rela.2000-7426.rela0051 www.rela.ep.liu.se

Aleandri, G. & Russo, V. (2015). Autobiographical Questionnaire and Semi-structured Interview: Comparing Two Instruments for Educational Research in Difficult Contexts. 7th World Conference on Educational Sciences (WCES-2015), 05-07 February 2015, Novotel Athens Convention Center, Athens, Greece. *Procedia – Social and Behavioral Sciences, 197*, 514 – 524. https/doi: 10.1016/j.sbspro2015.07.179

Biesta, G., Hodkinson, P., & Goodson, I. (2005). *Combining Life History and Life-course Approaches in Researching Lifelong Learning: Some Methodological Observations from the "Learning Lives" Project*. Paper Presented at the TLRP Research Capacity Building Network Methods and Methodologies in Teaching and Learning Research in Cardiff, 22 February 2005.

Coffey, A. (2014). Analysing Documents. In U. Flick (Ed.), *The SAGE Handbook of Qualitative Data Analysis.* Thousand Oaks, CA, Sage.

Colbeck, C. L. (2008). Professional Identity Development Theory and Doctoral Education. *New Directions for Teaching and Learning, 113*, 9 – 16. https://www3.interscience.wiley.com/browse/?type=JOURNAL

Council on Higher Education [CHE]. (2009). *The Response of the Council on Higher Education to the Report of the Ministerial Committee on Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions.* Pretoria, Council on Higher Education.

Department of Education (DoE). (1995). *White Paper on Education and Training.* Cape Town: Department of Education.

Egan-Robertson, A. (1998). Learning about Culture, Language and Power: Understanding Relationships among Personhood, Literacy Practices, and Intertextuality. *Journal of Literacy Research, 30*, 449 – 487. http//doi.org/10.1080/1086296809548011

Henning, E. (2004). *Finding Your Way in Qualitative Research.* Pretoria, Van Schaik.

Hooks, B. (1984). *Feminist Theory from the Margin to Center*. USA, South End Press.

Jones, K., S. Sambrook, Henley, A., & Norbury, H. (2012). Higher Education Engagement in Leadership Development: Using Autobiographical Narrative to Understand Potential Impact. *Industrial & Higher Education, 26*(6), 461 – 472. doi:10.5367/ihe.2012.0129.

Noddings, N. (2001). The Care Tradition: Beyond "Add Women and Stir". *Theory into Practice, 40*(1), 29 – 34.

Potts, P. (2007). The Place of Experience in Comparative Education Research. In M. Bray, R. B. Adamson, & M. Mason (Eds.), *Comparative Education Research: Approaches and Methods,* (pp. 63-81). Comparative Education Research Centre.

Republic of South Africa. (1998). *Employment Equity Act, No. 55 of 1998*. Pretoria, Government Printers.

Richardson, L. (2008). Writing: A Method of Inquiry. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Collecting and Interpreting Qualitative Material*, (pp. 473-500). Los Angeles, SACE.

Ricoeur, P. (1995). *Tempos e Narrativa*. São Paulo, Papirus.

Santamarina, C., & Marinas, J. M. (1994). Historias de Vida y Historia Oral. In J. M. Delgado, & J. Gutierres (Eds.), *Metodes y Tecnicas Cualitativas de Investigacion en Ciencias Sociales*, (pp. 259-283). Madrid, Sintesis.

Seekings, J. (2008). The Continuing Salience of Race: Discrimination and Diversity in South Africa. *Journal of Contemporary African Studies, 26*(1), 1 – 25. https//doi.org/10.1080/02589000701782612

Soudien, C., Michaels, W., Mthembi-Mahanyele, S., Nkomo, M., Nyanda, G., Nyoka N., Seepe, S., Shisana, O., & Villa-Vicencio, C. (2008). *Report of the Ministerial Committee on Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions.* Pretoria, Department of Education.

Spreizer, A. (2009). *Report Handbook on Autobiographical Pedagogical Approaches for Working with Second Generation Migrants.* http://www.bridge2g.eu/userfiles/file/handbook/Handbook.pdf,15

Subreenduth, S. (2013). Theorizing Social Justice Ambiguities in an Era of Neoliberalism: The Case of Post-apartheid South Africa. *Educational Theory, 63*(6), 581 – 599. https//doi.org/101111/edth.12043

Walker, A. (2017). Critical Autobiography as Research. *The Qualitative Report, 22*(7), 1896 – 1908. https//doi:nsuworks.nova.edu/tqr/vol22/iss7/10

ASSESSMENT OF SCIENCE PROCESS SKILLS IN A RURAL CONTEXT DURING THE CORONAVIRUS PANDEMIC

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Abstract
The purpose of the study was to assess technological challenges and the acquisition of science process skills among grade 12 students in a rural context in Limpopo Province, South Africa, during the COVID-19 pandemic. The study was underpinned by a constructivist learning theory, with a quantitative research approach and a survey research design. The population size was 43 science students in one school, while the sample size was 30. A questionnaire was used to collect data on a Likert scale (1-strongly disagree to 5-strongly agree) where students indicated their level of agreement with the challenges of using technology in imparting scientific skills before and during the COVID-19 pandemic. The students experience the most challenges with network and cellphone availability. Students practised most of the science process skills (overall mean 3.83) before the lockdown period. There was a significant difference in mean scores ($p < 0.05$) for the practice of skills before and after (overall mean 1.41) the lockdown. The researchers recommend the use of previously generated data for the practice of science process skills. Students may use WhatsApp for their parents or guardians to send assessment tasks and receive tasks and feedback. Furthermore, Google Classroom applications may be created as they are cheap platforms that enhance communication.

Keywords: science process, skills, digital divide, COVID-19, pandemic, online learning, high school students.

INTRODUCTION

Teaching science involves imparting theoretical knowledge and scientific skills that are vital to providing solutions to real-life problems. The COVID-19 pandemic imposed restrictions on in-person teaching and learning in various schools around the world. This may have significantly affected the assessment of science process skills among various learners around the world.

He, Hayes, and Wiliam (2011) criticize assessment where knowledge and understanding of scientific skills are done through presenting brief outlines on paper of invented scientific scenarios before asking students a series of questions about hypothetical science inquiry. Although criticized by several scholars, the approach of inventing scenarios appears to be an unavoidable option during the COVID-19 pandemic. According to Davies, Collier, and Howe (2012), a moderated teacher assessment where a full range of enquiry skills are assessed using multiple assessment activities at various times, will enhance scientific skills acquisition. This agrees with Harlen (1999), who opines that a combination of a summary of ongoing special assessment tasks and some well-designed practical tasks should be used to assess practical skills. Harlen (1999) has the view that scientific skill attainment could be assessed through observation of skills such as handling the apparatus, questioning specific task settings, and asking pupils to communicate ideas through drawings, artifacts, actions,

role play, and writing. Harlen's view only appears to be practical under normal circumstances or in situations where the classes are small enough to accommodate the issue of social distance.

Davies, Collier, and Howe (2011) also claim that assessment can take the form of purposeful inquiry that can enhance pupils' learning through constructive collaboration. Moreover, during the assessment process for learning, teachers provide the means for students to collect data. Students have the opportunity to express their ideas and listen to the ideas of others. The process enables students to build on their existing ideas and improve their ability to apply information in new situations. Although this approach seems plausible, activities are difficult to implement during the COVID-19 pandemic.

Despite the onset of the COVID-19 pandemic, it is necessary to ensure that the learners are empowered with the necessary scientific skills in science classrooms. Scientific practices in the online environment should emphasize the importance of developing scientific skills such as collecting, analysing, interpreting data, and communicating information (LaDue, Libarkin, & Thomas, 2015). One can acquire such practical science skills by using the existing data from previous experiments, which can be accessed online or in textbooks. Hence, it is possible to ensure that learners acquire these science process skills despite the non-availability of contact sessions. Web-based activities can fulfil this function.

Gamage et al. (2020) suggest web-based activities in distance education courses, while blended learning approaches are used for teaching and learning in campus-based courses. When developing practical skills, it is essential to prepare web-based activities that teach students experimental methods, data synthesis, communication skills, and laboratory practices (Gamage, et al., 2020). Online learning has limitations for developing practical laboratory skills. The distance learning mode denies valuable hands-on exposure that is essential in developing skills for handling equipment. However, students can gain laboratory skills via web-delivered slide-specific micro-lectures and a set of virtual slides. Computer-aided learning packages with interactive animated diagrams, instant feedback on problems, a hyperlinked glossary, and simulated exercises can be used to develop scientific skills (Gibbins, Sosabowski, & Cunningham, 2003). Additionally, video clips, interactive simulations, and formative as well as summative assessments also play a vital role in developing the required skills (Gamage, et al., 2020). It is essential to achieve learning outcomes whilst maintaining a high-quality educational experience by developing computer-based experiments, learning tools or media, learning places and activities (Endean & Braithwaite, 2012). Online labs provide flexible working hours with ubiquitous access, and students will be able to carry out real experiments without safety concerns (Müller & Ferreira, 2005).

There are several inherent challenges associated with web-based activities. These include the availability of devices, the Internet, and data. In the United States of America, about 87% of the population own computers, while 77% have access to the Internet (Ramani, et al., 2018). This contrasts with South Africa, where only 22 % of households have their own computers and only 54 % of the adult population access the Internet. A small percentage of the population (11%) access the Internet at home, while 17% access it at work (Statistics South Africa, 2017). The remaining 12% access it through Internet cafes and educational facilities (Statistics South Africa, 2017; Schwab, 2018). The availability of devices and networks for Internet connection can also partly influence the access to technology by individuals. The assessment of practical science skills in rural communities with much less access to

technological facilities, including Internet access, could have been more severely affected by the onset of the pandemic. This, in turn, affected the development of science process skills.

Theoretical Framework

The constructivist learning theory, which can be divided into social constructivism and cognitive constructivism, underpins this study. According to this theory, learning requires the activation of cognitive structures, and a supportive environment that aids the construction of knowledge. This process requires reference to prior knowledge that one can link to new knowledge. Concept maps can also help to tie these items together. The support for cognitive structures includes the provision of cognitive tools, and conversation and collaboration tools. Cognitive tools are educational technologies that help students learn by providing strategies and guidance to help students process information more efficiently. Conversation and collaboration tools play a role in promoting efficient peer-to-peer and student-to-teacher interaction. According to constructivist learning theory, learning is an active process that involves group interaction (Silalahi & Hutauruk, 2020). As a result, Vygotsky encouraged more interactive activities such as productive discussions, constructive feedback, and collaboration with others to promote cognitive growth (Kurt, 2020).

Additionally, constructivism allows student-centered learning, which facilitates more efficient learning than teacher-centered learning (Dong, Wu, Wang, & Peng, 2019). Scaffolding, one of the elements of constructivism, provides the necessary support to promote learning when concepts and skills are initially introduced to students. Teachers support students by providing resources, compelling tasks, templates, guides, and guidance to develop cognitive and social skills further. They can also employ instructional scaffolding by modelling a task, giving advice, and providing coaching. Constructivism is related to the sociocultural theory of Vygotsky (1978) by developing the student's current understanding through interactions with their potential understanding. Constructivism allows the student to make connections between existing knowledge and new knowledge (van de Pol, Volman, Oort, & Beishuizen, 2015). Murphy and Messer (2000) also indicate that scaffolding leads to improved student performance.

Instructors can help learners connect prior knowledge to new knowledge. One can achieve this by using graphical organizers such as concept maps (Boroumand, Mardani, & Esfahlan, 2020). Students learn through trial and error. They should undertake a variety of activities undergoing some discussion resulting in a better understanding of concepts. There is also a need to ensure that students can apply the information they learn. Activities that require them to apply the learned information will assist them acquire application skills.

The COVID-19 pandemic resulted in school closures because there was a need for social distancing to prevent the spread of the deadly virus. The measures were likely to have a more severe impact in facilitating learning of practical activities in science classrooms (Chadwick & McLoughlin, 2021). In one study, it was reported that there was a decrease in the facilitation of practical activities in science classrooms, and about a quarter of the participants reported never facilitating practical activities during the COVID-19 pandemic (Chadwick & McLoughlin, 2021). The challenges that hindered engagement included a lack of resources and technology at home.

1. The study sought to answer the following research questions: What are the technological challenges that affect science learning among rural students in South Africa?
2. What are the impact of the COVID-19 pandemic on the development of scientific skills among rural science students in South Africa?

The results of the study can contribute significantly to addressing the main drawbacks and difficulties of teaching science process skills online during the coronavirus pandemic. The study plays a critical role in informing policymakers, teachers, and the public about the skills development deficiencies imposed by the coronavirus pandemic. This knowledge can assist educators in devising mechanisms to avoid the drawbacks of skill development imposed by the pandemic.

METHOD

A survey design, a valid and reliable tool to measure reality through the lens of a positivist research paradigm, focused the study toward objective and replicable results.

Population and Sampling Technique

The COVID-19 pandemic imposed various restrictions on research, especially on data collection. Limpopo has numerous schools, most of which are in rural settings. The researchers purposively selected one rural school to collect data and used an investigator-administered questionnaire. The target population consisted of 43 grade 12 learners who took physical science and life science subjects in grade 12. While all learners received parental consent forms for their parents/guardians to sign, some of the respondents were absent on data collection day, while others were unwilling to participate in the study. Some respondents did not return the parental consent forms. The data were collected from 33 respondents who signed the learner consent forms after the researcher explained and clarified the relevant details. Three of the questionnaires were discarded because the data were incomplete. Thus, only 30 questionnaires were analyzed.

Instrument

The questionnaire consisted of three sections. The first section requested biographic data icluding gender, age, number of years spent in the same school, subject line, and whether the parent or guardian was working or not. In the second section of the questionnaire, the learners had to indicate their level of agreement with digital challenges during the coronavirus pandemic on a Likert scale. The last section was based on the practice of practical skills in the science process by the students before the pandemic and during the pandemic. The latter was also in the form of a Likert scale (1-strongly disagree to 5-strongly agree), where respondents had to tick a box to indicate their level of agreement in practising the skills highlighted. Before the data collection process, the questionnaire was pilot tested with ten respondents in grade 11, and ambiguous questions were corrected. Furthermore, three expert researchers checked the precision and clarity of the questions.

Ethics clearance (UFS-HSD 2019/0217/3007) was obtained from the University of the Free State Ethics Clearance Committee, and further permission was obtained from the Limpopo Department of Education District Office. The school principal granted permission, and the researchers collected the data thereafter.

Data Analysis

After checking all sections for completeness, questionnaires with large sections of missing portions were discarded. The remaining questionnaires were coded and the data entered into SPSS. The demographic and Likert scale data served to generate frequencies, means, and standard deviations (descriptive statistics). The researchers then compared the responses for the practice of science process skills using the independent sample t-test in SPSS version 26.0.

RESULTS

The results are presented in texts and tables.

Biographic Data

Five (16.7%) males and 25 (83.3%) females participated in the study. All students had been in the same school for a period between four and five years, and in the 15-20-year age category. The parents of most of the 18 (60.0%) respondents were unemployed, while only 12 (40.0%) were working.

Table 1. Challenges experienced by students during the COVID-19 pandemic

Challenge	**N**	**Mean**	**Standard Deviation**
Data availability	30	1.50	1.23
Cell phone availability	30	3.43	1.14
Laptop availability	30	1.90	1.54
Network availability	30	3.80	0.61
Data & network availability	30	2.30	0.79
Data, network, and device availability	30	2.70	0.65
Download assignments	30	3.33	1.21
Scanning & sending assignment	30	3.50	1.04

Students experience the most challenges with network and cellphone availability (M = 3.80, SD = 0.61 and M = 3.43, SD = 1.14, respectively). Due to network challenges, downloading and sending assignments (M = 3.33, SD = 1.21 and M = 3.50, SD = 1.04, respectively) were not easy (Table 1). The least challenges were in the availability of data and laptops (M = 1.50, SD = 1.23 and M = 1.90, SD = 1.54, respectively).

Table 2. Student responses to science skills practice before and during the lockdown period

		Before Lockdown		During lockdown		Independent sample t-test
Practical skills practiced	N	Mean	Standard Deviation	Mean	Standard. Deviation	p-value
Following instructions on the procedure for investigation	30	4.80	0.41	1.60	1.22	0.00[b]
Making biological drawings	30	3.00	0.00	1.40	0.68	0.00[b]
Measurement using a microscope	30	1.33	0.48	1.10	0.31	0.03[b]
Comparing material before & after treatment	30	2.20	0.41	1.50	1.23	0.01[b]
How to draw conclusions from the results	30	4.27	0.98	1.50	1.04	0.00[b]

Converting results from one form to another	30	4.37	1.00	1.30	0.65	0.00[a]
Writing hypothesis	30	4.43	0.81	1.52	1.06	0.00[b]
How to ensure validity in an investigation	30	4.63	0.67	1.40	0.93	0.00[a]
How to ensure reliability in an investigation	30	4.71	0.60	1.40	0.93	0.00[a]
How to plan an investigation	30	4.53	0.68	1.40	0.93	0.00[a]
Overall		3.83		1.41		

The tests were carried out at significance level of 5%.
[a] equal variance was not assumed.
[b] equal variance was assumed.

The students practiced most of the skills of the science process (overall mean 3.83) before the lockdown period (Table 2). There was a dramatic change after the lockdown, as students did not practice practical skills (overall mean 1.41). This is reflected in the significant differences ($p < 0.05$) in the independent t-tests that compared the mean values before the lockdown period and the lockdown period.

DISCUSSION

The students practised most of the scientific skills before the lockdown. There was a significant decline in the practice of these scientific skills during the COVID-19 period. Students mostly faced cell phone and network availability challenges. Due to such challenges, it was difficult for the learners to download and send assignments. The data resonate with Statistics South Africa (2017) results, which indicate limited availability of electronic devices and that only a small percentage of the population has access to the Internet at home. The challenges of the Internet and the devices, especially cellphones, offered many barriers to the learning process during the COVID-19 pandemic.

The availability of cellphones and Internet access could provide the opportunity for teachers to send teaching materials, voice notes to explain issues, or a cheaper way to call specific individuals and explain concepts. According to the constructivist theory, conversation and collaboration tools play a critical role in promoting effective peer-to-peer and student-to-teacher interaction. The limited availability of devices minimized peer-to-peer and student-to-teacher interaction, resulting in a loss of opportunity to learn through collaboration. According to distance learning theory and research, interaction is essential for successful distance learning courses (Roblyer & Wiencke, 2003). As a result, Vygotsky encouraged productive discussions, constructive feedback, and collaboration with others to promote interaction and cognitive growth (Kurt, 2020). The availability of cellphones may help obtain a cheap communication platform for peer-to-peer and student-to-teacher discussions and feedback. Therefore, it is imperative that parents and guardians provide cellphones with instant messaging applications to ensure that there is a cheap learning platform that promotes interaction at a reasonable cost. Cellphone and network providers may take advantage of the situation by offering specials (low-cost cellphones). This would increase the turnover rate and may still result in the same profit.

The use of instant messaging applications enhances instructional scaffolding that allows student-centered learning, which facilitates more efficient learning than teacher-centered learning (Dong, Wu, Wang, & Peng, 2019). According to sociocultural theory, scaffolding allows students' current understanding to be developed through interactions toward their potential understanding (Vygotsky, 1978). Furthermore, scaffolding assists the student to make connections between existing knowledge and new knowledge, leading to improved performance (van de Pol, Volman, Oort, & Beishuizen, 2015; Murphy & Messer, 2000).

Educators should assist learners to connect prior knowledge to new knowledge by using graphical organizers such as concept maps (Boroumand, Mardani, & Esfahlan, 2020). Students learn through trial and error. They need to be given a variety of activities that must be marked and corrected. There is also a need to ensure that students can apply the newly learned information. Activities that require application of the learned information will assist them in acquiring application skills.

CONCLUSIONS

The majority of the students experienced the most challenges with network and cellphone availability, leading to difficulties in downloading and sending assignments. There was a significant decline in the practice of science process skills during the lockdown period. This was probably due to the lack of devices and slow adaptation to the new normal.

Recommendations

There is an urgent need to provide adequate resources, such as science equipment and learning technologies, to enable teachers in South African schools to facilitate practical activities in science while adhering to strict safety measures. Students should continue learning science process skills during the COVID-19 pandemic. Data from previous experiments that they can obtain from textbooks or the Internet may ensure continuous learning of the most principal issues that assist students in developing most of the required skills. Students may use instant messaging applications for their parents or guardians to receive and send assessment tasks. Additionally, educators can create Google Classroom applications, as they are cheap platforms that enhance communication. Teaching theoretical knowledge and science skills should be accompanied by assessments that help evaluate the learners' understanding of the knowledge and skills imparted.

Limitations of the Study

The researcher tried to use a larger sample size to offset the inherent limitations of the study. Due to the COVID-19 pandemic, the study focused only on one school, limiting the generalization of the information. The pandemic also limited the triangulation of data sources. It would have been important to supplement the questionnaire data through interviews and observation of lesson plans, student portfolios, and exercise books to obtain more reliable information.

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REFERENCE

Awan, M. N. (2015). Physical Conditions of Science Laboratories and Problems faced by Science Teachers in Conducting Practicals in Punjab. *Bulletin of Education & Research 37(1),* 1–8.

Boroumand, M., Mardani, M., & Esfahlan, F. (2020). The Influence of Explicit Teaching and and Utilization of Concept-mapping on EFL Students' Listening and Self-efficacy. *Language Teaching Research Quarterly*, 21, 16-34.

Crisp, G. (2010). Interactive E-Assessment - Practical Approaches to Constructing More Sophisticated Online Tasks. J*ournal of Learning Design, 3(3),* 1-10.

Davies, D., Collier, C., & Howe, A. (2011). Assessing scientific and technological enquiry skills at age 11 using the e-scape system. *International Journal of Technology & Design Education, 22(2),* 247-263.

Dong, Y., Wu, S. X., Wang, W., & Peng, S. (2019). (2019). Is the Student-Centered Learning Style More Effective Than the Teacher-Student Double-Centered Learning Style in Improving Reading Performance?. . https://doi.org/10.3389/f. *Frontiers in psychology, 10,* 2630.

Endean, M., & Braithwaite, N. (2012, August 13). *Online Practical Work for Science and Engineering Students—A Collaborative*. Retrieved from : http://www.open.ac.uk/about/teaching-and-learning/esteem/sites/www.open.ac.uk.about.

Gamage, K., Wijesuriya, D., Ekanayake, S., Rennie, A., Lambert, C., & Gunawardhana, N. (2020). Online Delivery of Teaching and Laboratory Practices: Continuity of University Programmes during COVID-19 Pandemic. *Education Sciences, 10(10),* 291.

Gibbins, S., Sosabowski, M., & Cunningham, J. (2003). Evaluation of a Web-based Resource to Support a Molecular. *Biochemistry and Molecular Biology Education, 31*, 352-355.

González-Gómez, D., Jeong, J. S., & Cañada-Cañada, F. (2020). Examining the Effect of an Online Formative Assessment Tool (OFAT) of Students' Motivation and Achievement for a University Science Education. *Journal of Baltic Science Education, 19(3),* 401–414.

Grob, R., Holmeier, M., & Labudde, P. (2017). Formative assessment to support students' competences in inquiry-based science education. *The Interdisciplinary Journal of Problem-Based Learning, 11(2).* https://doi-org.ufs.idm.oclc.org/10.7771/1541-5015.1673.

Gudyanga, R., & Jita, L. C. (2019). Teachers' implementation of laboratory practicals in the South African physical sciences curriculum. *Issues in Educational Research, 29(3),* 715-731.

Harlen, W. (1999). Purposes and procedures for assessing science process skills. *Assessment in Education, 6(1),* 129-144.

He, Q., Hayes, M., & Wiliam, D. (2011). *Classification accuracy in results from key stage 2 national.* Coventry : Ofqual.

Kurt, S. (2020, July 7). *"Lev Vygotsky – Sociocultural Theory of Cognitive Development,".* Retrieved from Educational Technology: https://educationaltechnology.net/lev-vygotsky-sociocultural-theory-of-cognitive-development/

LaDue, N. D., Libarkin, J. C., & Thomas, S. R. (2015). Visual representations on high school biology, chemistry, earth science, and physics assessments. *Journal of Science Education and Technology*, 24(6), 818–834.

Liu, J. C., John, K. S., & Courtier, A. M. (2017). Development and Validation of an Assessment Instrument for Course Experience in a General Education Integrated Science Course. *Journal of Geoscience Education, 65(4),*, 435–454. .

Meek, S. E., Blakemore, L., & Marks, L. (2017). Is peer review an appropriate form of assessment in a MOOC? Student participation and performance in formative peer review. *Assessment & Evaluation in Higher Education, 42(6)*, 1000-1013.

Mezzacappa, D., & Wolfman-Arent, A. (n.d.). *Hite Clarifies Ban on 'Remote Instruction' during Shutdown.* Retrieved from https://thenotebook.org/articles/2020/03/18/philly-schools-forbid-remote-instructionduring-shutdown-for-equity-concerns/

Mostert, M., & Snowball, J. D. (2013). Where angels fear to tread: Online peer-assessment in a large first-year class. *Assessment & Evaluation in Higher Education, 38(6),*, 674-686.

Müller, D., & Ferreira, J. (2005). Online labs and the MARVEL experience. *International Journal of Online and Biomedical Engineering,1*, 1-5.

Murphy, N., & Messer, D. (2000). Differential benefits from scaffolding and children working alone. *Educational Psychology, 20*, 17-31.

Ramani, K., Zhang, J., Wang, X., Rathbun, A., Corcoran, L., Diliberti, M., . . . Synder, T. (2018). *Student Access to Digital Learning Resources Outside of the Classroom (NCES 2017-098).* Washington, DC,: U.S. Department of Education, National Center for Education Statistics.

Schwab, K. (2018). *The Global competitive report 2018.* Geneva: World Economic Forum.

Silalahi, T. F., & Hutauruk, A. F. (2020). The Application of Cooperative Learning Model during Online Learning in the Pandemic Period. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *3*(3), 1683–1691. https://doi.org/10.33258/birci.v3i3.1100

Statistics South Africa. (2017). *General Household Survey.* Pretoria: Statistics South Africa.

van de Pol, J., Volman, M., Oort, F., & Beishuizen, J. (2015). The effects of scaffolding in the classroom: support contingency and student independent working time in relation to student achievement, task effort and appreciation of support. *Instructional Science volume, 43*, 615-641.

Vygotsky, L. S. (1978). *Mind in society—the development of higher psychological processes.* Cambridge: Harvard University Press.

EFFECT OF CONCEPT MAPPING INSTRUCTIONAL STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN ENUGU EDUCATION ZONE, ENUGU STATE, NIGERIA

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Abstract
This study investigated the effect of concept mapping instructional strategy on students' academic achievement in Biology in Enugu Education Zone. Two research questions and two hypotheses guided the study. The study adopted a pre-test post-test non-equivalent control group quasi-experimental research design. The sample size was 357 biology students. The instrument for data collection was Biology Achievement Test (BAT) which was face and content validated by two experts in Biology Education and one in Measurement and Evaluation. The reliability co-efficient of the instrument using Kuder-Richardson formula (KR-20) was 0.88. Mean was used to answer the research question while the hypotheses were tested using analysis of covariance (ANCOVA) at 0.05 level of significance. The findings revealed that students who were exposed to concept mapping instructional strategy achieved better than their counterparts taught using lecture method in biology achievement test and that male and female taught with concept mapping achieved better than male and female taught with lecture method. The ministry of education should through seminars, workshops, and conferences equip serving Biology teachers with requisite knowledge and competencies on the utilization of concept maps in teaching and learning.
Keywords: Concept mapping, Instructional strategy, Students' achievement in Biology

INTRODUCTION

Background to the Study

No country has attained any breakthrough in its economic development without the development of an adequate base in science and its application, technology. A nation's development and prosperity are judged to a large extent by the status of science and technology of that nation. A scientifically unsophisticated society means an underdeveloped nation in all sectors. According to Aboagye (2011), science is the bedrock of technology and socio-economic development. This emphasizes the universal recognition that the application of science and technology is paramount to the rapid development of every nation. Science should be at the service of humanity as a whole and should contribute to providing a better quality of life for all and a healthy and productive environment for present and future generations. Therefore, the pursuit of science is imperative for any nation that wants to maintain its independence and sovereignty to ensure growing prosperity and hold up its head among the civilized nation. Several factors have been identified as militating against students' attainment of the objectives of science instruction, and the most pronounced factor identified by researchers is the inappropriate and uninspiring teaching methods adopted by science teachers (Cheema & Mirza, 2013). Many investigations have shown that secondary school students are exhibiting dwindling interest in Science (Oladejo, Olusunde, Ojebisi & Ishola, 2011)

Despite the increase in the provision in terms of resources and facilities, schools generally have not been able to make a significant improvement in science teaching (Egboga, 2012).

These setbacks will have a serious repercussion on the country's effort towards becoming a scientifically and technologically advanced nation. To achieve this vision would require nothing short of good achievement in science at all levels of schooling since science and technology education hold the key to the present and future development of any nation (Egboga, 2012). Science and technological progress can only be effectively enhanced through effective science education. Science education embodies all educational processes aimed at providing unlimited opportunities for learners to understand and utilize the necessary knowledge, skills, and attitudes required to operate effectively in a scientific and technological society. It is in the attainment of this goal of science education that we hope to produce the required large pool of experts in science and technology, which will help to bring about the much-needed socio-economic development of a nation. Biology education is an aspect of science education.

Biology is the science of life that deals with the structural complexity of organisms in their environment. It is a branch of natural science that deals with the study of living organisms. Biology occupies a unique position in the curriculum of our educational system. The secondary school biology curriculum in Nigeria is designed to deepen students' understanding of biological science and also to encourage students' ability to apply scientific knowledge to everyday life, in matters of personal, community, health and agriculture, among others (Federal Ministry of Education, (FME) 2009). These objectives can never be attained without a teaching strategy that will enable students to develop appropriate skills and knowledge in biology.

Biology, as one of the major science subjects, is of paramount importance to every nation including developing ones. Sound working knowledge of biology is requisite for entrance into such professions as Medicine, Pharmacy, Agriculture, and Nursing, among others. Therefore, a sound theoretical and practical knowledge of biology is very necessary for the management of our natural resources, provision of good health facilities for the masses, adequate food supply, and a favourable environment. Most students in secondary schools prefer biology to other science subjects because it has less mathematical calculation unlike physics and chemistry and in most cases deals with a non-abstract concept (Aboagye, 2011). In some cases, it may remain the only science subject done by most arts students. Irrespective of the high enrolment of students in biology in the West African Examination Council (WAEC) and National Examination Council (NECO), the academic achievement of students in biology is still poor (Ainsola &Popoola, 2014). Based on Ainsola and Popoola (2014) report, numerous studies have been carried out by researchers to find out the reasons for poor achievement in biology. Some of the factors identified include time factor, class size, and inadequate facilities, among others (Ige, 2009). However, Ainsola and Popoola (2014) attributed it to ineffective teaching strategies. The traditional teaching method such as the lecture method of teaching mostly used by teachers does not give students the opportunity for active participation in the teaching/learning process. The lecture method of teaching is a teacher-centred approach to learning (Nwosu, 2011; Guisti, 2013). This method makes students learn by rote/memorization and is not effective in learning difficult concepts.

The persistent search for an effective method of teaching and learning biology culminated in the discovery and suggestions by some researchers (Ibe & Nwosu, 2013; Nwagbo, 2015), for the use of innovative teaching methods such as concept mapping where learners are perceived as active participants in the knowledge acquisition process. Such learners are self-motivated, independent and meta-cognitive in the process of learning. In view of this, the meta-cognitive strategy is suggested, because it is self-motivated (Ezekannaya, 2017).

Meta-cognitive strategies are those teaching strategies that enhance learners' independent learning ability and self-regulation. Meta-cognitive teaching strategies empower the learners to take charge of one's learning in a highly meaningful fashion. Concept mapping is one of the meta-cognitive teaching strategies that have been identified by some scholars (Okebukola, 2012). Concept mapping is therefore considered necessary to determine its efficacy on students' achievement in biology.

Concept maps are graphical tools for organizing and representing knowledge. Imoko, (2015) defined concept mapping as one way of representing concepts hierarchically showing their relationship. Kinchin, (2013) suggested that concept mapping assists students to develop a relationship among different bits of information and build up previous knowledge and skills in learning. It is on this basis that this researcher wanted to find out the effect of concept mapping on students' achievement in biology. Achievement may be influenced by the gender of the students.

Gender means ascribing different roles such as to males and females in society. Gender is defined as the socio-cultural constructed characteristics and roles, which are ascribed to males and females in society. Previous studies (Nzewi, 2010; Nwagbo & Chukelu, 2011) reported that there exists no significant difference in the achievement of boys and girls in biology. Okoro (2011) indicated that a significant difference exists in the achievement of male and female students in biology. These contrasting views on gender differences of students in biology achievement have prompted the researcher to investigate the achievement of males and females using concept mapping since it is not commonly used by many biology teachers in the teaching and learning process.

Literature Review

Concept mapping instructional strategy

Gerstnera and Bognera (2009) defined concept mapping as a pictorial arrangement of a key concept that is unique to a specific subject. It is a kind of visual network showing regularity in events or objects designated by some label. Imoko, (2015) defined concept mapping as one way of representing concepts hierarchically showing their relationship. In view of these definitions, a concept map is a type of graphic organizer used to help students organize and represent knowledge of a subject. Concept maps begin with the main idea (or concept) and then branch out to show how that main idea can be broken down into specific topics. Concept maps are graphical two-dimensional display of knowledge that is comprised of concepts (usually represented within boxes or circle), connected by directed arcs encoding brief relationships (Linking Phrases) between pair of concepts. These relationships usually consist of verbs, forming propositions or phrases for each pair of concepts

The characteristic of concept maps is that the concepts are represented hierarchically with the most inclusive, the most general concept at the top of the map and the more specific, less general concepts arranged hierarchically below. Another important characteristic of concept maps is the inclusion of cross-links. These are relationships or links between concepts in different segments or domains of the concept map. Cross-links help us see how a concept in one domain of knowledge represented on the map is related to a concept in another domain shown on the map.

One instructional strategy which probably has the potential to offer opportunities to address the problems of effective teaching and learning of science is the concept mapping advocated

by Novak and Godwin (1984). It was derived from Ausubel's (1963) learning theory which places central emphasis on the influence of students' prior knowledge on subsequent meaningful learning.

Ausubel (1963) maintained that meaningful learning occurs only when the learner consciously and explicitly ties new knowledge to relevant concepts and expressions. Therefore, the responsibility of teachers in schools and colleges is not only to teach students the particular content of knowledge needed for their professional discipline but also to help them develop successful lifelong skills of acquiring knowledge. Ausubel (1963) and Novak (1990) assert that the mental ability of students to enhance their credible standard and good performance relies on the understanding, proper application of an acquired skill and successfully relating them with new ones. The extent to which the students interrelate concepts can be assessed using the concept mapping technique. Therefore, concepts maps can be seen as a diagrammatic representation of ideas that helps to solve problems of learning, while concept mapping is a technique of presenting ideas, planning a strategy and developing a process of providing meaningful learning. By this, concept maps were used in this study to help students understand how concepts are linked, how one develops out from another, all of which enabled the students to extend and deepen their knowledge of reproduction in vertebrates and to understand its wholeness.

Lecture Method

Lecture is a simple, fast and cheap method to present the vast issues to a lot of groups of learners (Golafrooz Shahri& Khaghanizade, 2010). Inactiveness of the students, tiring long lectures, one-way communication, and fast forgetting of the issues are the disadvantages of this method. (Norouzi, Mohsenizadeh, Jafary Suny & Ebrahimzadeh, 2011).

This is the most popular and widely used method of teaching. A lecture according to Ahmed (2010) is mainly a one-way method of communication that does not involve significant audience participation. Therefore, lecture is often contrasted to active learning. Basically, in the lecture method, the teacher delivered the content to the entire class and the students listen to the lecture. Thus, the learning mode tends to be passive and the learners play little part in their learning process. Lecture method is a one-way channel of communication of information. Students' involvement in this teaching method is just to listen and sometimes pen down some notes if necessary during the lecture, combine the information and organize it (Umar, 2012). Learning has a strong influence on the method of teaching. The pouring process of the lecture method is educationally not perfect or recommended for secondary level students. At this level, it is difficult for students to pick new concepts using lecture method of teaching and as such students may not find the teaching and learning interesting. This method makes students learn by rote/memorization and is not effective in learning difficult concepts.

Theoretical Framework

Ausubels' (1963) Theory of meaningful learning

Aususels' (1963) cognitive theory centres on the process of meaningful and rote learning. Meaningful learning occurs when the new knowledge is consciously linked to existing concepts (ie. Subsumers) the learner already knows. Meaningful Learning is achieving a deep understanding of complex ideas that are relevant to students' life. In other words, when what is learned can be related clearly to what is already know, this will optimize meaningful, learning. Ausubel included that where the 'Subsumer' does not exist, he recommended the use of what he calls "advance organizers". Advance Organizer is in the form of introductory

materials presented in advance of the learning itself, to link already known materials to the new material to be learnt. Ausubel asserts that "the most important single factor influencing learning is what the learner already knows". According to him, the information should be organised and stated in such a way that it can be easily related to student's existing knowledge scheme. Ausubel also stated that any individual's perception of stimuli will be a function of background experience. This emphasizes that teachers need to take into account a particular learner's thinking process at a particular time and situation. Ausubel sees value in learning through discovery.

Ausubel (1963) theory implies that teachers should relate the new material to what the learner knows. Also, teachers should employ the practice of alerting their students in advance of what topic or concepts will be treated next and furnishing them with the relevant references, bearing in mind, however, its relevance to what the students already know. It is therefore expected that by using the concept mapping strategy, students will be properly guided.

Statement of the Problem

Biology has been accorded a very high recognition as one of the important science subjects, yet the way and the manner biology is being taught in schools leaves much to be desired. Over the years, the achievement of students in biology in Nigeria secondary schools has been very poor. This poor achievement in biology in secondary school has been attributed to the ineffective teaching methods. Based on these, a lot of efforts are being made by educators to improve students' achievement through the use of effective teaching methods and approaches that will facilitate learning and enhance student's academic achievement. The problem therefore is how effective is concept mapping as an instructional strategy in enhancing students' achievement in biology?

Purpose of the Study

The purpose of the study was to investigate the effect of concept mapping instructional strategy on students' achievement in biology**.** The desire to improve students' learning in science subjects in general and biology in particular through more effective instructional strategies has led to increasing awareness in recent years of the importance of learner-centeredness in teaching. Concept mapping is therefore considered necessary in this study, to determine its efficacy on students' achievement in biology.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of students taught biology using concept mapping instructional strategy and those taught using lecture method?
2. What are the mean achievement scores of males and females taught biology using concept mapping instructional strategy and those taught using lecture method?

Hypotheses

Ho_1: There is no significant difference in the mean achievement scores of students taught biology using concept mapping instructional strategy and those taught using lecture method.

Ho_2: There is no significant difference in the mean achievement score of male and female students taught biology using concept mapping instructional strategy and those taught with lecture method.

RESEARCH METHOD

Research design

A quasi-experimental design, specifically the pre-test post-test non-equivalent control group design, was employed. The design was appropriate for the study because intact classes were used to avoid disruption of a normal class lesson. The study was carried out in Enugu Education Zone, Enugu State. Enugu Education Zone consist of three (3) Local Government Areas namely Enugu East, Enugu North, and Isi-Uzo. The choice of this area is based on the fact that the students in this area also have poor performance in Biology like their counterparts in other parts of the state.

Participants

The population of the study comprised all year two senior secondary school (SS11) biology students numbering 3319. There are 31 schools in the zone, made up of 23 single-sex schools and seven coeducational schools. The researcher selected one coeducational school from each local government using a simple random sampling technique. Co-educational schools were used because gender is a variable in the study. The researcher drew two intact classes from each school. The two intact classes were assigned experimental Group A and control group B through the simple toss of coin. Group A was treated using concept mapping instructional strategy while Group B was taught using the lecture method. The sample size is 357 students, made up of 178 students in the experiment group and 179 students in the control group.

Instrument for data collection

An instrument titled Biology Achievement Test (BAT) was used for the study. BAT was developed from the content that was covered in the study. BAT is a thirty-item multiple choice objective item developed by the researcher. The items were drawn using a table of specifications. The instrument was face and content validated by three experts. The reliability of BAT was determined using the Kuder Richardson formula (KR-20) and yielded a reliability index of 0.88.

Experimental Procedure

One week training programme was organized for the biology teachers in the sampled school. Biology teachers in the experimental group were trained on how to teach using concept mapping while biology teachers in the control group were trained on how to teach using the lecture method. Students in both experimental and control groups were pre-tested with BAT before the commencement of treatment by their biology teacher. After the pre-test, the regular biology teachers commenced teaching in their schools, using the instructions on the lesson notes given to them by the researcher. The treatment of this study involves teaching on the topic "Reproduction in vertebrates". The experiment was conducted during normal school periods. At the end of the experiment which lasted for four weeks, the biology teachers administered the post-test to the research subjects in the two groups. Before post-testing, the researcher reshuffled the test items to minimize pre-test sensitization. Data collected from the two tests were used for data analysis.

Control of Extraneous Variables

Teacher variable: Training the regular biology teachers in the sample schools helped to control the error that might arise as a result of teachers' variables.

Instructional Situation Variable**:** The researcher issued out lesson notes to the regular biology teachers. Also, teaching and testing were conducted in all the biology classes of SS II and not just in the intact classes drawn. This was done to avoid the Hawthorne effect (a situation in

which research subject's behaviour is affected not by the treatment on its own but by their knowledge of participation in a study) and Novelty effect (increased motivation or participation on the part of the subject simply because they are doing something different).
Inter Group Variable**:** To eliminate the error of none randomization of the subjects, data from the study were analysed using the Analysis of Covariance (ANCOVA).

Method of Data Analysis
Mean and Standard Deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

RESULTS
Research Question One: What are the mean achievement scores of students taught biology using concept mapping instructional strategy and those taught using lecture methods

Table 1. Mean and standard deviation of students taught Biology using concept mapping strategy and those taught using lecture method

Method		Pre-test		Post-test		
	N	Mean	SD	Mean	SD	Mean Gain
Concept Mapping	178	62.22	0.529	82.35	0.69	20.13
Lecture Method	179	48.25	0.469	53.27	0.91	5.02

Table 1 shows that the students that were taught Biology using concept mapping instructional strategy had a mean achievement score of 82.35 with a standard deviation of 0.69 at the post-test while those that were taught using the lecture method had a mean achievement score of 53.27 with a standard deviation of 0.91. The mean gain scores for the two groups were 20.13 and 5.02 respectively. This implies that the students that were exposed to concept mapping instructional strategy achieved better than their counterparts who were taught using the lecture method.

Research Question Two: What are the mean achievement scores of males and females taught Biology using concept mapping instructional strategy and those taught using lecture method?

Table 1. Mean and Standard deviation of male and female students.

		Pre-test		**Post-test**		
	N	**Mean**	**SD**	**Mean**	**SD**	**Mean gain**
Concept Mapping						
Male	86	51.72	0.546	71.900	0.521	20.180
Female	92	45.61	0.533	68.423	0.546	22.813
Lecture Method						
Male	88	40.914	0.590	43.981	0.546	3.067
Female	91	42.700	0.576	44.786	0.533	2.086

Table 2 shows that male students had a post-test mean achievement score of 71.900 with a standard deviation of 0.521 while their female counterparts had a post-test mean achievement score of 68.423 with a standard deviation of 0.546, mean gain scores of 20.180 and 22.813 for the male and female students respectively in concept mapping. While under the lecture method of teaching, both male and female students acquired 43.981 and 44.786 as mean scores; the standard deviation of 0.546 and 0.533, with a mean gain of 3.067 and 2.086

respectively. The table showed that male and female taught with concept mapping achieved better than male and female taught with lecture method.

Hypothesis One: There is no significant difference between the mean achievement scores of the students taught Biology using concept mapping instructional strategy and those taught with lecture method.

Table 3. Analysis of Covariance of the effect of concept mapping instructional strategy and lecture method on students' achievement in Biology

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15631.279[a]	4	3907.820	22.354	.000
Intercept	14010.026	1	14010.026	80.143	.000
Pre-test	548.088	1	548.088	3.135	.081
Treatment	12738.818	1	12738.818	72.871	.000
Gender	132.681	1	132.681	.759	.386
Treatment * Gender	143.624	1	143.624	.822	.368
Error	13110.909	75	174.812		
Total	131345.000	80			
Corrected Total	28742.188	79			
a. R Squared = .544 (Adjusted R Squared = .520)					

Table 3 shows that the probability associated with the calculated value of F (72.871) for the effect of concept mapping instructional strategy on students' achievement in Biology is 0.000. Since the probability value of .000 is less than the .05 level of significance ($p < .05$), the null hypothesis was rejected. Thus, there is a significant difference between the mean achievement scores of the students taught Biology with concept mapping instructional strategy and those taught with lecture method in favour of the experimental group.

Hypothesis Two: There is no significant difference in the mean achievement score of male and female students taught biology using concept mapping and those taught with lecture methods.

Table 4. Analysis of Covariance of male and female students.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.942[a]	4	.235	1.215	.312
Intercept	39.531	1	39.531	204.001	.000
Pre-achievement	.000	1	.000	.002	.964
Treatment	.519	1	.519	12.681	.006
Gender (Females)	.230	1	.230	1.185	.280
Treatment * Gender (Males)	.251	1	.251	1.295	.259
Error	14.533	75	.194		
Total	916.293	80			

Corrected Total	15.475	79
a. R Squared = .061 (Adjusted R Squared = .011)		

Table 4 shows that the calculated value of F (12.681) is 0.006. Thus, there is a significant difference between the mean achievement scores of male and female students taught Biology with concept mapping instructional strategy and those taught with lecture method in favour of the experimental group. This is for the fact that the probability value of 0.006 is less than the 0.05 level of significance ($p < .05$).

DISCUSSION OF THE FINDINGS

The findings of the study in tables 1 and 3 revealed that the students taught Biology with concept mapping instructional strategy achieved better than their counterparts taught with the lecture method. It also showed that there is a significant difference between the mean achievement scores of the students taught Biology with concept mapping instructional strategy and those taught with lecture method in favour of those taught with concept mapping. The finding is in line with that of Ajaja (2011) who found that students exposed to the concept mapping as the study skill achieved more in biology than those who were not. The findings also agree with the findings of Karakuyu (2010) who observed that drawing concept map instruction was more effective than traditional instruction in improving the achievement of the participating students.

The findings of the study in tables 2 and 4 indicated that male and female students taught Biology with the concept mapping achieved better than male and females taught with lecture method. This is in line with the findings of Gerstnera and Bognera, (2009) that Concept mapping as a teaching-learning tool is as effective for male students as it is for female students concerning achievement in science.

CONCLUSION

1. Students who were exposed to concept mapping achieved better than their counterparts taught using lecture method.
2. male and female taught with concept mapping achieved better than male and female taught with lecture method.
3. There is a significant difference between the mean achievement scores of the students taught Biology with concept mapping instructional strategy and those taught with lecture method.
4. There is a significant difference between the mean achievement scores of male and female students taught Biology with concept mapping instructional strategy and those taught with lecture method.

Recommendations

From the findings of the study, the following recommendations were made

1. Teacher educators in Universities and Colleges of Educations should be focused on preparing Biology teachers to acquire the appropriate skills and competence needed for concept mapping instructional strategy.
2. The ministry of education should through seminars, workshops, and conferences equip serving Biology teachers with requisite knowledge and competencies on the utilization of concept maps in teaching and learning.

REFERENCES

Abogye, M. (2011). Meeting Challenges to Sustainable Development in Africa through Science and Technology Education. *International Council of Associations for Science Education (ICASE), Africa Regional Conference,* 170 – 171.

Ahmed. B. (2010). Understanding Teaching. Yola – Nigeria: Paraclete Publishing.

Ajaja, O.P. (2011). Concept Mapping as a Study Skill: Effects on Students Achievement in Biology. *International Journal of Education Science 3*(1),49-57.

Ainsola, M.K. & Popoola, A.A. (2014). A Comparative Study of the Effective Achievement of Secondary School Students. *Journal of the Mathematics Association of Nigeria, Abacus, 29(*1).

Ausubel, D.P. (1963). Some Psychology Aspects of the structure of knowledge in Education and the structure of knowledge. *Fifth annual Phi Delta Kappa Symposium in Educational Research*

Cheema, A.B. & Mirza, M.S. (2013). Effects of Concept Mapping on Students'Academic Achievement. *Journal of Research and Reflection in Education, 7* (2),125-132.

Egboga, E.O. (2012). The Role of Science and Technology in National Development. The Miracle of Malaysia and the Future for Nigeria. *International Journal of Petroleum Technology Development,* 1.

Ezekannaya, G.N. (2017). Effect of Concept Mapping and Cognitive Styles on Achievement of
Students in Integrated Science. *Unpublished Ph.D Thesis, University of Nigeria Nsukka.*

Federal Ministry of Education (2009). *Senior Secondary School Curriculum Biology.* Corrected
Version

Gerstnera S.& Bognera, F.X. (2009). Concept Map Structure, Gender and Teaching Method: An Investigation of Student's Science Learning. *Nursing Education Perspective, 51(*4), 425-438. https://doi.org/10.1080/00131880903354758.

Golafrooz Shahri, H. & Khaghanizade, M. (2010). Introduction to oral presentation teaching method. *Education Strategies in Medical Sciences, 2* (4), 161–166.

Guisti B.M (2013). Comparison of Guided and Open Inquiry Instruction in a High School Physics Classroom. *Unpublished M.Sc. Thesis,* School of Technology Brigham Young University.

Ibe, E. & Nwosu, A.A. (2013). Effect of Guided Inquiry and Demonstration on Science Process Skills Acquisition among Secondary School Biology Students. *Journal of the Science Teachers' Association of Nigeria, 38*(1 and 2), 58-56.

Ige, A. (2009). Strategies for Improving Biology Teachers for Optimum Performance. *http://en.oboulo.com/strategies-forimproving-biology-teachersforopt* .

Imoko, B.I. (2015). Effect of Concept Mapping on Student's Achievement in Trigonometry. *Unpublished, Ph.D Thesis, University of Nigeria, Nsukka.*

Karakuyu, Y. (2010). The Effect of Concept Mapping on Attitude and Achievement in a Physics Course. *International Journal of the Physical Sciences, 5*(6), 724-737.

Kinchin, I.M. (2013). Effective Teacher-Student Dialogue. A *Model from Biological Education. Journal of Biological Education, 37*(3),110– 113.

SNorouzi HM, Mohsenizadeh SM, Jafary Suny H, & Ebrahimzadeh S. (2011). The Effect of Teaching using a Blend of Collaborative and Mastery of Learning Models, on Learning of
Vital signs: an Experiment on Nursing and Operation room Students of Mashhad
University of Medical Sciences. *Iranian Journal of Medical Education. 11* (5), 544-553.

Novak, J.D. & Gowin D.B. (1984). Learning How to Learn. Cambridge University press London.

Novak, J.D. (1990). Concept Mapping. A useful Tool for Science. *Education.Journal of Research in Science Teaching*. (27), 937-949.

Nwagbo, C.R. (2015). Effect of two Teaching Methods on the Achievement and Attitude to Biology of Students of Different Levels of Scientific Literacy. *International Journal of Educational Research.* 45(3), 216 – 229. https://doi.org/10.1016/j.ijer.2006.11.004.

Nwagbo, C. & Chukelu, U. (2011). Effect of Biology Practical Activities on Students' Process Skill Acquisition. *Journal of the Science Teachers' Association of Nigeria, 46* (1), 58 – 70.

Nwosu, A.A. (2011), The Effect of Teaching Sensitization on the Acquisition of Science Process Skills Among SS 1 Biology Students. *An Unpublished Ph.D Thesis, University of Nigeria, Nsukka.*

Nzewi, M.U. (2010). It's all in the Brain of Gender and Achievement in Science and Technology Education. *An Inaugural Lecture of University of Nigeria, Nsukka. March 25.*

Oladije, M.A., Olusundo, G.R., Ojebisi, A.O. & Isola, O.M. (2011). Instructional Materials and

Students Academic Achievement in Physics. Some Policy Implications. *European Journal of Humanities and Social Sciences. 2*(1), 112-126

Okebukola, P.A.O. (2012). Beyond the Stereotype to New Trajectories in Science Teaching. *Text of special Lecture Presented at the 43rd Annual Conference of STAN and CASTME.*

Okoro, A.U. (2011). Effect of Interaction Patterns on Achievement in Biology among Secondary School Students in Enugu State Nigeria. *Unpublished M.Ed Thesis UNN Sc/Ed.*

Umar, F. (2012). Lecture Method of Teaching, Definition, Advantages and Disadvantages *http/www.studylecturenotes.com/social-science/education/382-lecture-method-of-teaching-definition-advantages-a-disadvantag. es.*

FATHERS' PARTICIPATION IN THE SOCIAL DEVELOPMENT OF THEIR CHILDREN UNDER SIX YEARS: CHALLENGES AND STRATEGIC IMPLICATIONS

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Abstract
When fathers are actively participating in the early social development of their children, such children tend to do much better later in their lives trajectory. Given this dictum, the research reported in this paper explored the roles South African fathers play in their children's early social development. Previous literature found that fathers appear to be confronted with constraints that impact their abilities to get involved in more ways than one. Therefore, the main aim of this study was to establish whether the fathers selected for the study had experienced any difficulties in participating in their children's early social development. The convenient sampling technique was used to select fathers (n = 20) whom the researchers thought were experienced to respond to the various issues raised during the semi-structured in-depth interviews. A thematic approach was employed to make sense of the data obtained from the fathers. Opportunely, the cohort of fathers who participated in the study appeared to desire to be involved in the early social development of their children under six years. However, the findings of the study reveal that these fathers faced numerous constraints as they battled to get involved. The results shows that strained partner relationships a major source of constraint to fathers. Furthermore, results also show that working long hours was a major challenge to father involvement in the early social development of the child. Data also revealed that lack of experience in childcare constituted a source of constraint to fathers' participation in the early social development of their children. Time spent at work by fathers was a major issue as to how and when they want to get involved in their children's social development. However, the father effect connotes the quality of time fathers spend with their little ones as well as the benefits that accrue from such paternal presence on the early social development of the child. It is therefore recommended that fathers be adequately equipped to participate in the early development of their children.
Keywords: Children; Early development; Fathers participation; Social capital; Social development

INTRODUCTION

Fathers are recognised as significant influences on their children in every society. What fathers do, however, differs concerning social backgrounds that appear to shape the numerous influences that fathers have on their children (van Rensburg, 2013; Đurišić & Bunijevac, 2017; Basil & Ndijuye, 2019). Much of the current research on fatherhood in South Africa is concerned with the deficit model of fathers absent and thus their failures to participate in the early social development of their children (Morrell, 2005; Talitwala, 2005; Richter, 2006; Ratele, Shefer, & Clowes, 2012; van Rensburg, 2013). Research on the values of parental and more specifically fathers' participation in their children's early lives have been largely acknowledged (Đurišić & Bunijevac, 2017; Basil & Ndijuye, 2019). Equally important is the emerging global literature signifying that father do want to get involved in their children's

lives (Behson & Robbins, 2016; Đurišić & Bunijevac, 2017; Basil & Ndijuye, 2019; Ellis, Khan, Harris, McWilliams & Converse, 2021). Partner separation, divorce, toxic relationships, construction of father as automatic teller machines (or ATM), the 'painful' experiences from previous broken relationships, and the very expensive cultural practices like the 'ilobolo' are some of the reasons adduced to suggest why most men do not want to get involved in their families (Eddy, Thomson-de Boor & Mphaka, 2013; Basil & Ndijuye, 2019). Notwithstanding, studies by the above authors (Eddy *et al.*, 2013; Đurišić & Bunijevac, 2017; Basil & Ndijuye, 2019) fully demonstrate that engaging fathers in their children's early social development facilitates healthy early childhood development and leads to enhanced outcomes not just for the children themselves, but also for their parents as well as family and the community at large. Within South Africa's fatherhood research tradition, it appears more work are required to be done to fully establish the constraints that tend to dissuade fathers from fully and passionately participating in the early social development of their children. Hence, the study is reported in this paper.

What social development of the child entails

The process by which children acquire the capacity to engage and interact with others around them in a social context refers to as social development (Darling-Churchill & Lippman, 2016; Stop Child Abuse Now (SCAN) (2021). Social development is a lived experience that appears to occur as children begin to progress through their personal life trajectories within the community in which they live (Alzahrani, Alharb & Alodwani, 2019). This developmental life course includes the discovery of their personality as well as the acquisition of basic skills that enable them to cohere within a particular social setting in positive conformity with others (Alzahrani *et al.*, 2019). The importance of the cumulative quality of the child's social development within their primary habitats, and their reactions to the pressures around them in such social context have been highlighted by prominent theorists. For instance, Erickson's (1950) theory of personality development highlights the interaction between social skills and the domains of emotions. Vygotsky (1978) notes the collaboration between the social and educational developments of the child using the dynamics of the functional imperatives of the zone of proximal development (ZPD) to highlight the power of quality interactions in the life of the child. Moreover, Bandura (1986) in his social learning theory argues that the child's self-efficacy, which amounts to the beliefs about his/her competencies, appears to influence the quality of the child's social development. In addition, Bronfenbrenner (1979) uses his multi-layered bio-ecological theory to demonstrate the impact the child's significant orders, can particularly have on his/her social development.

Within the framework of social development, Huitt and Dawson (2011) argue that caregivers such as parents, fathers in particular who engage their children in interactive ways that ensure their social skills' acquisition, appear to lay a better foundation for their children's future social development. This is because these social skills are connected with the ability to positively interact with others in such settings as the classroom with their peers and their teachers (Alzahrani, Alharb & Alodwani, 2019). When fathers as development actors participate in the social development of their children, Browne and Millington (2015) suggest that this will inevitably result in the raising of better children who can deal with their emotional issues. Conversely, when parents particularly fathers are unable to participate in this aspect of the development of their children, this may impede their capacity to develop positive relationship skills; such children may become anti-social within contexts where positive social skills matter if they want to achieve (Browne & Millington, 2015; Darling-Churchill & Lippman, 2016). Darling-Churchill and Lippman (2016) opine that early positive

social experience with the proximal others as adults in the life of the child, tends to lay the foundation for the child's positive developments in all other areas of his/her life course. It is therefore necessary that fathers are encouraged to participate in their children's early social development.

Theoretical Framework

The research reported in this paper was theoretically informed by Coleman's (1988) social capital theory. Although there have been other prominent social capital theorists (Bourdieu, 1986; Putnam, 2000), however, that promoted by Coleman (1988) provided the ontological fit and explanations we aimed to draw by adopting the theory in our research. According to Coleman (1988), social capital theory is delineated by its operational roles that are only facilitated by certain actions of actors within the social structure. Qi (2018) notes that what stands out in Coleman's exposition on social capital theory is its connection with rational choice theory, which resonates clearly at the level of the individual's calculative capacities to decipher what is right from wrong. Coleman (1988) opines that social capital theory is productively dynamic and makes the achievement of certain human endeavour possible whereby in its absence, achieving such human endeavour would still have been impossible. Still, according to Qi (2018: 2125), the rational choice theory contends that the individuals' actions are based on self-interest that aims to satisfy their purposes through the tactical application of the means carefully selected for their effectiveness.

Coleman (1988) notes that the social capital theory dispositions present in the family; in parents and fathers in particular, when activated by way of father-child interactions could play a huge role in the creation of the necessary human capital in their child. The social capital of fathers will continue to contribute to the social capital accumulation of their children where fathers can be able to contribute to the early social development of their children. This is because social capital in the family is commonly measured by the quality of parental participation in the child's formal activities, parents' expectations of their growth as well as the father-child interactions at home (Claridge, 2018; Chen & Starobin, 2019). However, Coleman (1988) notes that if families are absent in their children's lives or unable to get involved in their early development, such children will lack the possession of the necessary social capital dispositions imperative for success in society. A child's social capital may still be deficient despite having professional parents because of the parents' unavailability to spend quality interactive moments with their growing child or not participating in the early social development of the child. This appears to be the common scenario that confronts the majority of the South African children according to most fatherhood literature in the Republic (Eddy *et al*., 2013; Fazel, 2017; Salami & Okeke, 2018). Thus, we found this theory well-suited for the study reported in this paper.

Problem statement

It is no longer news that the majority of South African children experience their early years' developmental trajectories without the presence of their biological or any father figures. , This is a scenario acknowledged by researchers to have already grown into a somewhat pandemic proportion (Richter, 2006; Ratele et al., 2012; Doku, 2014; UNICEF, 2015; Okeke, 2018). What is worrisome, however, is the fact that most research aimed to try to provide empirical explanations on the reasons for this situation, end up theorising from the perspective of the deficit model promoting how unfit and responsible South African fathers have been (see Morrell, 2005; Talitwala, 2005; Richter, 2006; Ratele et al., 2012; van Rensburg, 2013). Equally worth noting is the fact that the majority of existing literature emanates from studies that were led by female researchers (Okeke, 2018; Salami & Okeke,

2018). The situation in which men are researched from what Richter (2006) refers to as the predominance of the maternal template appears to account for why the fatherhood research from the deficit model seems popular. The authors of this paper argue that the empirical challenges presented by this scenario are twofold. First, the fact that the involvement of fathers continues to be lacking, despite the acknowledged fact that children benefit in more ways than one when their fathers are positively involved in their early social development. A second empirical challenge posed by the scenario described above is the fact that while the deficit model appears to predominantly inform fatherhood research, few studies have tried to fully establish the constraints impeding fathers' interests in the welfare of their children. Without obtaining empirical evidence on the everyday issues affecting the modern-day South African fathers, and especially on how they participate in their children's matters or on how they want to do so, generated knowledge will remain predominantly informed by speculation. Based on this argument, we undertook to explore the challenges impeding fathers' participation in the social development of their children under six years old. We were of the view that by so doing, we will be in a position to obtain empirical data to implicate the strategies for improving fathers' participation in their children's early social development.

Values of father participation

Studies show that father participation can be of significant value in four broad areas of the children's lives namely: behavioural, psycho-emotional, social, and academic (or cognitive) development (Behson & Robbins, 2016). For example, research (Byrd-Craven, Auer, Granger, & Massey, 2012; Đurišić & Bunijevac, 2017) have shown that when the relationship with their fathers is receptive and sincere, such children are less likely to be emotionally combative. This means that such children are more likely to relate with peers within a social context. In the same vein, the engagement of fathers in their children's lives appears to be of immense social benefits to such children as they are more susceptible to display pro-social behaviours in context (Basil & Ndijuye, 2019; Ellis *et al*., 2021). Such children's externalizing behaviours will be more self-regulated in the manner they act out towards others especially when in such social settings as the classrooms and school. This means that such children will exhibit more improved social conduct (Behson & Robbins, 2016; Basil & Ndijuye, 2019). Behson and Robbins (2016) also note that when fathers participate in their children's early lives, they tend to develop a greater ability for higher academic readiness, and such children are less likely to drop out of formal schooling. A study by Yoon, Bellamy, Kim and Yoon (2018) found that good quality father participation correlates with a lower level of internalizing and externalizing behaviour problems among children. In addition, research by Fazel (2017) has equally shown that girls tend to have a balanced understanding of relationships later in their lives, while boys tend to have a balanced behaviour when they have experienced warm and receptive relationships from their engaged fathers. It is thus left to say that the values accruing from fathers' engagement in their children's early social development are immense as such efforts must be made to reduce if not eliminate such constraints that may be impeding fathers is playing this important role. This next subsection looks at some of these constraints.

Challenges to fathers' participation in their children's social development

There are major challenges commonly mentioned by fathers across the globe that impact their capabilities to effectively participate in the early social development of their children (Cookston, 2012; Roberts *et al*., 2014; Ball & Moselle, 2016; Đurišić & Bunijevac, 2017). Fathers have reported in numerous research that lack of financial resources, their commitment to paid work, and availability of time resources are major constraints to their active participation in the early social development of their children (Roberts *et al*., 2014;

Đurišić & Bunijevac, 2017). The psychologist Cookston (2012) highlights the absence of role models and roles' expectations; non-existence of paid leave; economics interpretations on how fathers perceive themselves; absence of communal support; the dynamics of child custody at the time of separation; and the armour and lifestyles associated with manhood as very serious constraints to father participation in their children's welfare. More so, research shows that children whose fathers fully participate in their early social development generally perform better and positive schooling outcomes in the long run (Ball & Moselle, 2016). Research also shows that the presence of fathers at home is highly valuable to the children's early social well-being if such fathers are truly actively present (Richter *et al*., 2010). Given these scenarios, the choice of the social capital theory of Coleman (1988) became very appropriate for application in the study report in this paper.

Research questions

The main research question we addressed in the study was: what challenges do fathers confront as they attempt to participate in the social development of their children under six years and what strategies may support improvement? To ensure the successful exploration of this task, we drew up the following subsidiary research questions.

- How do fathers understand the social development of their children?
- What challenges impede them from ensuring that this takes place in their children?
- What strategic implications for policy and practice, are there to support the fathers?

METHOD

Research paradigm and approach

The interpretive paradigm was adopted for the study because it allowed us to seek the meanings participants brought to the world in which they lived and worked. According to this paradigm, individuals seek an understanding of the world in which they live and work. Individuals develop subjective meanings of their experiences-meanings directed toward certain objects or things (Creswell & Creswell, 2014). By adopting this paradigm, we aimed to understand the complex world of lived experience from the point of view of those who live in it. Furthermore, the world of lived reality and situation-specific meanings that constitute the general object of investigation is thought to be constructed by social actors. The interpretivists believe in order to understand the world, one must interpret it. According to Creswell and Creswell (2018), individuals develop meanings of their subjective experiences about the social world and act in that order. That is why interpretivist researchers believe in the understanding of the world to interpret it (Creswell & Creswell, 2018). Given this, the qualitative research approach became most appropriate for the study reported in this paper. Qualitative researchers are inclined to collect data within the natural setting of the participants. Creswell and Creswell (2018) notes that the key notion behind qualitative research is to study the issue from participants' perspectives.

Research design, study site, and participants' selection

The case study design was followed. According to Creswell and Creswell (2018), a case study design allows the researchers to undertake an in-depth analysis of an event involving one or more individual. Creswell and Creswell (2018) argue that a case study design provides an opportunity for a thick and rich description of the phenomenon under study. We chose the design because we were interested to obtain rich empirical evidence to aid the development of an understanding of the case under study. Three schools in Eastern Cape Province of South Africa participated in this study. Demographically, the schools were located in a former Black township sandwiched in-between a couple of informal settlements, a former White suburb, and in a former Coloured township respectively. Our choices of schools were

strategic as they provided us the necessary access to relevant information to enable us to achieve the objectives of the study. Twenty fathers whose zero to six-year-old children attended the schools took part in the study. The fathers were purposefully selected based on our understanding that they had valuable information relating to the objectives of our study.

The Instrument for data collection and procedure

The semi-structured face-to-face interview was used to collect data from the fathers. The interview schedule comprised of eight open-ended questions in line with the research objectives. We sought to understand participants' experiences with participation in the social development of their children. Interviews lasted for fifty minutes each as was directed by the participants. All interviews took place at the schools that the participants' children attended as was preferred.

Ethical measures undertaken

Approval for this study was obtained from the Research Ethics Committee of one of the Universities in the Eastern Cape Province of South Africa. Additional clearance was also received from the Education Department in the same Province. The purpose of the research was explained to the participants who also signed the piece of consent form indicating their willingness to take part in the study. Participants were assured of all forms of confidentiality and anonymity, including the replacement of their names with pseudonyms whenever the data were to be made public in the form of publications or presentations. Participants were also requested that they reserved the right to withdraw from the study wherever they felt unease by the issues covered in the interviews. All participants expressed their willingness to take part in the study reported in this paper.

Data analysis

The data collected from the participants were analysed through the grounded theory analytic induction (Creswell & Creswell, 2018). Grounded theory analytic induction refers to the procedure that allowed us to develop an understanding of the challenges confronting the fathers who took part in the study. On the other hand, grounded theory entails a sense-making process whereby theory on the subject matter was generated through the empirical data Creswell & Creswell (2018). The lenses offered through Coleman's (1988) social capital theory enabled us to transcribe, synthesize, organize, analyze, and make sense of the data. The outcomes of these processes were presented descriptively.

FINDINGS AND DISCUSSIONS

Three major constraints stand out clearly in the empirical data we obtained from the fathers who took part in the study. Below, we present the outcomes of the analysis.

Strained relationship with the partner as a major constraint

Data reveal that strained relationships among partners were a major stumbling block to engaged father participation in the early social development of their child. Partner relationship is strained when mutual consents are challenging to achieve among the individuals involved in it. This appeared to be the neglected situation reported by the cohort of fathers who took part in the study. Fathers in the study noted that once the relationship between the father and the mother is strained, a situation will then ensue, which makes it difficult for fathers to get involved in the affairs of their children. This kind of difficult and often challenging situation according to Houlfort, Philippe, Bourdeau & Leduc (2017) may evolve through, one of the parents not returning home on time or at all, partner separation, or

total divorce. Here is how some fathers represented the effects of the strained partner relationship. According to father eight (F8) actual words quoted verbatim,

> *Something that makes one not to be involved, sometimes the parents are divorced…Let me talk about my own experience. I was married before and then I getting a divorce with my wife and I went to stay with my friend and then my other son is going, what is the name of that school he is going to? That school and his mother and parent do not give me chance to sit down with my child. He is 8 or 9 years old, she doesn't give me a chance because she is fighting with me and putting the child to be involved in that situation. This is making it difficult for me. How can I get involved when I have no chance? Leave me man…*

These kinds of sentiments were also alluded to by father two (F2) who mentioned that he moved out of his house he was sharing with the mother of the two children when both of them could not stay '*a day without a fight*' according to F2. Continuing his justification to move away from the family house, F2 mentioned,

> *…since then it is like she doesn't want me to see my children at all if I want to see them. Sometimes I am trying to go to the school speaking to the teacher because has the teacher's number but I don't want to lie sometimes no idea know what is happening at the school with my children. How can I have interest again, tell me, because am not close to their mother…am sad to see anybody because it is like am being punished.*

Serious relationship strains can have multiple effects on the family life as well as on the welfare of individuals in that family including the children and their overall developments. Thomas, Liu and Umberson (2017) highlight types of family relationships, particularly the consequential effects on the well-being of individuals about children's welfare once such relationships involving the partners are strained. Cookston (2012) notes that the dynamics of child custody at the time of separation make it impossible for one of the partners to effectively contribute to the social development of the child even with a mandatory court order. This scenario is likely to extend to other aspects of the child's life course requiring both parents to be mindful of the situations their decisions may expose their child.

The constraint from a lack of experience in child-care on the part of fathers

Whether realistically or presumably, data reveal that fathers who took part in the study were seen as lacking in experience of child-care. Somehow, our (the authors) individual personal experiences appear to make them susceptible to supporting this claim. Some of the fathers who participated in the study claimed that it was much easier for mothers to be involved in the social development of their children because there is this societal belief that they are naturally equipped to perform such child-care roles. Fathers claimed that it is common societal beliefs that they are did not intrinsically possess what it takes to perform childcare roles. In the views of father 2 (F2),

> *…patience, most men according to my search do not have patience and those with the age group from 0-6 you must have a lot of patience. That's the downside for males. The female side it's like the Lord make them with patience, for us men I won't say keep us away from that age group but we are impatient…but that's in my view how the society is looking at us males.*

More so, father six alluded to the issue of lack of patience in the statement below,

> ---*well, social and moral issues like it is more acceptable that women take on that role and fathers tend to lose focus, they forget that they also have to play a role in the child's life and also the way we grew up where the mothers take more charge* **(F6).**

This would seem to be what father nineteen (F19) referred to when he alluded, "m*aybe it is their work situation or maybe they do not know how they could be involved"*. Earlier, Hass (2005) argues that men feel handicapped being involved in their children's affairs because they have been made by the lingering traditional societal beliefs that child-care is an exclusively preserved role for women.

Hass (2005) suggests that men who subscribe to this traditional notion of matrilineal/patrilineal familial division of labour, may not feel any scruple when he fails to actively get involved in their child's early social development given that the reasoning is already informed by child-care being a feminine field in which men may not be welcomed. In this case, being seen to be playing the fathering roles may weaken men from their sense of lived manliness. It would thus seem that perceived lack of the knowledge and the unpreparedness on the part of the fathers to venture into childcare hitherto perceived to be women's own, were implicated in the fathers' responses with implications for all major stakeholders in the childcare business.

Amount of time at work and the nature of work a serious constraint to fathers

A final major finding from fieldwork data was the revelation that the amount of time they spend at work coupled with the nature of work they did prevent them from actively engaging in the early social development of their children. It is important to note that eleven of the twenty fathers' work commitments are a huge factor in their seemingly inactive engagement in their child's early social development. Verbatim extracts from fathers' comments on this issue are presented below as follows,

> *…most of the time according to my understanding, we work and support and the only job is to provide money. Children if they are under age it's too difficult…too small…it's difficult to handle them…especially when we come from work too weak and tired. Sometimes children does not know this at all. Their mother will tell them sometimes but not every time. It is a difficult one for me* **(F1).**

The constraint from work appeared to have been corroborated by the comments from father four (F4) who noted that "f*athers work most of the time. Some children do not stay with their fathers, some fathers do not worry about their children as long as they support them financially".* Again, according to father five (F5).

> *…I cannot tell what happens but most of the time according to our understanding we are the people (fathers) that provides, we work, we support we thought that the only job for us is to provide money and all that stuff to the children, we don't think to parent the children is our job***.**

In addition, this is what father seven (F7), below had to say on the issue:

> *…in most cases fathers are breadwinners and it may be a question of time. I am lucky that I work from 8 to 15h00 while some parents have to leave early, 5h00 and return late at night, so I think it is just a question of time* **(F7).**

It is quite glaring to note that **F5** views, support the much-sustained notion of automatic teller machine (ATM) fathers within South Africa research parlance (Eddy *et al*., 2013) who reveal that fathers appear to justify their absence in their children's lives with the claim that they provide financial supports to their families. Eddy *et al.* (2013) argue that this notion of economic or financial provision can discourage fathers to comfortably disengage from participating in the early social development of their child with the notion that they have played their own (financially supportive) part. Fathers who took part in the study appeared to think that they were put in a dilemma by this role expectation. For instance, fathers are expected to be there for their children at all times, fathers are equally expected to be at work to earn financial value to enable them to cater for their families. Notwithstanding, previous studies by Roberts *et al.* (2014), and Đurišić and Bunijevac (2017) support the claims that fathers' commitments to paid work and time factors play huge roles in impeding their active contribution to their children's early social development.

Limitations of the study

We just want to draw our attention to two limitations that might have affected the quality of data obtained from the fathers who took part in this study. First, noting that the fieldwork for the study reported in this was conducted after official working hours to minimize disruptions on both sides, we were forced to make some fundamental adjustments in terms of the location of the interviews. This made us to agree to meet with the fathers wherever they found to be convenient to them. As a result, we had to spend quality time in most cases negotiating for space (wherever) to accommodate and ensure successful interviews. We are of the view that this situation might have affected the quality of data we obtained from the fathers. A second point we thought worth noting, it the fact that lack of financial sponsorship meant that we decided to narrow down the scope of the study. This meant that the findings should be used, only in the context of the fathers who took part in the study.

CONCLUSIONS

The challenges mentioned by fathers who took part in the study may be fewer than what exists in the literature. However, the fact remains that those challenges were quite serious as far as the participants were concerned. The issues raised by the fathers require continuous research in the area until credible solutions drop out of such endeavours. It is equally important for male researchers, to not leave it to the female researchers alone, but for them to get their hands dirty and get on board in order to finding solutions to fathers' low or non-involvement in their child's early social development. Below is the section on strategic implications, we have made some honest suggestions on how to motivate and support fathers to begin to actively engage in their children's early social development. What is more, we think that these can be productive strategies the help mitigate father active engagement. Finally, we call on all major stakeholders (particularly the school), and policymakers in early childhood development to take the findings of the study leading to this paper seriously and find ways to implement the suggested strategies.

Strategic implications

As fathers who took part in the study preferred to be coached to participate in the early social development of their children, it would be plausible to suggest that strategies should be mounted to assist them in this regard.

- Fathers in the study thought that centres and schools do not always think about fathers when they plan for their children. As such, they appealed to schools to be accommodative towards fathers when planning activities for their children.

- It is very important that when planning for such activities as meetings and sports events, which tend to attract the attention of parents to witness their child's performance at such events, the school should take important care to ensure that fathers are reached via newsletter for their availability and/or convenient most suitable for them. Fathers in the study confirmed that they would be more than willing to attend such events if notified well in advance.
- To ensure that fathers are always there, they should be made to feel that their ideas are valued both in the family, ECD centres, and in the schools. It is natural that human beings want to get involved in those activities where they sense that their contributions will be valued.
- Schools and ECD centres should set up talk-in center shows for fathers whose children attend such centres where role models should be invited to hear, speak and engage with fathers. In planning such talk shows, it will be the responsibility to conduct surveys on what may be of interest to fathers from the perspective of men themselves. Once these are established, any announcements on inviting fathers to such events should be sufficiently publicised through appreciate media outlets.
- It is our argument that the increased presence of fathers in the lives of their children and schools/centres-based events will allow for more wide-ranging practices of participation. Getting fathers to be involved in the school-based affairs of their children, will require that the centres and schools should mount father-friendly activities. This should start from the family in the first place.
- Given the above, efforts must be made by the Department of Social Development in conjunction with the Department of Basic Education to support stronger and unified families in this scheme of child's affairs. This will facilitate effective father participation in their child's early social development. The Department of Labour should also take up the responsibility to further explore ways of ensuring stronger unifying policies on paternal leaves that will be biding to both the formal and informal employer of men's labour. It is obvious that when it comes to paternal leaves, the regulations have not been very fair to the fathers. All relevant government units can do more to play a role in strengthening the policies in this regard.

REFERENCES

Alzahrani, M., Alharb, M., & Alodwani, A. (2019). The effect of social-emotional competence on children academic achievement and behavioral development. *International Education Studies*, 12(12): 141-149.

Ball, J., & Moselle, S. (2016). Aboriginal fathers in Canada. In Roopnarine, J. L. (Ed.), *Father – paternity* (pp. 25–29). Syracuse, NY: UNICEF.

Bandura, A. (1986). *Social foundations of thought and action: A social-cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.

Basil, P.T., & Ndijuye, L.G. (2019). Is fathers' involvement in young children's development and learning in the early years important? Experiences from the caregivers in Tanzania. *Global Education Review*, 6 (1): 63-74.

Behson, S., & Robbins, N. (2016). *The effects of involved fatherhood on families, and how fathers can be supported both at the workplace and in the home.* Paper presented at the United Nations Department of Economic and Social Affairs (UNDESA) Division for Social Policy and Development's Expert Group Meeting on Family Policies and the 2030 Sustainable Development Agenda, New York, 12 – 13 May 2016

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.) *Handbook of theory and research for the sociology of education.* New York: Greenwood Press.

Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.

Browne, E., & Millington, K. A. (2015). *Social development and human development: Topic guide.* Birmingham / Oxford: GSDRC, University of Birmingham / HEART.

Byrd-Craven, J., Auer, B. J., Granger, D. A., & Massey, A. R. (2012). The father–daughter dance: The relationship between father–daughter relationship quality and daughters' stress response. *Journal of Family Psychology*, 26(1), 87–94. http://doi.org/10.1037/a0026588

Chen, Y., & Starobin, S.S. (2019). Formation of social capital for community college students: A second-order confirmatory factor analysis. *Community College Review*, 47(1): 3-30. https://journals.sagepub.com/doi/10.1177/0091552118815758.

Claridge, T. (2018). *Introduction to social capital – SOCAP101.* Dunedin, New Zealand. Retrieved from: https://www.socialcapitalresearch.com/wp-content/uploads/edd/2018/08/Introduction-to-Social-Capital-Theory.pdf [Accessed 14.09.2021].

Coleman, J. (1988). Social capital in the creation of human capital. *The American Journal of Sociology*, 94: 94-120. http://dx.doi.org/10.1086/228943

Cookston, F. (2012). *Six obstacles to father involvement—and how to overcome them*. Retrieved from: https://greatergood.berkeley.edu/article/item/. [Accessed 06.09.2021].

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th Ed.). New York: Sage Publications.

Creswell, J.W., & Creswell, J.D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, California: Sage Publications.

Darling-Churchill, K.E., & Lippman, L. (2016). Early childhood social and emotional development: Advancing the field of measurement. *Journal of Applied Developmental Psychology*, 45: 1-7. DOI:10.1016/j.appdev.2016.02.002

Doku, D. (2014). *Where are the men in early years' setting?* (Unpublished master's thesis). University of Malta, Msida.

Đurišić, M., & Bunijevac, M. (2017). Parental involvement as an important factor for successful education. *C E P S Journal*, 7(3): 137-153.

Eddy, M.M., Thomson-de Boor, H., & Mphaka, K. (2013). *So we are ATM fathers: A study of absent fathers in Johannesburg, South Africa.* Johannesburg: Centre for Social Development in Africa, University of Johannesburg, and Sonke Gender Justice.

Ellis, S.M., Khan, Y.S., Harris, V.W., McWilliams, R., & Converse, D. (2021). *The impact of fathers on children's well-being.* Florida, USA: IFAS Extension, University of Florida.

Erikson, E. (1950). *Childhood and society.* New York: Norton.

Fazel, F. (2017). Responding to the challenge of father absence and fatherlessness in the South African context: A case study involving concerned fathers from the North West Province. *Stellenbosch Theological Journal*, 3(1): 89–113. DOI:10.17570/stj.2017.v3n1.a05

Hass, A. (2005). *12 reasons fathers might not want to spend more time with their children*. Retrieved from: https://www.parents.com/parenting/dads/101/ [Accessed 21/09/2021].

Houlfort, N., Philippe, F. L., Bourdeau, S., & Leduc, C. (2017). A comprehensive understanding of the relationships between passion for work and work–family conflict and the consequences for psychological distress. I*nternational Journal of Stress Management*, 1-19. Advance online publication. http://dx.doi.org/10.1037/str0000068

Huitt, W., & Dawson, C. (2011). *Social development: Why it is important and how to impact it. Educational Psychology Interactive.* Valdosta, GA: Valdosta State University. Retrieved from: http://www.edpsycinteractive.org/papers/socdev.pdf. [Accessed 06.09.2021].

Morrell, R. (2005). Youth, fathers and masculinity in South Africa today. A*genda Special Focus*, 84–87.

Okeke, C.I.O. (2018). Crises impacting South African men's participation in early socio-education development of children and possible useful interventions. *South African Journal of Psychology*, 48(4): 476-487. https://doi.org/10.1177/0081246317729572.

Putnam, R. (2000). *Bowling Alone: The collapse and revival of American community.* New York: Simon and Schuster.

Qi, X. (2018). Social capital. In B. Turner et al. (Eds.), The Wiley-Blackwell encyclopedia of social theory (2125-2127). London: Blackwell.

Ratele, K., Shefer, T., & Clowes, L. (2012). Talking South African fathers: A critical examination of men's construction and experiences of fatherhood and fatherhood and fatherlessness. *South African Journal of Psychology*, 42(4): 553-563.

Richter, L. (2006). The importance of fathering for children. In Richter, L., & Morrell, R. (Eds.), *Baba: Men and fatherhood in South Africa* (pp. 53–69). Cape Town, South Africa: HSRC Press.

Richter, L., Chikovore, J., & Makusha, T. (2010). The status of fatherhood and fathering in South Africa. *Childhood Education,* 86, 360–365.

Roberts, D., Coakley, T.M., Washington, T.G., & Kelley, A. (2014). Fathers' perspectives on supports and barriers that affect their fatherhood role. *SAGE Open:* 1-10. DOI: 10.1177/2158244014521818

Salami, I.A., & Okeke, C.I.O. (2018). Absent fathers' socio-economic status and perceptions of fatherhood as related to developmental challenges faced by children in South Africa. *South African Journal of Childhood Education,* 8(1): 1-16. https://doi.org/10.4102/sajce.V8i1.522

Stop Child Abuse Now (SCAN) (2021). *Social development in children*. Northern Virginia, United States: SCAN of Northern Virginia. Retrieved from: https://www.scanva.org/parent-resource-post/social-development-in-children/ [Accessed 06.09.2021].

Talitwala, E. M. (2005). *Fathers' parenting strategies: Their influence on young people's social relationship* (Unpublished doctoral thesis). University of South Africa, Pretoria.

Thomas, A.T., Liu, H., & Umberson, D. (2017). Family relationships and well-being. *Innovation in Aging*, 1(3): 1–11.

UNICEF. (2015). *Family and parenting support policy and provision in a global context*. Florence, Italy: Author.

van Rensburg, B. A. (2013). *Children in crisis: Imperatives and strategies for the church in South Africa* (Unpublished master's thesis). University of South Africa, Pretoria.

Vygotsky, L.S. (1978). *Mind and society.* Cambridge, MA: MIT Press.

Yoon, S., Bellamy, J.L., Kim, W., & Yoon, B. (2018). Father involvement and behavior problems among preadolescents at risk of maltreatment. *Journal of Child and Family Studies*, 494-504. DOI: 10.1007/s10826-017-0890-6.

SUSTAINABLE RURAL YOUTH DEVELOPMENT THROUGH NON-FORMAL EDUCATION: AN EXPLORATORY STUDY OF TWO NON-FORMAL EDUCATION PROGRAMMES IN LIMPOPO PROVINCE

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Abstract
This exploratory case study was undertaken in the rural Municipality of Thulamela in the Limpopo Province of South Africa. Youth unemployment is high in the area because many of them dropped out of school and lack skills for employment or job creation. Since the past six years the Municipality has opened a number of non-formal education programmes to equip the unemployed youth with practical skills in plumbing, cobbling, sewing, welding and scientific farming. The case study used qualitative research method of interview to explore the value of the non-formal education and training programmes among the youth in the Thulamela Municipality. The researchers purposively selected 12 learners and 4 facilitators from two non-formal education sites to participate in the study because of their in-depth knowledge of the programme. The data which were manually and thematically analysed revealed that non-formal education has the potential to equip the youth with self-employment skills. Based on the findings the study concluded that in order to bolster local economic development to reduce unemployment in the rural communities Municipalities should use non-formal education as an alternative pathway to train the youth in practical skills for job creation.

Keywords: sustainability, youth, non-formal education, skills, employment, empowerment

INTRODUCTION

In the contemporary world of knowledge economy education is the best tool to bring about socio-economic advancement in every country. As Nelson Mandela (1918-2013) affirms, "education is the best weapon which you can use to change the world". This observation is correct in that most of the youths in the rural areas in Limpopo live in poverty because they are less educated and have no job skills. Without knowledge and skills, they cannot create their own jobs or compete with their skilled and knowledgeable peers for better jobs. Zwane (2021) reports Fitch Rating Agency as saying that South Africa's poor education system largely reflected the historical legacies arising from apartheid and the bolstering of quality education in unlikely to be either a rapid or low- cost process. The poor education system inherited from the apartheid regime does not equip school graduates with skills for employment hence the high unemployment among the youth, especially those in the rural areas. The unemployment rate may average 29.9% over the long term forecast period to 2030 due to the problems in the education system and labour market rigidities (Zwane, 2021). Being unemployed and living in poverty might entice many of these young people to engage in crime to survive. The high levels of youth unemployment would continue to post risks to the country's stability and real GDP growth in the long term (Zwane, 2021). Most often some of the unemployed youths also engage in alcohol and drugs thinking these would reduce their stress but instead makes them sick or lose their dignity. In the rural communities under Thulamela Municipality for example, many of the youths dropped out of school few years

back and might think that they are too old to go back to the formal school. As Zwane (2021) intimates the long-term economic growth of South Africa may be hampered by youth unemployment, lack of quality education and outbreaks of political unrest. This therefore makes it crucial for alternative education and training route via non-formal education programmes to empower them with employment skills outside the formal school environment. It is assumed that when the youth acquire relevant job skills in the trades such as plumbing, fitting, sewing, cobbling and welding, they would be able to create their own jobs, earn money and lead better life. The best alternative route to equip those who might not be able to go back to school is to attend non formal education and training programmes to acquire skills for self-employment. Rogers (2004:112) attests that Non-Formal Education could meet the needs of those populations untouched by the formal system, especially rural areas, in a way that formal education could not. Thus Non-Formal Education can be useful to those youths who are outside the formal school system because of socio-economic problems. Two Non-Formal Education settings in the Limpopo Province were deliberately chosen by the researchers for the study which culminated in this paper. The objective of this case study was to explore the value of non-formal education in empowering the unskilled and unemployed youth in the rural municipality of Thulamela in the Limpopo Province with practical skills for job creation.

Theoretical Framework

The study adopted the empowerment and the human capital theories discussed below as its theoretical foundation.

Empowerment is the process of transition from a state of being powerless to a state of being in control over one's life, destiny and environment. It is a transition from a passive condition to a more active condition of control. Empowerment, in the context of this study, is a process by which young people gain control over their lives through acquisition of relevant economic skills for participation in community activities. The major proponents of the empowerment theory; Kieffer (1984) and Zimmerman and Rappaport (1987) agree that the participation in decision-making may improve one's sense of empowerment and that empowered people are likely to be active members in community organisations and activities. Empowerment is a construct that links individual strength, competencies, natural helping systems and proactive behaviour to social policy and change (Rappaport, 1981). The theory links individual well-being with the larger socio-political environment. Both empowerment process and outcomes differ in their outward form because no single standard can fully capture its meaning in all context or population (Zimmerman, 1993). In more practical terms, empowerment involves concerted effort by knowledgeable people or experts to equip some individuals with economic skills to enable them lead independent and better life. The empowering at individual level therefore might include participation in some learning activities in their communities or organizations to acquire some relevant skills they lack and thus make them powerless. Empowerment is seen as a collective effort between an expert and a novice with the aim of strengthening the abilities of the latter as assurance of quality life. Therefore, the major tenet of the empowerment theory is participation with others to acquire skills and knowledge, achieve goals, efforts to gain access to resources and critical understanding of one's social and economic environment. When individuals are empowered with specific economic skills, knowledge and competencies they become asset to the community in which they live and the nation at large. In view of its practical application to adult education and training a number of researchers [including but not limited to] Quan-Baffour (2015) and Mokwena (2018) have adopted the empowerment theory in various adult education teaching and learning activities.

The second theory underpinning this study is Human Capital. The concept, *Human Capital*, is defined as knowledge, skills, and capabilities of a person that have economic value to an organization (Bohlander, Snell & Sherman,.2001). Human capital is therefore the knowledge, skills, competencies and attributes possessed by an individual that facilitate the creation of personal, social and economic well-being. Human capital development is therefore any activity aimed at improving the quality of an employee. It is the knowledge and training undergone by an employee that enhances the individual's capabilities in performing of economic values.

The origin of the human capital theory can be traced back to 1776 in Adam Smith's inquiry into the nature and causes of the wealth of nations. Smith argued that human efforts lie at the root of all wealth: The theory was developed into an educational idea by Gary Becker in (1930) and Schultz (1902-1998). Schultz formalized the human capital theory in 1961 and this brought much enthusiasm for education. The theory assumes that education or training transfers useful knowledge and skills to employees or individuals which in turn enhance their productivity and income (Becker, 1993). Thus the more knowledge and skills individuals possess the more productive they could become. Becker perceives human capital as similar to physical means of production for instance a factory or machine: Thus, if one invests in human capital (via education and training) one's outputs can increase because of the skills and knowledge one has acquired through education and training. Human capital is therefore a means of production, in that the more investment you put in it the more outputs you get in return. The theory portrays that when unskilled people acquire job skills they can be more useful to themselves and even their communities. This implies that education as a capital good can be used to develop the human resources necessary for economic and social development (Olaniyan & Okemakinde, 2008). In the contemporary world education contributes to human capital development and increases or improves the economic capabilities of people (Schultz, 1971). There is therefore a close link between education and economic development. Gu (1981) for example, points out that the integration of education and production was a law of education applying to both capitalist and socialist societies.

Implications of the Theories to the Study

The empowerment and human capital theories are relevant to this study in that they point to the knowledge and training which people must undergo to enhance their individual capabilities in performing duties of economic values. Majority of the youth in South Africa depend on government for grants instead of acquiring skills that can lead them to self-employment and better living conditions. The provision of grant to the unemployed could lead to dependency syndrome where the beneficiaries cannot break away from the cycle of poverty. Rather than making the grant permanent feature of government expenditure, these authors are of the view that the unemployed youth must be empowered through non-formal job-related training activities to enable them utilize the acquired skills for the economic benefits to themselves and the nation at large. Thus non-formal education and training in trades such as textile design, sewing, plumbing, electrician, welding, fitting and cobbling initiated and managed by the government or the municipalities can empower the unemployed youth to break away from the dependency syndrome. Non-formal education and training may also contribute immensely to human capital development for the entire country.

METHOD

A research design is a plan or strategy adopted by a researcher to conduct a research project from the beginning to the end (Crewell, Ebersohn, Eloff, Ferreira et al (2012). This investigation was a case study that explored the value of non-formal education in

empowering rural youth with practical skills to create their own jobs. Case study research is defined by the fact that it is a bounded system but it does not necessarily mean that the investigation is restricted to only one site (Crewell, Ebersohn, Eloff, Ferreira et al. (2012). This was a qualitative phenomenological case study which used interviews to seek the views and experiences of a purposively selected group of people on the value of the phenomenon-*Non-formal education*-within the Thulamela Municipality in Limpopo Province. Polit and Beck (2012) attest that a qualitative phenomenological research seeks to describe the lived experiences and meanings participants give to such experiences. A phenomenological investigation is therefore a process of understanding and reflecting on what participants perceive about life from their own day-to-day experience. Being a study that sought the experiences of a group of people, it was located in the interpretivist paradigm hence the use of interviews.

Population and sample

In the discourse of research population refers to the total number of persons, objects or items from which samples are taken (Lumadi, 2015). The entire population for this study comprised 44 learners and 8 educators at the two non-formal education sites in the Thulamela Municipality in Limpopo Province.

Sampling procedure

Sampling has to do with considering any portion of population as representative of that universe. It is a technical accounting device to rationalize the collection of data and to choose appropriate persons or event from which the actual information will be obtained (Graziano & Raulin, 2000). To obtain the relevant data for the study the researchers purposively selected 12 learners (out of 44) and 4 facilitators (out of 8) to participate in the study. Purposive sampling is where a case is chosen because it illustrates some features of interest to the study (Polit & Beck, (2012) and Silverman (2000). It is a type of sampling that is entirely based on the researcher's judgement to identify a sample from the entire population that is composed of elements most representative of the population. The researchers used purposive sampling to recruit 12 learners and 4 facilitators from the two sites (Makwarela and Donald Fraser) to participate in the study because of their knowledge of the phenomenon under study- *the value of non-formal education-in the Thulamela Municipality.* The researchers requested for the attendance registers of the learning sites and picked any 6 learners and 2 facilitators from each of the centres; making the total participants 16. It was assumed that the participants' involvement in the non-formal education programme could make them provide rich and reliable information needed for the study.

Data Collection

The researchers contacted the regional Adult Education office and requested permission to conduct interviews at two Non-formal education centres at Makwarela and Donald Fraser. Two facilitators and six youths were purposively selected from each of the two centres to participate in the study, making the total participants 16. The researchers chose interviews as the tool for the investigation because interviews allowed the research participants to construct meanings to their personal experiences as unemployed youths studying for employable skills. The approach allowed the researchers to probe participants to get in-depth information from them. It also assisted the researchers to obtain data from multiple sources such as facilitators and learners at the two different sites selected for the study. The multiple sources allowed triangulation of data, thereby enhancing the validity and reliability of the research. The interviews centred on:

- What causes marginalisation among youth in Thulamela Municipality?
- How can the youth get out of the poverty and marginalization?
- What role can Non-formal education play to empower the unemployed youth in Thulamela Municipality?
- Which skills development programmes can empower the unemployed youth in the Municipality to become self-employed?

Trustworthiness

Trustworthiness in a qualitative study relates to how researchers establish that the study findings are credible, transferable, confirmable, and dependable (Pandey & Patnaik, 2014: 5751). It is the level of dependability or reliability of the data gathering instruments, the process followed in gathering the data, the quality of data gathered and their validity (Quan-Baffour, 2012). To ensure trustworthiness in this study the researchers gave the data collecting instruments to a senior academic colleague to evaluate them. All his suggestions were incorporated into the data collections tools before the field work. Again, the researchers kept a journal in which they jotted down whatever they saw and heard from the participants during the interview. Throughout the interviews the researchers asked the participants to repeat all responses which were not audible to them. They wrote down the verbatim statements provided by the respondents to ensure that they obtained the correct information from the participants. Lastly triangulation was achieved by comparing the responses of the learners to those of the educators who participated in the interviews.

Ethical Consideration

Research ethics have to do with whether the behaviour of both the researcher and participants conforms to the professional standards of research such as informed consent and anonymity of participants (Bless, Higson-Smith & Sherman, 2006) and (van Wyk, 2015). In this research project the researchers adhered to important protocols including request for permission, assurance of anonymity and confidentiality of information. They informed the participants that their participation in the study was voluntary, and they could withdraw from it at any time. Again, to keep the participants anonymous the researchers did not ask for the names.

Data Analysis

Data analysis is the process of bringing structure and meaning to the mass of information collected. Subjective information investigation may be a look for general explanations around connections among categories. Higson-Smith and Kagee (2006:163) agree that data analysis could be a handle that permits the analyst to create discoveries and implications from the data at hand. This study aimed at examining meaningful and symbolic content of qualitative data (Creswell et al, 2012) obtained from the selected participants through interviews. Being qualitative research, the analysis followed the tradition of the interpretive paradigm where the researchers interpreted and discussed the data through the use of words participants. The data were analysed manually and thematically through the open coding approach. In doing this, the researchers pruned and divided the information into smaller units and put each unit under a specific theme (Quan-Baffour, 2020). The process assisted the researchers to quickly retrieve and put together all the texts and other data they were associated with (Nieuwenhuis, 2012). They then analysed, interpreted and discussed the data in accordance with each of the themes that had emerged from the raw data. In the discussion of the data, the researchers used cross referencing to indicate how the data from the participants corroborated the existing literature. This effort was to give credence to the fact that qualitative research seeks to

understand the socially-constructed meanings of the problem being investigated (Creswell, 2009:190).

RESULTS AND DISCUSSION

The study explored the value of non-formal education in the lives of the unemployed youth the municipality of Thulamela in the Limpopo province. It therefore aimed at examining the meaningful and symbolic content of qualitative data (Creswell et al, 2012) collected from the purposively selected individuals. The data collection which took place at the two learning sites lasted for two days. The interview sessions were made in such a way that they did not disrupt the participants' academic programmes hence they took place during their free periods. Throughout the interviews the researchers kept diaries in which they made copious notes in addition to the recordings of the proceedings. Through the application of the thematic and interpretive approaches the researchers presented, analysed and discussed the data under the following themes:

Theme 1: Causes of Youth Exclusion

Exclusion occurs where young people do not have the opportunities to participate in socio-economic activities in their communities. The interviews revealed that most youths in the rural areas are excluded for participation in economic activities because they lack knowledge and skills. The youths in Thulamela Municipality are marginalised on account of knowledge and skills as many of them dropped out of school and engaged in some anti-social activities. As one of the educators remarked.

> *Many young people in this area left school early and are now on alcohol and drugs Because of anti-social behaviours and lack of job skills they are poor and excluded from important social and economic activities*.

As the above response indicate alcohol and drugs seem to be the major causes of the youth marginalisation in the Municipality of Thulamela and perhaps other areas in the Province of Limpopo. One of the learner- participants affirmed that;

> *because many youths have excluded themselves from their communities by sticking to alcohol, drugs and violence the communities do not value them. They are often seen as uneducated, violent, drug addicts and trouble makers*.

Five of the interviewees (3 learners and 2 educators) expressed another view regarding the youth marginalisation and exclusion in the municipality. They pointed out that many of the youths remain on the margins of society because there are no opportunities for them to participate in decisions that affect their future or their communities. It can be deduced from the responses above that education as a capital good can be used to develop the human resources necessary for economic and social development (Olaniyan & Okemakinde, 2008). Thus, through NFE and training the youth can be empowered and moved from the margins to the mainstream of society. One of them put it thus:

> "*I fall under the category of exclusion because I was not included in the local agricultural project that is aimed at empowering the community with skills for self-employment. My application was turned down because they said I was always drunk*".

The views expressed above indicate why the youths are generally marginalised. In African communities where young people stick to alcohol and drugs they might not be taken seriously

by the leaders who expect good moral standard from community members. The anti-social behaviours keep them away from engaging in community development projects because the community doubts whether such youths with moral turpitudes can deliver quality work under the influence of alcohol and drugs. The fact that the community doubts the credibility of youth to deliver quality work subjects most of them to exclusion. The unemployed and unskilled youth may get out of the exclusion by engaging in non-formal education and training activities to learn practical skills for job creation. They can be empowered through NFE programme which can serve as a weapon to change their world (Nelson Mandela, 1918-2013). Without skills for employment the youth cannot afford basic needs of life and might remain marginalised and excluded from all socio-economic activities in their area, region and the country at large. The youth should be empowered to make them useful to themselves and their communities because frustrations can drive them to criminal activities. As one participant who claimed to have changed told the researchers:

> *I became a drunkard because of frustration. I couldn't get any job because I have no matric and that made me take alcohol. My parents used to talk to me until I decided to join the non-formal education to learn welding and fence making.*

Thus, through Non-formal Education activities the unemployed youths could be empowered with employable skills for better life. Non-formal adult education actually has the ability to address inequalities and can be used as a tool for social, economic and cultural development (Rogers, 2004). It can be a source of empowerment because it may take the unemployment from poverty and economic exclusion. It is, therefore, imperative for youth who do have hand-on skills to enrol on adult education programmes to obtain skills that they can use to make a living instead of resorting to crime.

There were five other respondents (3 educators and 2 learners) who ascribed the youth marginalisation to the lack of good role models in their families and the communities in general. The participants were of the view that children learn from what they see in their environment as they grow up and as such a community which has many negative role models is likely to influence the young ones negatively. The negative behaviour displayed by the youth does not only ruin their reputation in the community but also puts them on the wrong side of the law. This makes it difficult to be hired in the public and private sectors. The lack of role models may have serious effects on the youth as indicated in the following response from a teenage mother:

> *My exclusion started when I fell pregnant at an early age which eventually led to dropping out of school at a lower grade. This has contributed to the failure to continue with school and inability to take part in community youth projects because I had to take care of the child. I therefore had to look for a job and the job I found was cheap and low paying because I was not educated.*

Raising a child can be difficult for a teenage mother because it requires a person to be financially and mentally fit to cope with the stress of parenting. This is why the youth need good role models in their families and communities to avoid falling into poverty traps.

Theme 2: The Value and Role of NFE Adult Education in Empowering the Marginalised Youth.

The responses from the previous section revealed that lack of knowledge and skills are the key factors in the marginalisation and exclusion of the youth from productive economic activities. This led to the question of the role of NFE in empowering the youth with employable skills. Six learners corroborated in their responses that they enrolled on NFE programes to acquire practical skills such as welding, plumbing, sewing, cooking and scientific gardening for self-employment. The facilitators therefore have the responsibility to create a learning environment where the adult learners may feel accepted, respected and supported in the classroom (Knowles, 1980:47). In a country where job opportunities are scarce the acquisition of practical skills by the unemployed could empower them to become economically and socially independent. The following response from one participant seems to epitomise the views of many learners:

> *With practical job skills I can employ myself instead of going round in search of work which may be in short supply. Some foreign residents in my community do their own jobs for a living. They do not depend on government for jobs and why can't I do the same?*

The responses above indicate the expectations of the participants from NFE programmes. They see the skills acquisition as the way out of powerlessness, marginalisation and poverty. This also indicates how the unemployed can learn from the self-employed in their midst to gain economic power for themselves. Once the youth acquire self-employment skills no one can take such skills away from them and they can always fend for themselves.

NFE adult education institutions must therefore empower youth to get them out of poverty and marginalisation. In emphasing the value of NFE, one of the educator-participants pointed out that: "*it is important to start community projects that are aimed at teaching the youth vocational skills such as sewing and carpentry*". The emphasis here is that skills training can assist the youth to create their own employment since unemployment among youth is very high in the country. Thus NFE and training is a construct that can link individual strength, competencies, natural helping systems and proactive behaviour to social policy and change (Rappaport, 1981). Contrary to the perception among some of the youth that non-formal adult education was designed for old people who could not go to school due to the apartheid system; it is meant to equip every unemployed citizen with relevant skills and knowledge to address socio-economic challenges they might encounter.

The interviews also revealed that in spite of the valuable role of NFE in equipping the unemployed wit practical job skills it is not very much known to the youth in rural areas of Limpopo. The onus is therefore on the learning centres popularise it through the various media platforms including newspapers, radio, television news and seminars. Two of the respondents corroborated in their responses that the ambassadors and advocates of non-formal education should also advertise their programmes on the radio and in newspapers to showcase what they are capable of doing for the unskilled people in the rural communities. Such an effort could increase patronage of NFE programmes among the unemployed youth.

Theme 3: Skills Development Programmes to Empower the Excluded Youth

The participants acknowledged NFE as an important component of skills training programmes for the unemployed youth. Four of the educator-participants corroborated and

three learner-participants agreed in their responses that non-formal education can equip the unemployed youth with technical skills for self-employment. They agreed that practical skills such as plumbing, welding, shoe-making, sewing and carpentry can provide the youth with self-employment. One leaner had this to say:

> *I have been on the programme for only three months, but I am able to weld gates to earn some income. Within the next eight months I can set up my welding shop. In fact as unemployed youth, we need vocational training in welding to weld gates and fences for a living.*

The above responses underscore the value of NFE in empowering the unemployed youth to get them out of economic exclusion. The ability to read and write without backing it with practical job skills can keep the youth marginalised forever hence the need for NFE programmes to acquire employable skills. The acquisition of practical skills can assist the youth to participate fully the local economic development of their respective communities, instead of sitting on the margins and complaining. It must however be noted that the development of human resources through non-formal education and training involves important stakeholders such as the learning centre managers, supervisors, administrators, inspectors, learners and qualified adult education facilitators training for income generating activities (Dunkley, 2008:31). The effective and collaborative efforts from all the key players can lead to the human resources development of the youth.

Five female participants indicated that they were more interested in learning vocational skills such as sewing and hairdressing. They explained that sewing and hairdressing could help them to open sewing businesses and beauty salons to support their families. One of them had this to say:

> *I have realised that a lot of people are interested in fashion and women change their hair styles almost every two weeks, so if I have a hair dressing skill I can operate my own beauty salon in my village.*

The responses affirm the fact that in the contemporary world of knowledge economy skill training is the best way to reduce youth unemployment in a developing country like South Africa. The government alone cannot employ every job seeker hence the need for self-employment creation. It is clear from the responses that young people require hands-on technical vocational skills such as plumbing, hairdressing, sewing, carpentry, brick-laying and welding to address their socio-economic problems and not to wait for handouts in the form of government grants.

The acquisition of job skills would be a source of empowerment and human capital for both the local communities and the country at large. With practical knowledge and skills, the unemployed youth would be able to start their own small and medium enterprises and even employ other members of the respective communities. The success of this however depends on the availability of resources. UNESCO (2005) and Palmer (2007:410) attest that a proper delivery of non-formal education for skills acquisition and employment requires a conducive environment that consists of material resources, human resources and enabling non-formal education and training centre governance. With the acquisition of relevant practical skills, the youth can engage in self-employment activities in the form of entrepreneurship to reduce poverty, marginalisation and exclusion from socio-economic and political activities of their communities. The youth who acquire practical skills might however need financial support to

start their own businesses and this is where the municipalities through the local economic development forum should provide them with the financial support to enable them take off. For example, the NFE participants who show interest in vegetable garden could be assisted to acquire land, seeds and labour to enable them grow vegetables such as onions, tomatoes, melons, potatoes and carrots for the local supermarkets.

CONCLUSION

This study explored the value of non-formal adult education in empowering the youth in the Thulamela Municipality in Limpopo who are mostly marginalized due to lack of employable skills. Interviews were conducted on purposively selected participants on the phenomenon-*Non-formal education*. The findings indicated the important role NFE could play in the lives of the unemployed youth in the rural communities within the Thulamela Municipality in Limpopo province of South Africa. The responses provided by the participants emphasized the socio-economic role of NFE programmes in reducing poverty, unemployment and marginalization of the youth. In the light of the findings the paper concludes that municipalities, especially those in the rural areas, should initiate, establish and fund NFE programmes to capacitate them to equip the unemployed youth with practical skills for job creation. Without a concerted effort to empower the youth they would continue to remain marginalized and excluded from social and economic activities of the communities. They might even undermine the stability of their communities through violent anti-social activities.

Recommendations

In the light of the findings outlined in the previous sections, the study makes the following recommendations for the improvement of Non-formal education programmes in the Thumamela Municipality.

- The municipality, local economic development forum and NFE authorities should team up to ensure that facilities are available to train the out of school youth and the unemployed in practical job skills for self-employment.
- The programmes offered by NFE should be popularised through the various media platforms to attract more youths to study practical job skills.
- The municipality and the local economic development forum should assist the youth who complete NFE training programmes with ‘start ups’ and monitor their activities to ensure sustainability.

Limitations of the Study

The findings of this exploratory study were based on the interviews conducted with 16 participants at only two NFE learning sites in the Thulamela Municipality of Limpopo province. The views of these participants cannot therefore be generalised because of the limited number. Again, the conditions in the above Municipality may differ from others and as such a similar study elsewhere might produce different results. The findings and the conclusions of the study should therefore be interpreted against the above limitations.

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REFERENCES

Becker, G.S (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). Chicago: University of Chicago Press.

Bless, C., Higson-Smith, C. & Kagee, A. (2006). *Fundamentals of social research methods: An African perspective* (4th ed.). Cape Town: Juta

Bohlander, G., Snell, S.A., and Sherman, A. (2001). Managing human resource. (12th edition). South-Western College Publishing, Cincinnati, OH

Creswell, J.W., Ivankova, N.V., & Plano Clark, V.I. (2012). Foundations and Approaches to Mixed Methods Research. In K. Maree (Ed). *First steps in Research (2ed). Pretoria. Van Schaik Publishers Ltd.*

Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage.

Dunkley, G. (2008). *Technology based vocational skills training for marginalized girls and young women.* Bangkok: UNESCO Bangkok.

Graziano, A.M. & Raulin, M.L. (2000). *Research methods: A press of inquiry.* (4th ed.). Boston: Allyn & Bacon.

Gu, S.S. (1981). A chronicle of china's education system [Zhongguo lidai jiaoyu zhidu]. Nanjing China: Jiangsu People's Press.

Kieffer, C. (1984). Citizen empowerment: A development perspective. *Prevention in Human Services*, 3: 9-36.

Knowles, M.S. (1980). *The modern practice of adult education. From pedagogy to andragogy*. (2nd ed.) New York: Cambridge Books.

Lumadi, W. (2015). The Logic of Sampling. In: Chinedu, O & van Wyk, M. (Eds.) *Educational Research; An African Approach*. Cape Town. Oxford University Press; Southern Africa.

Mandela, N. (1918-2013). Former South African President and Statesman.

Mokwena, G. (2018). Vocational Education and Training Programmes for Unemployed Women in Winterveldt, Pretoria. *PhD Thesis*. University of South Africa.

Nieuwenhuis, J. (2012). Qualitative Research Designs and Data Gathering Techniques. In K. Maree (Ed). *First steps in Research (2ed). Pretoria. Van Schaik Publishers Ltd.*

Olaniyan, D. A., & Okemakinde, T. (2008). Human capital theory: Implications for educational development. *European journal of scientific European journal of scientific research*, 24(2), 157-162.

Palmer, R. (2007). Skills for work? From skills development to decent livelihoods in Ghana's rural informal economy: *International Journal of Educational Development,* 27 (4): 397-420

Pandey, S. C., & Patnaik, S. (2014). Establishing reliability and validity in qualitative inquiry: A critical examination. *Jharkhand Journal of Development and Management Studies*, 12(1), 5743-5753.

Polit, F.D & Beck, C.T. (2012). *Resource Manual for Nursing Research: Generating and Assessing Evidence for Nursing Practice*. 9th ed. Philadelphia: Wolters Kluwer Health. Lippincott Williams & Wilkins.

Quan- Baffour, KP. (2020).Cultural Tourism and Socio-Economic Regeneration of Rural Communities: The Apo Festival of Bono Takyiman, Ghana. *Journal of African Identities. https://doi.org/10.1080/14725843.2020.1856644*

Quan-Baffour, KP. (2012). The Liberative Power of Education: Adult Basic Education as Empowerment Tool for Rural Women in Taung. *Journal of Tribe and Tribals 10(2):91-97.*

Quan–Baffour, KP. (2015). Youth Empowerment: A Strategy to Mitigate Vulnerability to Human Trafficking in Ghana. *Participatory Educational Research 2(1), 24-33.*

Rappaport, J. (1981). In praise of paradox: A social policy of empowerment over prevention. *American journal of community Psychology*, 9, 1-25.

Rappaport, J. (1987). Terms of empowerment/exemplars of prevention: Toward a theory for community psychology. *American Journal of Community Psychology, 15*, 121–148.

Rogers, A. (2004). *Non-Formal Education; Flexible Schooling or Participatory Education*? Hong Kong. Kluwer Academic Publishers Ltd

Schultz, T. W. (1971). *Investment in human capital: The role of education and research*. New York: The free Press.

UNESCO. (2005). *Education for all: The quality imperative. Education for all Global Monitoring Report 2005*. Paris: UNESCO.

Van Wyk, M. (2015).Writing for publication: Sharpening your academic writing skills. In Okeke, C & van Wyk M (Eds) *Educational Research; An African Approach*. Cape Town. Oxford University Press Southern Africa.

Zimmerman, M. A. (1993, April). Empowerment theory: Where do we go from here? Paper presented at the annual meeting of the Midwest Psychological Association, Chicago II.

Zimmerman, M. A. (1993). Psychological empowerment: Issues and illustrations. *American Journal of Community Psychology*, *23*, 581–600.

Zimmerman, M.A., & Rappaport, J. (1988). Citizen participation, perceived control and psychological empowerment. *American Journal of Community Psychology,* 16: 725-750.

Zwane, T. (2021). Fitch paints a bleak economic picture. *City Press News Paper 24 October Issue. pp.1-18.*

EFFECT OF ELECTRONIC BOOKS ON CHILDREN'S ACHIEVEMENT IN BASIC SCIENCE: A CASE OF SIMPLE REPEATED MEASURES

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Abstract
Due to technology advancements and expectations in teaching and learning, 21st century classrooms demand a lot from both teachers and students. Most parents nowadays buy their children smart/android phones, tablets, or laptops without realizing the educational benefits of these devices in gaining access to internet learning materials. The use of e-books has become very advantageous to the growing population of learners who have access to the internet - thanks to 21st-century technology—but it is concerning that there is a scarcity of research on such topics in the Nigerian setting. As a result, the impact of electronic books (e-books) on children's academic progress in Basic Science was investigated in this study. This study was carried out utilizing a quantitative research method and a simple repeated measures methodology. The study included 37 class three pupils who were purposively selected from two primary schools in the Nsukka Local Government Education Authority. The data were collected using the Basic Science Achievement Test, which was validated and trial-tested. Mixed methods design repeated measures analysis of variance was used to analyze the data. It was discovered that e-books had a considerable impact on children's Basic Science achievement. As a result, it was suggested that elementary school children be exposed to the use of e-books to improve their academic performance.
Keywords: Academic achievement, Basic Science, children, electronic books, teaching and learning, simple repeated measures

INTRODUCTION

According to recent research findings, students' achievement in basic science is on the decline (Ugwuanyi et al., 2020; Ugwuanyi et al., 2021). This low level of accomplishment has been attributed to teachers' continued use of the traditional mode of instruction (Adonu et al., 2021; Offordile et al., 2021). Despite that we live in the twenty-first century, which is dominated by the usage of modern devices, this condition persists. In the twenty-first century, the era of information and communication technology has brought many changes to the manner of learning in schools. Both teachers and students must use digitally improved teaching and learning methodologies in this century. Teachers now have access to a wealth of educational tools for delivery of teaching in the twenty-first century (Kaminski, 2018). Electronic books (e-books) are one type of resource that allows learners to watch a story come to life through a technologically advanced device.

These kinds of technological materials encourage students to engage in imaginative activities and learn about the world (Kaminski, 2018). The multidisciplinary technology period that marked the twenty-first century has created a plethora of e-books for instructional delivery, among other developments (Korat et al., 2014). The educational value of e-books has been proven through research. Korat et al. (2014) observed that e-books are particularly successful in facilitating the acquisition of word meaning at various levels of schooling, which supports

this claim. In today's society, a majority of children's primary literacy experiences are acquired through the use of iPads, Smartphones/Android phones, and other digital devices (Miller & Warschauer, 2014).

During the Sustained Silent Reading condition, digital texts dramatically enhanced students' reading achievement and motivation compared to traditional or printed texts (Snyder, 2016). From pre- to postintervention, the total emergent literacy skills of children exposed to the use of e-books improved dramatically (Shamir & Korat, 2008). It was discovered that an educational exercise involving an e-book had a substantial impact on children's vocabulary development (Shamir et al., 2018). The use of digital storytelling in the teaching and learning of scientific topics has a substantial impact on pupils (Shemy, 2020). Jones et al. (2011) discovered that using an e-book made children feel more at ease while learning, resulting in significantly higher reading achievement than those who used traditional textbooks.

Based on the foregoing, it is clear that e-books are valuable educational materials, but teachers do not appear to be using them in the classroom. According to the empirical research evaluated, e-books are primarily used to teach reading and vocabulary with only one study using e-books for science instruction. However, none of these research was undertaken in Nigeria, necessitating the current investigation. As a result, these researchers looked into the impact of electronic books on children's academic performance in Basic Science.

Purpose of the study

Specifically, the study sought the effect exposure to e-books has on children's achievement in Basic Science.

Research Question

The following research question was posed for the study:

What is the effect of exposure to e-books on children's achievement in Basic Science?

Hypothesis

The lone hypothesis tested at 5% probability value was formulated for the study

Ho_1: There is no significant effect of exposure to e-books on children's achievement in Basic Science.

METHOD

Research Paradigm, Approach, and Design

The scientific research paradigm was used to conduct this study. This is because the research results were produced from the testing of the hypothesis. As a result, a quantitative research approach was used because the participants' characteristics were quantified and presented objectively. The investigation was led by a basic repeated measures research design based on this technique. This approach is based on numerous measurements of the dependent measure at various test times before and after treatment. Ugwuanyi, Okeke et al. (2020), Ugwuanyi, Ede et al. (2020), Ugwuanyi, Ede et al (2020). Ugwuanyi et al. (2021) conducted similar research.

Participants

The study included 37 class three pupils who were randomly selected from two primary schools in the Nsukka Local Government Education Authority. This sample was taken from two Nsukka Local Government Education Authority primary schools on purpose. Because

the study's treatment was exposure to the usage of e-books, purposive sampling was utilized to ensure that primary schools with computer and internet access were sampled.

Measure

The data were collected using the researchers' basic scientific achievement test (BSAT). The test consisted of 20 multiple choice questions with four options: A, B, C, and D, with only one option being correct. Primary 3 basic science concepts were used to create these products. Each correct answer received two points, resulting in a maximum score of 40 and a minimum score of 0.

Validation and Reliability of the Measure

Before trial testing, the BSAT was adequately content- and face-validated. The inclusion of a Table of Specification guaranteed that BSAT's content was validated. Following this, two physics education experts and one measurement and assessment expert performed face validation. The experts provided helpful feedback on the BSAT, including the language of the items, their appropriateness for the children's ability level, and their relevance to the research purpose, among other things. Following this, the validators' comments were used to make changes to the BSAT.

The modified BSAT was trial-tested on 20 primary three kids who were not part of the study after it was face-validated. To establish the internal consistency dependability of the BSAT items, the data were subjected to Kuder-Richardson’s formula 20 reliability estimate. The reliability test yielded an index of 0.867, suggesting that the instrument was reliable.

Ethical Consideration Statement

The University of Nigeria's committee on research ethics gave its permission for the study. In addition, informed consent forms were given to the participants as well as their teachers prior to the start of the research. The concerned parties filled out and signed these forms correctly.

Experimental Procedure

Two rounds of pre-testing were performed one week apart before the start of the treatment. This allowed the researchers to collect the study's baseline data. This was followed by the treatment sessions. During the teaching of Basic Science principles, the students were exposed to the use of e-books. The topics learned through the usage of e-books include energy sources (light), physical movement, and measures. Pupils were taught these notions by introducing them to several e-books that contained similar concepts. For a total of four weeks, this exposure was repeated. The students were encouraged to ask questions about the subjects they didn't comprehend at each session. The individuals were given the reshuffled BSAT for the first posttest at the conclusion of the treatment. The second posttest was given at a one-week interval after the first posttest. Following this, the various measurement scores before and after therapy were organized and cleaned in preparation for data analysis.

Data Analysis

In order to answer the research question and evaluate the accompanying hypothesis, the data were analyzed using a mixed design repeated measures analysis of variance. The mean was utilized to answer the study question, and the hypothesis was tested at 5% probability levels using simple repeated analysis of variance. The research strategy for the study was summarized in Figure 1.

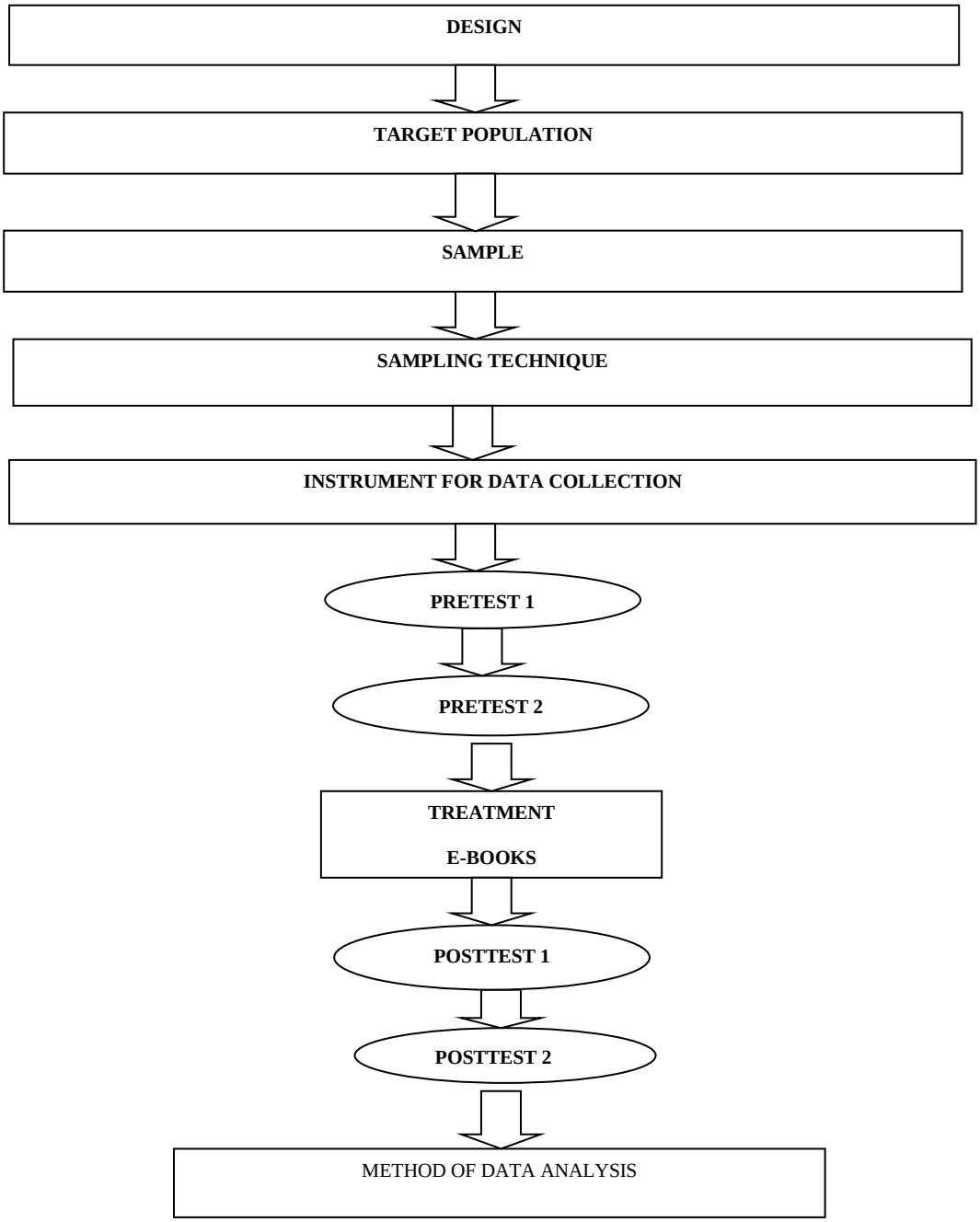

Figure 1. Schematic Representation of the Research Method

RESULTS

Table 1. Mean analysis of the achievement scores of the children at four test occasions before and after exposure to e-books

Test occasion	n	Mean	Std. Deviation
Pretest 1	37	10.16	2.02
Pretest 2	37	10.45	2.38
Posttest 1	37	32.45	6.26
Posttest 2	37	35.16	5.64

Table 1 shows that the children had mean achievement scores of (M = 10.16, SD = 2.02 and M = 10.45, SD = 2.38) at pretests 1 and 2 and had mean achievement scores of (M = 32.45, SD = 6.26 and M = 35.16, SD = 5.64) at posttests 1 and 2.

Table 2. Repeated measures analysis of variance of the difference in the test occasions

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	20570.020	3	6856.673	355.724	.000	.908
	Greenhouse-Geisser	20570.020	2.102	9785.223	355.724	.000	.908
	Huynh-Feldt	20570.020	2.236	9201.413	355.724	.000	.908
	Lower-bound	20570.020	1.000	20570.020	355.724	.000	.908
Error (Time)	Sphericity Assumed	2081.730	108	19.275			
	Greenhouse-Geisser	2081.730	75.677	27.508			
	Huynh-Feldt	2081.730	80.479	25.867			
	Lower-bound	2081.730	36.000	57.826			

Results in Table 2 indicated that e-books significantly improved the achievement of children in Basic Science, F (3, 108) = 355.724, p = .000, η_p^2 = .908. Besides, with the effect size of .908, 90.8% positive variation in the achievement of children in Basic Science is a result of their exposure to e-books. Moreover, Table 3, which has the results of the post hoc pairwise comparison test showed that the mean difference between tests 4 and 1 had the highest contribution to significant difference while the second highest contributor is the mean difference between tests 4 and 2.

Table 3. Post-Hoc pairwise comparison test for the significant difference in the test occasions

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.297	.365	.962	-1.314	.719
	3	-22.297*	1.092	.000	-25.336	-19.258
	4	-25.000*	.966	.000	-27.688	-22.312
2	1	.297	.365	.962	-.719	1.314
	3	-22.000*	1.164	.000	-25.241	-18.759
	4	-24.703*	1.000	.000	-27.486	-21.919
3	1	22.297*	1.092	.000	19.258	25.336
	2	22.000*	1.164	.000	18.759	25.241
	4	-2.703	1.280	.226	-6.265	.860
4	1	25.000*	.966	.000	22.312	27.688
	2	24.703*	1.000	.000	21.919	27.486
	3	2.703	1.280	.226	-.860	6.265

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Sidak.

DISCUSSION OF THE FINDINGS

The purpose of this study was to see how e-books affected children's achievement in Basic Science following four distinct test dates. It was discovered that the children's achievement in Basic Science was low at the start, but greatly improved once they were exposed to e-books. This suggests that the adoption of e-books has a considerable impact on children's Basic Science achievement. The researchers were not surprised by this conclusion because children prefer pictorial materials in gadget form to physical copy. During the trial, it was found that the students were much more engaged and interactive in the learning process than in the traditional manner of teaching. In addition to words and pictures, e-books may have interactive components such as animations, games, recorded narration, music, sound effects, and built-in dictionaries, among other things. When utilized educationally, well-designed e-books can help youngsters develop social, listening, language, and thinking skills. This could have influenced the e-book effect that was seen. These findings are consistent with those of other empirical investigations.

Electronic resources, according to Kaminski (2018), encourage learners to use their creativity and learn about the world. E-books, according to Korat et al. (2014), are particularly helpful in facilitating the acquisition of word meaning at various levels of schooling. Most youngsters acquire first literacy experiences through the use of iPads, Smartphones/Android phones, and other digital devices, according to Miller and Warschauer (2014). It was discovered that an educational exercise involving an e-book had a substantial impact on children's vocabulary development (Shamir et al., 2018). Jones et al. (2011) discovered that using e-books made children feel more at ease while learning, resulting in significantly higher reading achievement than those who used traditional textbooks. During the Sustained Silent Reading condition, digital texts dramatically enhanced students' reading achievement and motivation compared to traditional or printed texts (Snyder, 2016). From pre- to

postintervention, the total emergent literacy skills of children exposed to the usage of e-books improved dramatically (Shamir & Korat, 2008). The use of digital storytelling in the teaching and learning of scientific topics has a substantial impact on pupils (Shemy, 2020).

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it was concluded that the use of e-books was very beneficial in improving children's Basic Science achievement. As a result, the utilization of e-books is critical for children's scientific growth, particularly in this Covid-19 period. As a result, it was suggested that: 1. primary school teachers try to introduce children to the usage of e-books during the teaching and learning of Basic Science. 2. The Local Government Education Authority should make an effort to train instructors in the use of e-books in the classroom.

REFERENCES

Adonu, C. J., Nwagbo, C. R., Ugwuanyi, C. S., & Okeke, C. I. O. (2021). Improving students' achievement and retention in biology using flipped classroom and PowerPoint instructional approaches: implication for physics teaching. *International Journal of Psychosocial Rehabilitation*, *25*(2), 234-247. https://www.psychosocial.com/article/PR320026/37829/

Jones, T., & Brown, B. (2011). Reading engagement: a comparison between e-books and traditional print books in an elementary classroom. *International Journal of Instruction, 4*(2), 5–22. *www.e-iji.net*

Kaminski, B. (2018). Teacher-Led Read Alouds and Electronic Books to Engage Students and Enhance Achievement in the Area of Comprehension. *Culminating Projects in Teacher Development. 29*. https://repository.stcloudstate.edu/ed_etds/29

Korat, O., Levin, I., Atishkin, S., & Turgeman, M. (2014). E-book as facilitator of vocabulary acquisition: Support of adults, dynamic dictionary and static dictionary. *Reading and Writing*, *27*(4), 613–629. https://doi.org/10.1007/s11145-013-9474-z

Miller, E. B., & Warschauer, M. (2014). Young children and e-reading: Research to date and questions for the future. *Learning, Media and Technology*, *39*(3), 283–305. https://doi.org/10.1080/17439884.2013.867868

Offordile, E. E., Umeano, E. C., Adene, F. M., Obi, M. C., Ugwuanyi, C. S., Okeke, C. I. O., Adimora, D.E. (2021). Improving the academic achievement of low achieving secondary school students in physics using peer tutoring learning strategy: Implications for Engineering Career. *International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)*, *11*(3), 201–212. ISSN (P): 2249–6890; ISSN (E): 2249–8001. http://www.tjprc.org/publishpapers/2-67-1618048208-15IJMPERDJUN202115.pdf.

Shamir, A., & Korat, O. (2008). Computers in the Schools Developing an Educational E-Book for Fostering Kindergarten Children ' s Emergent Literacy Developing an Educational E-Book for Fostering Kindergarten Children ' s Emergent Literacy. *Computers in The Schools*, *0569* (November 2011), 37–41. https://doi.org/10.1300/J025v24n01

Shamir, A., Segal-Drori, O., & Goren, I. (2018). Educational electronic book activity supports language retention among children at risk for learning disabilities. *Education and Information Technologies*, *23*(3), 1231–1252. https://doi.org/10.1007/s10639-017-9653-7

Shemy, N. S. (2020). The Impact of Digital Storytelling on Motivation and Achievement in Teaching Scientific Concepts for Pre-School Students. *European Journal of Education*

Studies, *7*(12), 801–820. https://doi.org/10.46827/ejes.v7i12.3627

Snyder, A. B. (2016). *The effect of using electronic books during sustained silent reading on the reading achievement and motivation of first grade students*. Unpublished M.Ed project. Graduate Programs in Education, Goucher College.

Ugwuanyi, C. S., Ede, M. O., Onyishi, C. N., Ossai, O. V., Nwokenna, E. N., Obikwelu, L. C., Ikechukwu-Ilomuanya, A., Amoke, C. V., Okeke, A. O., Ene, C. U., Offordile, E. E., Ozoemena, L. C., & Nweke, M. L. (2020). Effect of cognitive-behavioral therapy with music therapy in reducing physics test anxiety among students as measured by generalized test anxiety scale. *Medicine*, *99*(17), e16406. https://doi.org/10.1097/MD.0000000000016406

Ugwuanyi, C. S., Okeke, C. I. O., & Agboeze, M. U. (2020). Management of Test Anxiety Among Pupils in Basic Science Using Music-Based Cognitive Behavior Therapy Intervention: Implication for Community Development. *Journal of Rational - Emotive and Cognitive - Behavior Therapy*, *0123456789*. https://doi.org/10.1007/s10942-020-00371-2

Ugwuanyi, C.S., Okeke, C.I.O., & Okeke, C.C. (2021). Information and communication technology tool and children's achievement in Basic Science: Implication for Evaluation of Library and Information Resources. *Library Philosophy and Practice (e-journal)*. 6097. https://digitalcommons.unl.edu/libphilprac/6097.

CONSTRAINTS INHIBITING ZIMBABWEAN PARENTS' ACTIVE INVOLVEMENT IN THEIR CHILDREN'S PRESCHOOL EDUCATION IN THE BUBI DISTRICT

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Abstract
Poor paternal participation in parenting children aged 0 to 6 has been demonstrated in considerable studies. Such absence of paternal roles during the early development could adversely affect general development of the children at later years. Given these reasons, this study explored the constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi district of Zimbabwe. The study is based on the principles of interconnectedness within settings and the linkages between settings that affect individual development. The study focused on the immediate, being the microsystems. The interpretive paradigm and the qualitative approach were employed to explore the constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District. Purposive sampling was used to select a small sample of two Heads of schools, four Early Childhood Development teachers and sixteen parents; these were from two schools in the Bubi district of Matabeleland, North Province of Zimbabwe. The results showed that low socio-economic factors, lack of awareness, values and attitude among others are attributed to non-participation of fathers in the development of zero to six aged children. We therefore recommend that there should be provision of statutory instruments that clearly state the role of the parents.
Keywords: Parents' involvement; preschool Children; Education; Childhood Development

Introduction

Children develop in an environmental context of a shared responsibility by the family and society where the family and society have a huge influence on the child's education and development. Children learn from three contexts, which are the school, community and the family (Mathwasa & Okeke, 2016). Theoretically, the systematic relationship between child and parents has been by ecological theoretical framework. The ecological model holds that stakeholders need to ensure that children have needed experiences during development (lwrmarylou, 2005). This translates to the fact that all interested stakeholders in early childhood development programmes need to identify whether the ECD centres are of high quality to allow every child to develop to his/her full potential in order to meet the need of development (lwrmarylou, 2005). Conversely, the ecological systems theory encourages stakeholders to go beyond the ECD learning centres, especially when working with children below six years. The ecological theory calls for ECD programmes to uphold quality, responding to the needs of all young children, thinking about all children's experiences throughout the day.

The ecological systems model is child-centred because it begins with a focus on the proximal development experiences of his or her environment. The ecological systems model observes the child's environment as the "the engines of development". It emphasizes that the quality of

relationships between different settings are critical because they influence the child's development (Chan Lee & Choy, 2009). Literature remarked that in the child's environment, there are cultural values and beliefs that may have a negative impact on growth, development, and early stimulation opportunities (Chan Lee & Choy, 2009). Stakeholders should aim at these environments so that they become compassionate to the needs of ECD children, allowing them to fit in, and become engaging citizens of their society.

Parents involve themselves in parenting by sending their children to early childhood development centres, assist in provision of indoor and outdoor play materials, involve themselves in fund raising activities, advocating for children's issues, initiating and participating in feeding schemes, building and maintain infrastructure, ensuring that children are immunised, provide basic needs (Connor & Wheeler, 2009). The need to involve parents in children's development has been demonstrated but some constraining reasons have also been noted. For example, Mawere, Thomas and Nyaruwata (2015) noted that factors that strain parental involvement in ECD include lack of knowledge of the pedagogical principles and the stages of child development, these deter some parents to establish a partnership with their children's school. Jafarow (2015) revealed that factors affecting parental involvement in education can be divided into various categories, for example, parent related factors, school related and student. Parental involvement can also be affected by several socio-political factors, such as socioeconomic conditions and parents' negative school experience (LaRoeque et al., 2011).

Researchers' experience has shown that parents' involvement in the education and development of children under six years in Bubi District is either minimal or absent. This deviation is due to the fact that the mothers who used to be always available for the traditional practices of child care and development of the children have become 'working mothers', taking up formal employment outside the home. They are losing direct involvement with immediate care, education and supervision of the younger children. Chinhara (2015) indicates that parents play a major role in providing structures and supporting caregivers as well as learning materials for the young learners. Moyo et al. (2012) also chronicle the importance of parental involvement in their study on Factors that Affect the Implementation of Early Childhood Development Programmes in Zimbabwe.

Historically, Zimbabwean ECD is has been described as community-based initiative, meaning that we cannot separate the ECD programmes from the community (Nziramasanga, 1999). Parents are rarely involved in ECD programmes, the major reason being that teachers do not know how to involve the parents (Mawere, Thomas and Nyaruwata, 2015). The rationale of parental involvement in early childhood development of children below six years has been highlighted in a number of studies (Charles 2010; Mishra 2012; Stephinah 2014; Jennings & Bosch 2011; Galindo 2012). In Zimbabwe introduced SI106/2005, administrative circulars 14/2004 and 12/2005 as legal framework to govern the running of the ECD programme. Reynolds and Ou (2011) stated that some schools do not understand the roles of parental involvement in development of children. In the same vein, Mawere, Thomas, and Nyaruwata, (2015) concluded that the major reason for lack of parental involvement is the poor teachers of knowledge regarding contributions of parents in children's development. Contrary to that, Okeke (2014) explains that teachers have the greatest influence on whether parents become welcomed or involved in schools. Therefore, there is a need to explore constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District.

Theoretical Framework

This study was anchored on Coleman's social capital theory, developed in 1988 (Coleman, 1988). Social capital theory has been an indispensible research tool for researchers investigating the relationships within families and their impact on the human capital development of children (Akcomak, 2011; Razmi & Bazzazan, 2012). The social capital of the family suggested that the relationships and norms shape the quality and quantity of social interactions within the family. Coleman places families' centre-stage as a primordial organisation that has its origins in the relationships established by childbirth. He identifies social capital as a resource within the family that inheres in the structure of inter-generational relationships, especially among parents as well as between parents and their children. This notion of social capital was applied by the researchers in the investigation of constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District. As the social capital draws attention to the effects and consequences of human sociability and connectedness and their relations to the individual and social structure. The current researchers, therefore, drew from this important theoretical perspective in order to offer explanations to the constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District.

Objectives

This study is targeted to explore constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District.

Research Question

What are the constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District?

METHOD

Design

This study followed a qualitative research approach with attention on a case study design. Qualitative researchers tend to collect data in the field, at the site where participants experience the issue or problem under study (Creswell, 2014).

Location of the Study

The study area was in the rural community of Bubi District in Matabeleland North Region in Zimbabwe. Once the proposal was approved a comprehensive discourse on the dynamics of the study site and its impacts on parents' experiences with involvement in the education development of children under six years and its implications for childhood education provisioning was undertaken.

Sample

Purposive sampling has been used to come up with a sample because it enables respondents who have particular specific characteristics which are relevant to the topic of the research to be selected on the basis of these characteristics (Creswell, 2014). Babbie (2013) mentions that in purposive sampling the units to be observed are selected on the basis of the researchers' judgement about which ones are most useful or representative. Two schools have been used for this study, a total of twenty-two people were part of the study, that is, two heads, four teachers, two from each school, and sixteen parents, that is, eight from each school. Interviewed families ranged from the nuclear family, divorced, single as well as polygamous families who are facing so many challenges in the education and development of young children.

Table 1. Demographic information of the participants (School Head) in School

School Head	**School A**	**School B**
Gender	Female	Male
Age	55	49
Qualifications	Diploma in Education and Bed Primary	Diploma in Education and Bed Primary
Teaching experience	35 years	18 years
Years as head of school	15 years	8 years
Years in the present school	10 years	5 years
Area that you live in	Local-community	School cottage

Table 2. Demographic information of the participants (Teachers)

School A	**Teacher A**	**Teacher B**
Gender	Female	Female
Age	45 years	50 years
Qualifications	Diploma in ECD	Para-professional
Teaching experience	10 years	8 years
Marital status	Married	Married
No of children	4	7
Area that you live in	Local	Local

Table 3. Demographic information of the parents (participants) in school A

PARENTS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Gender	Female	Female	Male	Male	Female	Female	Female	Female
Age	40	35	30	37	50	60	55	48
Marital status	Married	Single	Married	Married	Widow	Married	Married	Single
No of children	3	1	4	3	5	6	5	2
Breadwinner	No	Yes	Yes	Yes	No	No	No	Yes
No of people in the family	5	6	4	3	7	5	4	5

Table 4. Demographic information of the parents (participants) in school B

Parents	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Gender	Male	Male	Male	Female	Female	Female	Female	Female
Age	47	35	34	45	50	49	46	52
Marital status	Single	Married	Single	Married	Married	Single	Divorced	Married
No of children	2	1	3	2	4	1	4	5
Breadwinner	Yes	Yes	Yes	No	No	Yes	Yes	No
No of people in the family	5	4	5	5	6	7	3	5

Instruments for data collection

This study was conducted through the use of focus group discussion for parents, semi-structured interviews for ECD teachers, and the Head of the schools and document analysis. The researcher opted to use the focus group discussion as one method for this study because it is useful to obtain detailed information about personal and group feelings, perceptions and opinions, they can save time and money compared to individual interviews and they can also provide a broader range of information.

Data collection procedures

Face to face interviews were planned, organized and conducted by the researcher to gather information from the participants. With the interviews, the researcher sought to establish and understand parents' experiences with involvement in the educational development of children below six years of age. An interview guide was prepared and used to keep the interview focused. These interviews involved open ended questions which were intended to elicit stakeholders' views on their experiences about the parental involvement in the development of children. Interviews lasted between 40-60 minutes and were recorded with participants' consent.

Data analysis procedures

Following the recommendations of Creswell (2014), data was organized and prepared by transcribing the information gathered. The researchers then looked at all the transcribed data in an effort to get a general sense of the information and an opportunity to reflect on its overall meaning such as the impression of the overall depth, credibility and use of the information. A general overview of the results of the coding process for all the individual cases were presented. Selected themes were repeatedly read and interpreted precisely with reference to a particular question asked and answered by the participants during the interview. The researchers then create groups or categories allocating similar sentences or words to categories, in order to discover patterns. Such patterns bring out themes that must be supported by groups.

Ethical considerations

Ethical considerations in this study focused on the following principles: confidentiality, informed consent and gaining entry, respecting the right to privacy, voluntary participation, avoiding harm to participants, and anonymity (Sotuku & Duku, 2015). The researchers received ethical clearance from the University of Fort Hare and asked for permission from Matabeleland North Provincial Department of Education to conduct the research.

RESULT

The result showed that socio-economic factors, poor communication between the school and the home, school heads' limited knowledge of the concept, teachers' limited education on parental involvement, parents' limited education on their roles, negative teacher attitude, negative parental attitude, culture, lack of clear government policies on parental involvement, and lack of clear school policy. The results are specifically presented below:

Socio-economic factors

It came out during interviews that most families are very poor, hence, they experience a lot of challenges when it comes to the payment of fees and levies for their children. It was also noted that some of the children stay with their grandparents.

Poor communication between the school and the home

Communication involves designing effective ways in which school reaches home and home to school about school activities and children's learning programmes. From the interview discussions it clearly came out that there was no consistency in communication from the school side, as was cited: **"**when children started learning beginning of the year the teachers used to write small notes if they needed something or wanted us at school, of late they tell us using children." In most cases children forget what they been told by their teachers. "This shows that teachers have no respect for us or they are telling us through the children is not very important".

School heads' limited knowledge of the concept

From the interview discussions of all groups it came out that everyone looked up to the head of the school to be more knowledgeable in all school matters, including parental involvement of teachers. The school head should direct all activities, as indicated, **"**we strongly depend on the advice we get from school heads. Anything concerning the education and development of our children." This explanation given indicates that the school head is expected to have all the necessary knowledge in order to handle school issues properly, including parental involvement.

Teachers' limited education on parental involvement

From the four teachers interviewed, only one had an idea of the concept. However, she clearly indicated that it was difficult for her to introduce parental involvement further than infrastructural development and cooking for the children because she was not sure how the head of the school was going to react to that. The other three teachers agreed that they had limited knowledge of the concept of parental involvement. One teacher was brave to mention that during their training there was no mention of this concept; hence, she assumed that it was the business of the school head, not them as teachers. This means that the teachers also strongly feel that involving parents in the education development of children was the role of the head of school.

Parents' limited education on their roles

From the interview responses it also clearly came out that parents' limited knowledge was a big barrier when it came to how far they should be involved in the education and development of their children, especially at this tender age. It was indicated that "we are supposed to build classrooms and provide learning materials and end there, the rest is the duty of the teacher who is trained and paid for that job". It was also supported this view by saying "if the teacher is not doing her work it is the duty of the head of the school to see to it that it is done because they are both paid to do so." From such responses, it is very clear that parents have limited knowledge on the subject. However, among the parents there was a handful of parents that were willing to do more than they have been doing, provided the school was willing to incorporate them in the learning of their children.

Negative teacher attitude

Teachers' negative attitudes emerged during the research period as a contributing barrier in parental involvement in the education and development of their children below the age of six years. Some teachers looked down upon the parents because they regarded them as uneducated; this was evidenced by the comments they uttered/made. They felt parental involvement should be limited to physical needs only. One expressed "involving parents in schooling activities will distort what we are teaching, considering the level of their education".

Parents also indicated that teachers have an attitude towards them when it comes to classroom activities. One parent expressed that **"***teachers' negative attitude convinced them that they are not welcome into classroom activities." A*s parents, "we *feel we should leave classroom issues to* the *teachers because they are trained yet us as parents we are not.* "Comments from the parents clearly show that there is no good relationship between the teachers and parents who are supposed be the first teachers of their children.

Negative parental attitude

Heads of schools expressed the view that some parents had negative attitude towards school activities. This attitude manifested in a number of ways, according to the heads of schools. The following were some of the ways:

- not attending school meetings;
- consultation day or open day;
- Some to an extent of not putting an effort to pay just something towards the education of their children. When explaining these issues, you could tell that the heads of school were annoyed when parents do not play their part, as expected by the schools.

Narratively, below are some of the extracts from eleven of the twenty participants in the study where work emerged as the main factor inhibiting main from actively participating in the early social development of their children. For instance, most of the time according to my understanding, we work and support and the only job is to provide money, but during these days children like their fathers. Children if they are under age it's too difficult to small it's difficult to handle them. Mothers are one's who have patience with the small children. They listen to their mother (F1). Fathers work most of the time. Some children does not stay with their fathers, some fathers do not worry about their children as long as they support them financially (F4). You see, I cannot tell what happens but most of the time according to our understanding we are the people (fathers) that provides, we work, we support we taught that the only job for us is to provide money and all that stuff to the children, we don't think to parent the children is our job, but during these days let me not lie we do help a lot because the children like their fathers more than their mothers (F5). Well, social and moral issues like it is more acceptable that women take on that role and fathers tend to lose focus, they forget that they also have to play a role in the child's life and also the way we grew up where the mothers take more charge (F6). In most cases fathers are breadwinners and it may be a question of time. I am lucky that I work from 8 to 15h00 while some parents have to leave early, 5h00 and return late at night, so I think it is just a question of time (F7).

Culture

Culture also seemed to be a barrier towards parental involvement in the education and development of children. From the interview discussion it emerged that there are some activities that should only be done by women. One man declared that in the Ndebele culture cooking is for women. Strange enough, the women were also in agreement of that statement and further added by saying that also includes indoor cleaning.

Lack of clear school policy

On school policy, the heads of schools mentioned that for them to craft such policies they should be guided by government policies.

DISCUSSION

Interviewed families ranged from the nuclear family, divorced, single as well as polygamous families who are facing so many challenges in the education and development of young children. It was raised during interview time that most families are very poor; hence, they experience a lot of challenges when it comes to payment of fees for their children. It was also noted that some of the children stay with their grandparents. This implies that some of the parents are failing to meaningfully contribute towards their children's learning. From the parents' views, it appears as if paying fees is the only way they can be involved in their children's education and development under the age of six years. This is confirmed by literature (e.g. Gobena, 2018) that parents with a poor socio-economic background are likely to have low levels of education, very low income and, in most cases, no stable jobs. As a result, their self-esteem is very low.

Communication involves designing effective ways or forms of school based to home and home to school about school activities and children's learning programmes. Form the discussion it clearly came out that there was no consistent line of communication from the school side, as was cited by one parent. When parents do not respond to the teacher's request it would appear they are not interested in their children's education and development, yet, in the true sense, they are not aware of the teacher's expectations.

This barrier in communication can be as a result of so many factors or perceptions. For example, when teachers stopped writing letters it could have been assumed that parents were not able to read those letters due to their low level of education. On the other hand, teachers could have stopped because of their tight schedule or they are demotivated by their working environment. The parents did not have much interaction with teachers because they suspected that teachers look down upon them, hence, whatever they might raise will not be taken seriously. The head of school B admitted that they do not have any policy on how and when to communicate with the parents, while the head from school A mentioned that they only communicate with parents when there is need to do so. This implies that communication between the home and the school seemed to be based on needs rather than an essential element of the child's education and development. The discussion revealed that both parties were frustrated by this discord in communication because almost everything was based on assumptions and perceptions.

At ECD level, communication and personal interviews between parents and teachers are very crucial, hence the need for the school to develop a policy that stipulates the times when parents may visit or have dialogue with the school staff (Hornby & Lafaele, 2011). Such a policy may assist to eradicate negative perceptions and create an environment where the school communicates with parents on regular basis and not only when there are problems to be attended to. This will facilitate a healthy atmosphere for the benefit of the learners in terms of school collaboration and decision making. Also, it could appraise each other about children's performance as well as school activities and vice versa. The heads of the schools and teachers are the key stakeholders in establishing an element of trust and co-operation with parents if meaningful partnership is to be realized.

From the interviews of all groups, it clearly came out that everyone looked up to the head of the school to be more knowledgeable in all school matters, including parental involvement. The school head should direct all activities, as indicated by one parent. Once a school headteacher is expected to be knowledgeable on all the procedures to be employed in order to manage the school more effectively. The teachers mentioned that, even if they know that they

should include parents in the school activities, if the head of the school has no initiative, they are also limited to do anything about it. There is need to educate the school heads on parental involvement through staff development so that the learners, teachers, parents and the entire community can benefit from his/her leadership.

It was noted that among the teachers only one teacher had an idea on parental involvement, however, she lamented that it was very difficult for her to introduce parental involvement further than just building of infrastructure and cooking for the children because she was not sure how the head of the school would react to that. On the other hand, she was not sure if the parents would accept that with open hands. This response seems to indicate that teachers who had just completed their training are aware of this parental involvement because it is now taught at colleges. From the researchers' experience, this is true, considering that the Zimbabwean ECD is community based, hence the need to empower the teachers while on training. According to Zvobgo (1994), through SDCs parents are called upon to bridge the gap between what government could provide and what communities want in their schools. In the same vein, the Minister of Education in September 2011 revealed that government's thrust to provide education for everyone required huge resources, and government has had to rely on parents and communities to play a major role in providing many of the resources that their schools and children need. The teachers were very clear that there is need for staff development for the teachers so that they are instrumental in the involvement of parents in all activities concerning the education and development of children.

From the interview discussion it also clearly came out that parents' limited knowledge was a big barrier when it came to how far they should be involved in the education and development of their children, especially at this tender age (Fitzgerald, 2004). From such responses it is very clear that parents have limited knowledge on the subject. However, among the parents there was a handful of parents that were willing to do more than they have been doing, provided the school was willing to incorporate them. Parents should attend school meetings, participate in the decision making process and support their children's education (Mubanga, 2012). This is also confirmed by Hanni, & Phippen (2010) that most parents felt that parental involvement is very important to them and they would want to see teachers involved, showing or giving them something to do with their children at home.

Teachers' negative attitude was observed during the research period as a contributing barrier in parental involvement in the education and development of their children below the age of six years. Some teachers felt parental involvement should be limited to physical needs only. This translates to the fact that, in this case, parents are not even given any opportunity to say something on the expectations about their children's education, let alone to be asked to help with academic issues.

Parents also indicated that teachers have an attitude towards them when it comes to classroom activities. Another participant concurred by saying "as parents we feel we should leave classroom issues to the teachers because they are trained yet us as parents we are not." This shows that parents have mixed feelings about helping in the school activities. Lemmer & Van Wyk (2004) confirm that the attitudes of schools towards active parental involvement are repeatedly indistinct. Given an opportunity they would definitely assist in the educational development of their children to a larger extent.

Heads of schools expressed that some of them had negative attitude towards school activities. This attitude manifested in a number of ways, such as not attending school meetings,

consultation day or open day, some to an extent of not putting an effort to pay just something towards the education of their children. One head said they do this in confidence because they know that the children will not be returned home because they have not paid anything, this is in line with government policy that children should not be turned away but heads of schools should deal with the parents and leave children to attend lessons.

Culture also seemed to be a barrier towards parental involvement in the education and development of children. It appeared among parents there was a strong feeling that some activities should be done by women not men, for example, never in their culture would a man be seen cooking. In the Ndebele culture one man declared that their culture does not allow them to cook. However, they were also quick to confirm that they can do anything in the school in the interest of their children's education except cooking. Strange enough, women also agreed that cooking and indoor cleaning is women's work and they were willing to do that for their children. From these responses, it is clear that parents need to be educated on their roles in the education and development of their children below the age of six years.

For effective parental involvement in the education and development of children the school heads, teachers as well as parents strongly felt there is a need for the government to craft clear policies on boundaries relating to parental involvement in schools (LaRocque et al, 2011). Fields-Smith (2005) also chronicles that parents respond more frequently in clearly stated demands from the school.

On school policy, the heads of schools mentioned that for them to craft such policies they should be guided by government policies, thus the procedure in government schools, confirmed one head of school.

Conclusion

The present study has peculiar strengths that could be regarded as contributions to knowledge. This study was one of the few qualitative research in Zimbabwe that explored Constraints inhibiting Zimbabwean parents' active involvement in their children's preschool education in the Bubi District which could be seen as a strength. Through its findings, the constraints inhibiting parental involvement were identified. Hopefully, the outcome of the present study (when taken back to the fathers) would help instill in them a desire to become more actively involved in their children's lives. This can be a valuable guide for men to teach their children that they are loved and respected, and it can help ensure that children, especially boys, do not feel the necessity to act out to get their fathers' attention. Involved fathers are likely to be more confident to see their interactions with their children positively. Moreover, this study made an important contribution to existing literature on men's involvement in the early development of their children. Such important contribution to knowledge would continue to enrich the professional development of educators themselves. This is because educators would understand better, various ways to deal with fathers themselves in order to continue to attract their involvement in the early education of their children.

Limitations

Experience has shown that all investigations carried out have weaknesses. The limitation of this study is a small sample that was used of the heads of schools, ECD teachers as well as parents to explore parents' experiences with involvement in the education development of children under six years in the Bubi district of Zimbabwe. Therefore, the present qualitative

findings cannot be generalized to a larger population of heads of schools, ECD teachers and parents.

Recommendations

The research study makes the following recommendations based on the findings;

- For meaningful parental involvement, which is not only biased to physical needs, the Government should provide policies that give clear boundaries on the part of all stakeholders.
- When Government policies are in place, the schools should also provide their school policy guided by the state policy; this will facilitate the smooth involvement of parents.
- Teacher Training Colleges to empower student teachers on parental involvement during their course of training.

REFERENCES

Akcomak, I. S. (2011). Social capital of social researchers. *Review of Economics and Institutions, 2*(2), 1-28.

Babbie, E. R. (2013). *The basics of social research*. USA: Thomson Wadsworth.

Chan, B., Lee, M., & Choy, G. (2009). Competing forces: Government policy, teacher education, and school administration in Hong Kong early childhood education. *International Journal of Child Care and Education Policy, 3*(1), 75-86.

Chinhara, H. (2015). Catering for children with special education needs in the provision of early childhood development programme in Zimbabwe: Towards a holistic and inclusive framework. PHD thesis. University of Fort Hare.

Coleman, J. (1988). Social capital in the creation of human capital. *The American Journal of Sociology, 94,* 94-120.

Connor, J. & Wheeler, H. (2009). Parents early years and learning. *EYE, 10*(9),36-42.

Creswell, J.W. (2014). *Research design, qualitative, quantitative, and mixed methods approaches* (4th Ed). New York: Sage Publications.

Fields-Smith, C. (2005). African American parents before and after Brown. *Journal of Curriculum and Supervision, 20,* 129–135.

Fitzgerald, D. (2004). *Parent partnership in early years.* London: Continuum.

Galindo, C., & Sheldon, S.B. (2012). *School and home connections and children's kindergarten achievement gains: The mediating role of family involvement*. United States: Johns Hopkins University,

Gobena, G. A. (2018). Family Socio-economic Status Effect on Students' Academic Achievement at College of Education and Behavioral Sciences, Haramaya University, Eastern Ethiopia. *Journal of Teacher Education and Educators, 7*(3), 207-222

Hanni, D. M., & Phippen, H. (2010). *Parental involvement in the Classroom.* New Yort, USA: The State University of New York.

Hornby, G. & Lafaele, R. (2011). Barriers to parental involvement in education: an explanatory model. *Educational Review*, 63(1), 37-52.

Jennings, K. & Bosch, C. (2010). *Parent engagement in children's education- Prepared for the family-school and Community Partnerships Bureau*.

LaRocque, M., Kleiman, I. & Darling, S. M. (2011). Parental involvement: the missing link in school achievement', Preventing School Failure: *ALTERNATIVE Education for Children and Youth, 55*(3), 15-122.

Lemmer, E. & Van Wyk, N. (2004). Home-school communication in South African primary schools. *South African Journal of Education, 24*(3), 183-188.

Mathwasa, J., & Okeke, C. (2016a). Barriers educators face in involving fathers in the education of their children in the foundation phase. *Journal of Social Science, 46*(30), 229- 240.

Mawere, V. H., Thomas, K. A., & Nyaruwata, L. T. (2015). An evaluation of Parental Involvement in Early Childhood Development programme*: A case study of Primary schools in Kuwadzana Suburbs in Zimbabwe. Global Journal of Advance Research, 2*(10), 545-1556

Mishra, J. (2012). Parental involvement in early childhood care education: A study. *International Journal of Psychology and Behavioural* Sciences, 2(2) 22-27.

Moyo, J. Wadesango, N. & Kurebwa, M. (2012). Factors that Affect the Implementation of Early Childhood Development Programmes in Zimbabwe. Zimbabwe Open University, Midlands Region, Zimbabwe. Walter Sisulu University, East London, RSA.

Mubanga, D. (2012). Educational policies in post-apartheid South Africa: The National Curriculum and The Social Stratification of Working Class Families. Wits Institutional Repository Environment on Dspace.

Ngwaru, J.M. (2012). Parental involvement in early childhood care and education: Promoting children's sustainable access to early schooling through social-emotional and literacy development. *Southern African Review of Education, 18*(2), 25-40.

Nziramasanga, C.T. (1999). Report of presidential commission of inquiry in education and training – Government Printers. Zimbabwe.

Okeke, C. (2014). Effective home-school partnership: Some strategies to help strengthen parental involvement. *South African Journal of Education 34*(3), 1-9

Potter, D. (2012). Same-sex parent families and children's academic achievement. *Journal of Marriage and Family, 74,* 556-571.

Razmi, M. J., & Bazzazan, S. S. (2012). A review of the effect of social capital on human development in Iran. *International Journal of Economics and Financial Issues, 2*(4): 448-459.

Reynolds, A.J., & Ou, S.R. (2011). Paths of effects from preschool to adult well –being: a confirmatory analysis of the Child-Parent Center program. *Child Development, 82*(2), 555-582.

Sotuku, N., & Duku, S. (2015). Ethics in human sciences research. In C. Okeke & M.M. van Wyk. (Eds.), *Educational research: An African approach (112-130).* Cape Town: Oxford University Press Southern Africa.

Stephinah, S. (2014). Parental Involvement in the Education of African Learners with Intellectual Disabilities. *Mediterranean Journals of Social Sciences, 5*(20), 1629-1635.

Wilson, T. (2015). *Working with parents, careers and families in the early years: The essential guide.* London: Routledge

Zvobgo, (1994). *Transforming education: The Zimbabwean experience.* Harare: College Press Publishers (Pvt) Ltd.

EXPLORING TEACHERS' PERCEPTIONS OF THE IMPACT OF UNEQUAL GENDER REPRESENTATION ON BUSINESS STUDIES TEXTBOOKS ON LEARNERS' LEARNING

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Abstract
Textbooks are essential tools that are used to impart knowledge, skills, attitudes and values to learners. However, gender bias contained in textbooks has been a cause for concern to many. This study explored the perceptions of Business Studies teachers on the impact of gender biased textbooks on learners' learning. The study is underpinned by the feminism theory. A qualitative research method has been adopted for the study. Six Business Studies teachers were purposefully sampled to participate in the study. Individual and focus group interviews were used to collect data from the participants. Thematic analysis was used to analyse data. The study found that teachers have divergent views on the impact of gendered textbooks on learners' learning. Furthermore, the study revealed that some teachers were not aware of gender bias contained in some Business Studies textbooks. Considering the above findings, it was recommended that teachers be encouraged to consider gender related issues when selecting Business Studies textbooks.
Keywords: Textbooks, Business Studies, Perceptions, Teachers

INTRODUCTION

Textbooks are considered as an important teaching aid to impart knowledge, skills, attitudes, and values to learners. Teachers rely heavily on textbooks as the main source of information for content to be taught (Ngwenya & Mbili, 2020) which suggests that textbooks play a major role in lesson preparation, curriculum implementation and assessment. The minister of Department of Basic Education in South Africa also emphasized the critical role of textbooks in schools as a dominant resource to maintain the implementation of the Curriculum and Assessment Policy Statement (CAPS) (DBE, 2011b). In this case, textbooks not only become a framework for a teacher in achieving the aims and objectives of the teaching and learning process but serve as a guide in conducting the lesson.

Despite the critical role played by textbooks in the process of teaching and learning, there is a serious concern regarding gender representation in textbooks. Unequal gender representation in textbooks is a global issue that remains unaddressed. Ariyanto (2018) conducted a study in Indonesia where it was found that textbooks used to teach English as a Foreign Language (EFL) contain stereotyped gender differences. Also, in Mexico, Aguilar (2021) conducted a study that investigated gender representation in EFL textbooks that are used in basic education. The study revealed that male characters were depicted more than female characters. Similarly, studies that were conducted in Africa unearthed that underrepresentation of women in textbooks is still rife (Mengistie & Worku, 2020; Nene, 2014,).

Business Studies textbooks used in South African schools are not exempt from gender inequality. Studies reveal that gender inequality in Business Studies textbooks is prevalent. The study by Pillay (2013) found that Business Studies textbooks depicted more male images compared to females. The study that was conducted by Pillay and Maistry (2017) found that

in case studies, Business Studies textbooks foregrounded more masculine narratives of success in the business sector compared to those of women. Furthermore, Gcabashe (2020) conducted a study where six Business Studies textbooks were analysed. The study examined the language used, images depicted, and gender roles contained in Business Studies textbooks. The study revealed that some textbooks that were analysed contain gender-biased language, gendered images and gendered assignment of roles. As a response to this, it is necessary to explore the perceptions of Business Studies teachers on the impact of gender biased textbooks on learners' learning.

PROBLEM STATEMENT

In South Africa, studies indicate that gender inequality is still prevalent in textbooks that are used in schools (Nene, 2014; Pillay & Maistry, 2014; Pillay & Maistry, 2017; Sibanda & Sibanda, 2016). Textbooks directly or indirectly affect the child's upbringing by transmitting models of social behaviour, norms and values which are considered as acceptable and appropriate (United Nations Educational, Scientific and Cultural Organisation, 2009). Teachers' voices have been missing in this issue of gender inequality in textbooks that are used in schools. Teachers' voices as the primary users of textbooks should be considered. Therefore, it was deemed necessary to conduct this study in order to investigate Business Studies teachers' perceptions on the issue of gender inequality in textbooks and its impact on learners' learning.

Research Objectives

- To examine whether Business Studies teachers recognise gender bias contained in some Business Studies textbooks.
- To elicit the perceptions of Business Studies teachers on the impact of gendered textbooks on learners' learning.

Literature Review

To highlight Business Studies teachers' perceptions on the impact of gendered textbooks, the existing literature on gender bias in school textbooks was reviewed. Furthermore, literature on preceding studies of teachers' perceptions of gender biased textbooks is provide in the following sections.

Gender bias in school textbooks

Existing studies reveal that gender bias can manifest in textbooks in different ways. Firstly, gender bias can manifest through female omission or underrepresentation, textually and/or visually (Lee & Mahmoudi-Gahrouei, 2020). According to a study conducted by Zakka and Zanzali (2015), more male characters compared to female characters were depicted in the mathematics textbooks that are used in primary schools in Nigeria. Also, the study conducted in Kenya by Mburu and Nyoga (2012) found that females were underrepresented in textbooks that are used in primary schools. Underrepresentation of females in textbooks may suggest that women are less important than their male counterparts (Lee & Chin, 2019). The absence of female models in textbooks may hurt self-image, aspirations and motivation of girls who are reading and internalising the textbooks (Mburu & Nyoga, 2012).

Furthermore, gender bias in textbooks can manifest through stereotyping, with females being portrayed as more fragile and engaging in household activities, and males as more active and engaging in more physically demanding work (Ariyanto, 2018). Maistry and Pillay (2017) conducted a study to understand how gender is represented in Business Studies textbooks used in South African schools and found that women are depicted as destitute while their

male counterparts were portrayed as confident and educated. Similarly, the study conducted by Foulds (2013) revealed that textbooks depicted females engaged in household activities such as cooking.

Impact of gendered textbooks on learners

Based on the literature reviewed so far, it is clear that gender bias in textbooks is still rife and can further exacerbate gender inequality among learners. This is because textbooks significantly affect learners' development of knowledge as well as their perceptions of themselves and others (Lee & Chin, 2019). This suggests that learners who are less represented in the textbook may see themselves as less important compared to the gender that is more represented. In other words, gender bias contained in textbooks can affect learners' learning. Lee and Collins (2010) state that gender bias contained in textbooks may have insidious effects on students who generally attach great credibility and authority to educational materials. There is a possibility that many learners in South African schools are affected by gender bias contained in school textbooks, Business Studies textbooks in particular. Learners spend most of their learning time using textbooks, and they are likely to consider textbooks as infallible and internalise the contents of the textbook.

To deal with gender bias contained in textbooks, teachers can play a major role in eliminating its effects on learners' learning. Studies looking at teachers' role in gender issues in educational materials have been conducted. Gul, Khan, Mughal, & Rehman, (2012) revealed that teachers do play a role in exacerbating gender inequality in their classrooms. They highlighted that teachers hold certain perceptions of gender roles, which lead to them assigning certain roles to males and females. Consequently, some teachers who come from a stereotypical society, may contribute to their perceptions regarding gender roles.

However, teachers should refrain from exacerbating gender inequalities. Rather, they should mitigate the impact of gendered textbooks on learners. Mahmood and Kauser (2019) are of the view that teachers can use their experiences of teaching to easily and appropriately identify areas of underrepresentation and accordingly offer strategies to address gender bias in textbooks. This suggests that teachers should be actively engaged in addressing gender bias inside and outside their classrooms. Learners perceive teachers as their role models, as a result their perceptions towards gender-related issues in textbooks can play a major role in shaping learners' outlook in relation to gender.

Teachers' perceptions of gendered school textbooks

There is a paucity of studies that investigate the perceptions of teachers on gender bias in textbooks contained in Business Studies textbooks that are used in South African schools. Studies that have been conducted mainly focus on analysing gender representation in textbooks. Pillay (2013) conducted a study that analysed gender inequality in Business Studies textbooks, and found that more males were represented in textbooks compared to females. Also, Gcabashe (2020) conducted a study that investigated gender representation on Business Studies textbooks. The study revealed that Business Studies textbooks depicted more male characters and found that women were depicted engaged in household activities, compared to their male counterparts that were depicted engaged in professional jobs.

Existing studies that focus on teachers' perceptions of gender bias contained in textbooks have been conducted in Asia. Mahmood, & Kausar, (2019) conducted a study that investigated perceptions of female teachers on gender bias contained in English textbooks in Pakistan. A mixed-method approach was employed in the study and data was collected using

questionnaires and interviews. The study revealed that participants agreed that the language used in textbooks favours the male gender, however they did not agree that learners are influenced by gender-biased texts.

In Turkey, Kizilaslan (2010) conducted a study that examined perceptions of student teachers on gendered texts contained in English textbooks. Sixty-eight student teachers were sampled for the study. A survey was used to collect data from the participants. The study found that most of the student teachers did not feel comfortable with having a class discussion on portrayal of males and females on school textbooks as they felt that the issue was controversial and divisive. Based on this finding, Kizilaslan (2010) recommended that student teachers should consider these thorny issues and decide upon the strategies for eliminating gender bias in school textbooks.

Concerning teachers' perception on gender bias in Business Studies textbooks, there are very few studies, if any, that have been conducted in the South African context. Hence the current study investigates the perceptions of teachers on gender bias contained in Business Studies textbooks that are used in South African schools.

THEORETICAL FRAMEWORK

The study adopted Feminist Theory. Feminism is based on the belief that women in society are subordinated, oppressed, disadvantaged, and treated unequally in comparison to men (Chiponda & Wassermann, 2015). Studies have indicated that the unequal treatment of women is not limited to a societal level but is also entrenched in school textbooks (Pillay & Maistry, 2017). The unequal gender representation both in school and the society exposes learners to unequal gender balance in both in the society and within the classroom through textbooks that are gender biased. Feminist theory holds the view that the condition of women is socially constructed, and therefore it can be changed (Hennam, 2007). Since the way in which women are perceived in society can be changed, it is clear that teachers can shape learners' outlook in relation to gender issues. The key to this is teachers' perceptions of gender related issues and their willingness to address these with their learners.

Teachers who hold a view that gender bias should be addressed, would be in a better position to create a conducive environment in their classrooms. Feminists believe that the oppression and subordination of women should end and social justice should prevail (Chiponda & Wassermann, 2015). Teachers who are aware of gender inequality contained in textbooks will be able to scrutinise and select textbooks that are sensitive to gender balance. Also, teachers who are aware of gender issues, will be able to create strategies that will mitigate the impact of gendered texts that might influence the underrepresented gender. Ritzer and Douglas (2004) state that feminism theory is concerned with identifying efficient strategies to improve the social world and to make a more just place for women.

METHOD

A qualitative research approach was considered suitable for this study as it explores the perceptions of teachers on gendered school textbooks that are used to teach Business Studies in South African schools. The adoption of a qualitative research approach in this study assisted the researcher in gaining in-depth views of Business Studies teachers. Interpretive paradigm was adopted since the study explored the experiences of the participants through soliciting their perceptions towards the phenomenon under investigation. Phenomenological research design was employed, and it assisted the researcher to study the phenomenon in its natural setting. Purposive sampling was used to select a sample of six Business Studies

teachers from six secondary schools situated in Mkhanyakude district that were also selected purposefully. The sample consisted of two commerce Departmental Heads and four post-level one Business Studies teachers. Semi-structured interviews were used to collect data from the Departmental Heads while focus group interviews were used to collect data from post-level one Business Studies teachers. Data generated through semi- structured individual interviews and through focus group interviews were analysed thematically.

FINDINGS

The main aim of the study was to explore the perceptions of teachers on unequal gender representation contained in Business Studies textbooks that are used in South African schools. During the process of analysing data gained from individual semi-structured interviews and focus group interviews, themes were developed. Three themes emerged during data analysis, which are as follows: perceived impact of gendered language on learners' learning, perceived impact of gendered images on learners' learning and perceived impact of gender roles on learners' learning. In the presentation of the findings, verbatim quotes are given to ensure that the perceptions of teachers are not lost.

Perceived impact of gendered language on learners' learning

Teachers reflected on how the prevalence of the use of pronouns such 'he' and 'she' on some Business Studies textbooks impacts learners of different genders on their learning. Teachers expressed divergent views on this. One view is that learners who are underrepresented may unconsciously learn that they are not meant to explore business leadership roles, while the other view is that learners may not be aware of gendered language contained in textbooks. One of the participants is of the view that learners, whose gender is more represented through pronouns, may subtly receive the message that they are superior and more important than their counterparts. HOD 2 stated the following:

> *Most of the textbooks come with male gender, every time they use "he" and that means male gender is most dominated than female gender and that makes female gender to be discriminates and they feel that they are not taken seriously in the society and they feel that they are rejected and they are not given enough power to show up that they can do things that male can do.*

HOD 1, on the other hand, expressed a view that both teachers and learners do not pay attention to the gendered language in the textbooks; hence she believes that it cannot impact learners in anyway. She stated:

> *The issue of language in textbooks, I don't think learners even notice that because even teachers if we can be realistic, don't notice that certain gender is being represented more times than the other one so I don't think that affect learners' mind-set.*

Similar to the HODs, teachers presented opposing views on the issue of the impact of gendered language on learners' learning. Some teachers expressed the view that the gender that is less represented in Business Studies textbooks through pronouns may be negatively affected while other teachers are of the view that gender representation in textbooks does not matter. For instance, Teacher 1 stated:

> *I know that it does has an impact. I will just give you a simple scenario when doing a case study in Business Studies only to find that there are two businesses looking for Porters' Five Forces model. There is Mr Manzini a male and Mrs Mathenjwa a female. Mr Manzini owns a business with old equipment, less skilled staff, and not paying good salaries and on the other hand, there is a new business owned by Mrs Mathenjwa, using modern equipment, pays good salaries and having trained employees. Automatically, learners in the classroom become*

> *divided. Males won't feel happy because they are represented by Mr Manzini who is not doing well while females, on the other hand, will be supporting Mrs Mathenjwa and they will feel motivated and they will participate in the lesson which results in them doing well*.

The anecdotal statement by Teacher 1 implies that teachers encounter such cases on a daily basis, where learners become divided because of the gendered language contained in textbooks. The division among learners' signals that portraying a certain gender in the inferior position through language use affects learners' participation during the lesson.
On the other hand, Teacher 4 is of the view that gender-biased texts used in the textbooks do not affect learners. He stated:

> *I don't think that exactly affect learners that are less represented, because I think what is important is the message that is contained by the case study. If the message that is learnt by the learners from the case study is understandable to both genders, I think it's not going to have a proble*m.

The statement by Teacher 4 implies that learners are gender blind, and they cannot be affected by gendered language contained in textbooks. The finding of this nature gives the impression that teachers think that learners are unaware of gendered languages contained in Business Studies textbooks. If teachers think that learners are gender blind, this may lead to teachers not taking initiatives to address gender bias contained in textbooks.

Perceived impact of gendered images on learners' learning

Participants echoed that most of the images contained in some Business Studies textbooks are male dominant, and to a certain extent, gendered images negatively affect female learners. They also echoed that male-gendered textbooks may result in female learners feeling less important than their male counterparts. For instance, HOD 2 stated:

> *Most of the pictures are gendered, and most of the pictures are male- dominant so it becomes a problem when teaching in class because female learners feel that they are not important than male learners*.

In the previous extract, HOD 2 confirms that in her view, some Business Studies textbooks contain mostly male gendered images which can be destructive to female learners. Although images are meant to enhance the content in textbooks, it appears that they may result in the discouragement of female learners.

Teachers also believe that less portrayal of images of a certain gender affect the underrepresented gender. Teacher 4 highlighted:

> *Less represented gender is affected. As you know, females have been long marginalised. I maybe, most of the textbooks consider males than females, I think it going to have a negative impact because men are going to do better when it comes to answering questions. Or an example, in our societies where we grew businesses were started by men*.

The view expressed by Teacher 4 indicates that some textbooks still portray a version of an unequal society where males are depicted playing influential roles in the society and in business while females are playing menial roles. In the past, males used to be in the centre of economic activities, and most of the textbooks used to depict males owning businesses. This finding also suggests that some textbooks still hold the narrative that only male business owners are acceptable, which may make female learners feel excluded.

Perceived impact of gender roles on learners' learning

HODs and teachers' reflections during interviews also indicated that inequality in textbooks is not limited to the use of language and images, but also the assignment of roles. They indicated that gender roles depicted in some Business Studies textbooks can have a lasting impact on learners, and can affect their future aspirations. However, participants acknowledged that the Business Studies curriculum does teach learners about gender equality, and as a result, some learners might not be affected by gender roles contained in textbooks.

HOD 1 stated that:

> *With regard to gender being repeated in the textbooks, it can influence the mind-set of the learner like if you find that in the textbook males are holding superior positions, yes it can affect the mind-set of the learner, but since there have been Acts with regards to empowering women for an example BBEE, Employment Equity Act and Skills Development Act, learners are taught on the leadership positions, leadership roles that women are now empowered, it was before during apartheid era where leadership roles were held by males only.*

She also stated that:

> *In my community and in my society where I live and in this school where I am teaching, women are holding leadership positions like the principal of this school is the female and the SMT is more dominated by female HODs so this thing of gender representation, I don't think it affects learners so much*.

Other Business Studies teachers consider that gender roles set limitations for both male and female learners. For example, Teacher 1 stated:

> *If textbooks show men in leadership positions in the society, this will mean people who deserve to be in leadership are males. This means female learners won't give a maximum participation because they will think that they are not capable of holding leadership positions*.

This statement suggests that assigning roles according to gender sets limits for learners. Learners end up believing that there are tasks that are reserved for a certain gender. Teacher 1 gives a practical scenario where female learners allow male learners to lead them, and they remain subordinates. He stated:

> *Let me make a simple scenario where in the classroom you need a class representative, then learners will nominate males because from what they are seeing in textbooks, only males are in leadership positions then they will go for a male.*

The comment by Teacher 1 suggests that female learners are affected by gendered roles contained in textbooks which make them believe that leadership positions are for males and then females submit to males. Such findings have a potential of prolonging the inequality that is in existence in some societies.

DISCUSSIONS AND RECOMMENDATIONS

The study found that teachers have opposing views on the impact of gendered language on learners' learning. Some teachers are of the view that gendered language negatively affects learners, while others believe that learners are not aware of this and are not affected. This find corroborate with the findings of the study that was conducted by Mahmood and Kausar, (2019) that found that teachers agreed that textbooks used in schools favours male gender; however, they did not agree that learner are influenced by gender-biased texts.

Findings revealed that teachers believed that most of the images contained in some Business Studies textbooks are male dominant, and to a certain extent, they negatively affect female learners. This finding coincides with the findings of the study that was conducted by Aguilar (2021) that revealed that EFL textbooks depicted more male characters than female characters.

Within the context of this study, which is Mkhanyakude District in KwaZulu-Natal, it might happen that teachers still use textbooks that contain images that are gender biased. The use of gender-biased Business Studies textbooks can worsen gender disparity that still exists in some rural areas where males are regarded as superior compared to females. However, the fact that some teachers notice the negative impact that gendered images have on learners creates hope that teachers will make strides to select textbooks with images that are gender inclusive.

The study also revealed that Business Studies teachers believe that gender roles contained in some Business Studies textbooks may have a negative impact on learners. This finding coincides with the findings of the study that was conducted by Karima (2017) that revealed that textbooks assign domestic activities to females while males are assigned highly ranked positions in society.

CONCLUSION

This article sought to explore Business Studies teachers' perceptions of the impact of some gendered textbooks on learners' learning. Teachers indicated that there are some Business Studies textbooks that still contain gendered language, gendered images and gendered roles. The views expressed by teachers indicated that some teachers do not take issue of gender into consideration when selecting textbooks, and as a result, they believe that gendered texts contained in textbooks do not affect learners. Teachers' views converged on the issue of gender roles, and they all indicated that gender roles contained in some Business Studies textbooks affect female learners and may set limitations for them. However, teachers did not indicate actions they have taken to mitigate the impact that gender biased textbooks might have on learners' learning.

From the research findings, it may be noted that there is potential for further research, especially a study in which learners can be sampled as participants to elicit their perceptions of the impact of gendered textbooks in their learning. Also, a quantitative study will be needed where many Business Studies teachers can be sampled so that the findings can be generalizable.

The recommendations offered to the authors of Business Studies textbooks are that they should ensure gender equality when writing textbooks. The Department of Basic Education should encourage the textbook authors to be considerate regarding gender issues in learning materials. Teachers should be made aware of the importance of gender issues in education and be able to consider gender balance when selecting textbooks. Teachers should be encouraged to use their teaching experiences and knowledge to mitigate the impact that gendered textbooks might have on learners.

REFERENCES

Aguilar, J.S. (2021). Gender representation in EFL textbooks in Basic Education in Mexico. *MEXTESOL Journal, 45*(1), 1-9.

Ariyanto, S. (2018). A portrait of gender bias in the prescribed Indonesian ELT textbook for junior high school students. *Sexuality & Culture, 22* (4), 1054-1076.

Chiponda, A. & Wassermann, J. (2015). An analysis of the visual portrayal of women in History textbooks in Malawian secondary schools. *Yesterday and Today, 14*, 208-237.

Foulds, K. (2013). The continua of identity postcolonial curricula: Kenyan students' perceptions of gender in school textbooks. *International Journal of Educational Development, 33,* 165-174.

Gcabashe, N.B. (2020). *Exploring gender representation in Business Studies textbooks and its impact on the achievement of learning outcomes in Further Education and Training Phase in Mkhanyakude District*. (Masters Dissertation). University of Zululand.

Gul, A., Khan, M.B., Mughal, S. & Rehman, S.U. (2012). Gender stereotypes and teachers' perceptions (The case of Pakistan). *Information and Knowledge Management, 2*(7), 17-28.

Hannam, J. (2007). *Feminism.* London: Pearson.

In the References section, resources that are highlighted in yellow were not found in the text itself. If you did not use them, they need to be omitted. Otherwise, it is reference padding.

Karima, M. (2017). Towards a zero tolerance on gender bias in the Moroccan EFL textbooks. *Arab World English Journal, 8*(3), 338-355.

Kizilaslan, I. (2010). Student teachers' perceptions of gendered texts in English language textbooks. *Procedia Social Sciences and Behavioural Sciences, 2*, 3228-353.

Lee, J.K.F. & Chin, A.C.O. (2019). Are females and males equitably represented? – A study of early readers. *Linguistics and Education, 49*, 52-61.

Lee, J.K.F. & Collins, P. (2010). Construction of gender: A comparison of Australian and Hong Kong English language textbooks. *Journal of Gender Studies, 29*(2), 121-137.

Lee, J.K.F. & Mahmoudi-Gahrouei (2020). Gender representation in instructional materials: A study of Iranian English language textbooks and teachers' voices. *Sexuality & Culture (2020), 24*, 1107-1127.

Mahmood, T. & Kausar, G. (2019). Female teachers 'perceptions of gender bias in Pakistani English textbooks. *Asian Women,35*(4),109-126. Retrieved from https://doi.org/10.14431/qw.2019.12.35.4.109

Mburu, D.N.P. & Nyoaga, G. (2012). Effects of gender role portrayal in textbooks in Kenyan primary schools on pupils' academic aspirations. *Problems of Education in the 21st century, 47*, 100-109.

Mengistie, S.M. & Worku, M.Y. (2020). Gender representation in educational materials: A focus of Ethiopian English textbooks. In W. Leal Filho (Ed.), *Gender Inequality, Encyclopaedia of the UN Sustainable Development Goals*. Retrieved from https://doi.prg/10.1007/978-3-319-70060-1_137-1

Mutekwe, E. & Modiba, M. (2012). An evaluation of gender sensitive nature of selected textbooks in Zimbabewan secondary schools. *Anthropologist, 14*(4), 365-367.

Nene, N.P. (2014). *An analysis of the visual images of women in Grade 12 South African History textbooks* (Masters dissertation). University of Kwa-Zulu Natal.

Ngwenya, J.C. & Mbili, S.H. (2020). Exploring Accounting teachers' views on the quality of Accounting prescribed textbooks in South Africa. *International Journal of Learning, Teaching and Educational Research, 19*(6), 353-369.

Pillay, P. & Maistry, T. (2014). Gender representation in contemporary Grade 10 Business Studies textbooks. *Perspectives in Education, 32*(4), 1-9.

Pillay, P. & Miastry, T. (2017). The 'firstness' of males as automatic ordering: Gendered discourse in Southern African Business Studies school textbooks. *The Journal of*

Transdisciplinary Research in Southern African, 14(2), 484. Received from https://doi.org/10.4102/td.v14i2.484

Pillay, P. (2013). *Gender representation in contemporary Grade 10 Business Studies textbooks*. (Masters dissertation). University of Kwa-Zulu Natal.

Republic of South Africa, Department of Education, 2011b. *Business Studies, Curriculum and Assessment Policy Statement Further Education and Training Phase, Grades 10-12*. Pretoria: Government Printers.

Ritzer, G. & Douglas, J.G. (2004*). Sociological Theory*. 6th Edition. Mc Graw Hill.

Sibanda, L. & Sibanda, S. (2016). Linguistic gender sensitivity strategies in the current South African intermediate phase English workbooks: feminisation and degenderisation. *Africa Educational Review, 13*(3), 104-118.

UNESCO. (2009). *Report by the Director of Education on the UNESCO World Conference on Education for Sustainable Development and the Bonn Declaration*. UNESCO, Paris.

Zakka, Z. M. & Zanzali, N. B. A. Z. (2015). Gender bias in primary school mathematics textbooks in Nigeria. *American Journal of Educational Science, 1*(5), 223-228.

ENGLISH TEACHING AND LEARNING FOR PROGRESSED LEARNERS IN THE TIMES OF COVID-19: A BRICOLAGE APPROACH

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Abstract
This paper explores the challenges faced by progressed learners in relation to English first additional language (ENGFAL) in Grade 12. Guided by the bricolage theory, the study employed participatory action research to find solutions for the underperformance of progressed learners in ENGFAL in Grade 12. Participants were purposively selected to participate in the study, and WhatsApp groups were created for participants to respond to the research questions. Responses were analysed using a thematic approach. The results show that a lack of parental support, the absence of a reading culture, and poor execution of the progression policy are contributors to poor performance in ENGFAL. In light of these findings, we argue that bricolage thinking has the impetus to transform the situation of progressed learners, by the implementation of local resources, such as group work, and inculcating a reading culture at an early age.
Keywords: Bricolage theory, English first additional language, Progressed Learners.

INTRODUCTION

Despite various intercessions to advance the teaching and learning of English as a second language, many progressed learners in rural South Africa still underperform in this subject. Although the Department of Basic Education (DBE) has, over the years, announced improvements in performance results for matric exams, the performance of progressed learners in English first additional language (ENGFAL) remains a problem. The progression policy was proposed by the DBE in 2012, and it was implemented in schools from Grades R to 12 in 2013 (DBE, 2013). The DBE implemented the progression policy to reduce learner dropout and to allow learners to advance with their age cohorts (Republic of South Africa, 2012). Although the progression policy was introduced with the aim to curb the high dropout rates of learners and increase the matric completion rate, Ngoepe (2016) reports that a significant proportion of progressed learners still struggle academically, then, end up failing matric. This is evident in the National Senior Certificate (NSC) results of 2016, when 108 742 progressed learners were admitted to the exam, which only 67 510 wrote, and progressed learners achieved a pass rate of 27% (DBE, 2017). The results show that the measures implemented to support progressed learners have a limited effect, and that further support and strategies are needed to improve the performance of these learners. In her presentation about the 2019 NSC results, the minister of Basic Education stated that the DBE seeks to assist learners to develop personal significance, achieve self-fulfilment, acquire abilities related to communication and self-expression, define personal beliefs, and build successful learning methods (South African Government, 2020). However, despite these remarks, progressed learners are struggling in terms of performance and, in this case, in ENGFAL.

Progression is described as the movement of a learner from their current grade to the next, even if the learner does not meet all promotion standards, in order to avoid the learner remaining in one phase for more than four years (DBE, 2011). According to the Schools Act

(Republic of South Africa, 2012), a learner may repeat a phase once; such a learner must be within the age range of that phase. The act specifies, furthermore, that learners in all Further Education and Training (FET) grades must be promoted to the following grade if they have written and completed all required school-based assessments (oral assessment activities, and practical assessment activities), and have met the minimum requirements for year-end examination in not less than seven subjects. The policy states that learners will be progressed if they obtain 40% in three subjects, with home language as a subject being obligatory, and a further 30% in three other subjects, provided the failed subjects' school-based assessment component is completed. If learners fail to satisfy the above-mentioned promotional standards, they could still be progressed on the basis of the number of years spent in a phase, or their age.

The implementation of the progression policy has, throughout the years, prompted both positive and negative responses from teachers, learners, parents, researchers, and other stakeholders in the education system. According to Hartley (2015), a progression policy is a solid systemic indication of great education. Munje and Maarman (2016) concur with Hartley (2015), and state that a progression strategy is an important tool for providing learners with the assistance they need to achieve equity, access, and equality. Educators have expressed concerns that the progression policy has the potential to impair, rather than aid, these students, and may increase the failure rate in higher grades (Spaull, 2013). In turn, Jimerson and Renshaw (2012) contend that neither automatic promotion nor retention have the capacity to entirely help high-risk learners, and do not give adequate solutions for learner underperformance issues, because both systems have a number of drawbacks. According to Motala, Dieltiens, and Sayed (2009, p. 252),

> Learners who are not in the proper age category for their grades are more likely to have issues with their studies and may be more prone to dropping out; hence, in the South African context, automatic progression is favored, given that retention is viewed as identical with learner dropout.

It is important to locate the challenges faced by progressed learners. The learners' poor performance in comprehending texts was evident in the Annual National Assessment (ANA) of 2011, as reported by the DBE (2011), which reveals that learners who underachieved varied from 30% to 47%, and those who performed poorly varied from 12% to 29% in term of final grades in matric (summative evaluation signalling the end of high school). These findings show the need to introduce and implement an effective strategy to enhance learners' performance in ENGFAL. One of the challenges that cause poor performance is reading, which is cited as difficult. Zhou and Zhao (2014) report that progressed learners are unable to read fluently and effectively, which frequently causes them to fail to comprehend a text. Cekiso and Madikiza (2014) report that progressed learners find it difficult to understand printed texts.

Despite the resources dedicated to assisting progressed learners, only a small proportion perform well, as demonstrated by the 2018 Grade 12 results (DBE, 2018). In total 128 634 progressed learners were registered in the country in 2018. In accordance with the commencement of the Multiple Examination Opportunities (MEO) initiative in 2017, which was phased out in 2019, merely 33 412 learners wrote the required seven subjects, and 95 222 were moduralised. The MEO programme was designed to guarantee that progressed learners wrote the NSC examination in stages, with the assistance of teachers, by selecting subjects that they could transfer to the next examination calendar year (DBE, 2018). Languages, especially ENGFAL, were removed from this programme, based on the premise that learners

pass languages. However, as reported by the data cited above, this was not the case with ENGFAL.

In Gert Sibande district in Mpumalanga province, 13 164 candidates sat for ENGFAL in 2018, and 6 510 failed to achieve at least 50%, and 2 007 candidates who were progressed learners failed the examination. In 2019, 11 119 wrote the ENGFAL NSC examination, and 4 258 candidates failed to break through the 50% level, of whom 1 177 candidates failed to achieve at least 30%. In 2020, 11 037 candidates wrote the ENGFAL NSC examination, and 2 185 candidates could not break through the 50% level, of whom 839 progressed candidates failed to achieve at 30% (Mpumalanga Department of Education, 2021).

According to the diagnostic report of the DBE on the matric results for 2020, progressed learners have inadequate responses to questions, demonstrate poor language skills and misunderstand examination techniques, which ultimately impact negatively in their performance (DBE, 2021). Furthermore, learners do not have a firm understanding of action verbs that are used in the phrasing of questions. The report also reports that, regarding literature questions, candidates often seem to lack an understanding of commonly used assessment terms such as explain, describe, how/why, state and discuss. In the poetry questions, candidates did not possess a clear understanding of the language of poetry. They often struggle with figurative interpretations and lack the ability to show how figures of speech contribute to the overall meaning of poems (DBE, 2021).

This study appreciates that there have been various research studies in the teaching and learning of English. For example, Kolobe (2019) studied the incorporation of technology to support progressed learners in ENGFAL comprehension. Kolobe states that, what remains a problem is the lack of applicable mechanisms that could be applied to assist progressed learners to reach the same level as promoted learners in the same grade. The study concludes that the application of Information Communication Technology (ICT) as a pedagogy in teaching and learning has been found to be productive in South Africa and abroad, in spite of problems with ICT that remain in rural and semi-urban schools. The study indicates, further, that ICT has the potential to lower the failure rate, which eventually reduces the number of learners who need to be progressed because they have failed to meet promotional requirements. The study warns that educators need extra training and support if they are to apply ICT as a pedagogy. Kolobe's study cannot, however, be generalised to the South African population broadly, because most schools are in rural areas and townships. In the Gert Sibande region, schools do not have access to ICT – some do not even have adequate electricity supply. The study also focused only on the intermediate phase, not FET, and it excluded certain aspects of ENGFAL, which comprises both grammar and literature.

Another study, by Ditshego (2020), investigated the lived experiences of Grades 10 and 11 ENGFAL teachers who taught progressed learners to improve communication proficiency. The study took place in Mount Fletcher, Eastern Cape. It was underpinned by Vygotsky's social development theory (1962), according to which learning is primarily a social process in which the support of parents, caregivers, peers, and the larger society and culture is critical to the development of higher-order psychological processes. Ditshego's study found that, in under-resourced schools, progressed learners were not given the support they needed to find relevant information for CAPS (Curriculum Assessment Policy Statement) compliance activities. The study recommends that policy makers ensure that CAPS for ENGFAL is aligned with the needs of diverse learners. It also proposes that ENGFAL teachers practice a culture of reading and lifelong learning, to empower themselves professionally to tackle

challenges related to the inclusive teaching of all learners who have difficulties learning the language. The study focused mostly on the views of teachers, and not on learners, particularly progressed learners.

Another study is that of George (2019), who researched facilitators and barriers impacting on the academic performance of progressed learners in KwaZulu-Natal. The study argues that, although the progression policy instructs schools to provide support actions and intervention strategies for progressed learners, many progressed learners still fail to complete school. The study was underpinned by Bandura's social cognitive theory, which explains the impact of individual experiences, other people's actions, and environmental factors on individual health behaviours. Social cognitive theory encourages social support through embedding expectations and building self-efficacy, and changing behaviour through observational learning and other reinforcements. The limitation of this study is that it did not focus specifically on ENGFAL in Grade 12. It, furthermore, focused on barriers and facilitators, not on ways to enhance the performance of progressed learners.

Munje and Maarman (2016) studied the level and significance of learner progression in Quintile 1 schools in Cape Town. The study argues that, while the progression policy is well intentioned, serious execution and monitoring challenges reconfigure the academic ambitions of primary school learners, with unfortunate consequences. The study examined the problem with the capabilities approach of Sen (2005). Munje and Maarman found that progressing learners who do not have the compulsory content knowledge, specifically in ENGFAL, frequently results in intricacies and unfreedoms for learners. A limitation of this study is that it focused on primary school education, not secondary school learners. The behaviour of primary school learners is unique, as are environmental conditions and cognitive levels at secondary schools.

Although the studies quoted above made a contribution to the study of learner progression in relation to ENGFAL, none of them focused on the teaching of ENGFAL to progressed learners using a bricolage approach. Thus, our study is unique, in the sense that it argues for the use of locally available resources to augment the performance of progressed learners in ENGFAL. In this light, as argued by Eilam (2013), "the unavailability of sufficient resources can undermine the effectiveness of teaching and learning at schools, and cause teachers to become dependent on external support to cover challenging topics" (p.55). Thus, this paper argues that, although there is a shortage of proper resources and manpower to improve the working conditions of teachers and augment the performance of progressed learners in ENGFAL, using locally available resources, such as newspapers, books, and storytelling that emerges from an oral tradition, may offer a solution to the problem, and serve as an alternative to just waiting to receive resources from outside. The virtue of books is that they are timeless, hence, William Shakespeare is still studied in schools today.

We developed an interest in studying progressed learners in relation to ENGFAL after observing that a significant number of learners were progressed through to Grade 12 without clear guidelines from the DBE concerning the kind and level of support to be provided to these learners, specifically in ENGFAL, which is the assessment language of the majority of subjects offered in the Gert Sibande region's public schools.

The aim of this study was to identify challenges faced by progressed learners in ENGFAL, explore probable answers to addressing the challenges faced by progressed learners in ENGFAL, and find opportunities that are available for progressed learners in ENGFAL

through bricolage. The arrangement of this paper is as follows: The theoretical framework is discussed, then the methodology, the findings, and a conclusion.

Theoretical Framework

This study used the bricolage approach. The term bricolage was first used by Claude Lévi-Strauss (1966), a cultural anthropologist, to describe characteristic patterns of mythological thought. Bricolage is the construction or development of a work from a varied range of things that happen to be available, or a work generated by such a process, in both the practical and artistic arts. The name comes from the French word *bricolage*, which means "amateur repair" or "do-it-yourself maintenance". A bricoleur is a person who engages in bricolage. The phrase has been applied in a variety of sectors, including intellectual pursuits, education, computer software, and business. Bricolage theory is relevant to this study because it could provide in-depth insight into new forms of complexity and rigor in social research. It focuses on new webs of relationships, rather than the things themselves. In addition, bricolage is based on developments, interconnections and relationships among phenomena.

By using this framework, the study of learner progression will generate a variety of important categories of learning, according to which multiple perspectives could be constructed: theory, methodology, interpretation, narratology and power relations. Kincheloe (2001) argues that bricolage gets to the nuts and bolts of multidisciplinary research. Bricolage is relevant to this study, because it is constituted by the methodology of historiography, ethnography, and philosophical analysis, combined with discourse analysis, aesthetic criticism, literary analysis, and dramatic and theatrical ways of observing and making meaning. Using bricolage theory in this paper provided richness and depth to the study of learner progression in, specifically, ENGFAL. This richness and depth provided ways to enhance the performance of these learners, and the recommendations were well-informed and based on comprehension of the cultural, social, mental and educational lives of progressed learners. Bricolage allowed the researcher to explore ways to use local resources to emancipate the progressed learners through the teaching and learning of English.

We chose bricolage theory because studying the complex issue of learner progression in ENGFAL in the context of educational enquiry would help progressed learners, teachers of these learners, educational specialists/curriculum implementers, parents, principals and department heads to use the “tools at hand” to improve the performance of progressed learners in ENGFAL. The following section will explain the methodology of the study.

METHOD

This study used the transformative paradigm, which is constructed upon the early work of Guba and Lincoln (2005). The transformative paradigm is a research framework that concentrates marginalised communities' experiences, analyses power differentials that have contributed to marginalisation, and connects research findings to actions aimed at reducing disparities (Mertens, 2009). It is defined as a metaphysical framework “that directly address the complexity encountered by researchers and evaluators in culturally diverse communities when their work is based on increasing social justice” (Greene, 2008, p. 8). The transformative paradigm also focuses on the strengths residing in communities that experience discrimination and oppression on the basis of their cultural experiences and values (Mertens, 2007; 2009). The transformative paradigm was used in this study to examine how the needs of teachers and progressed learners are shaped by institutional barriers, in this case, the progression policy. The transformative paradigm is related to bricolage, and provides a metaphysical framework that focuses on beliefs; it requires cultural sensitivity, spotting those

angles of multiplicity associated with authority differences, developing methods that are conducive to social change, and building trusting relationships (Mertens, 2009).

The study used a qualitative research design. Qualitative research is an approach where a researcher collects and works with non-numerical data, and attempts to infer meaning from the data, to help them comprehend societal life through the study of embattled populations or places (Punch, 2013). A qualitative design was relevant to this study, as the study aimed to understand why progressed learners struggle in ENGFAL, and to explore ways to assist them to perform better.

We opted for participatory action research (PAR) as an approach to qualitative research design. PAR is viewed as an impartial, autonomous, redeeming, and life-enhancing qualitative inquiry that remains distinct from other qualitative methodologies (Kach & Kralik, 2006). It is an organised inquiry that can be used by teachers and other educational workers to collect and study data that can support them in advancing and realising their practice (Mills, 2003). PAR is the embodiment of research in which professional social researchers operate as full-time collaborators of an organisation to study and transform that organisation. It is a continual organisational learning process, an approach in research that promotes participation, co-learning and transformation of the organisation (Whyte, Greenwood, & Lazes, 1991). PAR involves the collaboration of members of the organisation, who work with a professional social researcher.

We used PAR in this study because we hoped to enhance progressed learners' performance in ENGFAL in Grade 12, and the attitudes, support and actions of teachers, parents and all education stakeholders. PAR endorses the adoption of strategies from numerous voices, sources and perspectives to solve complex class challenges (Rogers, 2012).

This qualitative research study used purposive sampling. McMillan and Schumacher (2010) explain that, in purposive sampling, the researcher selects a particular group with relevant characteristics from the group of learners and educators that will be informative about the study problem. Purposive sampling was used to identify relevant categories of people (Csikszentmihalyi & Larson, 2014), for the purposes of this study, ENGFAL teachers, progressed learners and English curriculum implementers.

In implementing PAR, we used focus group discussions to collect data. Focus group discussions are used in studies that seek to understand education-related topics in a certain social, ecological, political, cultural and fiscal framework (Barbour, 2014). This is because focus group discussions are based on group collaboration and permits data to be produced collectively (Wong, 2008). Using focus group discussions for this study was justified because it recognises the humans ability to tell stories and is, therefore, particularly suitable for use in communities with a low levels of literacy and/or a strong oral tradition (Grbich, 1999; Bromley et al., 2003). The nine participants who had been purposively sampled participated in a closed temporary WhatsApp groups, which was more comfortable for them than a face-to-face meeting, and conducive to expressing themselves to answer the following research questions:

- What are the challenges that teachers and learners are faced with in teaching progressed learners in ENGFAL?
- What solutions are there to address challenges faced by progressed learners in Grade 12 ENGFAL?

ENGFAL teachers and progressed learners were purposively sampled: five ENGFAL teachers and four progressed learners. Two WhatsApp groups were created, one for ENGFAL teachers, and the other for progressed learners, to ensure that they were comfortable with their peers in the group. The discussion took place over a three-day period. One question was discussed for no more than an hour-and-a-half every day, to avoid draining the participants. The third day was used to solicit additional comments and to ask clarity-seeking questions and concluding statements from the participants who felt the need to engage further on the topic.

Regarding ethical considerations, participants were assured that their identities would not be revealed. We also informed them that their participation was voluntary, and they could withdraw at any time. During the focus group discussion, the participants were asked the predetermined research questions above, to determine their thoughts and feelings about challenges faced by teachers and progressed learners in the teaching and learning of ENGFAL, and possible solutions to address these challenges. This procedure resulted in an open-ended, free-flowing discussion, the content of which was used to help the researchers reach conclusions. Data was gathered from the focus group discussion by jotting down notes regarding the participants' written responses. Participants could also respond through voice recordings – an option available on WhatsApp –which the researchers saved for easy access during data analysis. Screenshots of the written responses were made, and printed for transcription by the researchers.

The data that was collected was analysed using a thematic approach model suggested by Laws, Harper and Marcus (2003), according to seven steps:

- Step 1: Review and reread all the data obtained: Data from the focus group discussions were read thoroughly to get to the heart of the problems experienced by advanced ENGFAL learners.
- Step 2: Make a rough theme list from themes that emerge from the data: Major topics and themes were discovered, then organised according to the research questions.
- Step 3: Reread the information: Data was reread by the researchers to determine if the themes identified correlated with the study questions and what the participants had said.
- Step 4: Use quotations and notes to connect the themes: Themes emerging from the data were related to views of other scholars.
- Step 5: Examine the topic categories to interpret them: Research questions were kept in mind by the researchers while they interpreted the data.
- Step 6: Create a tool to aid in the detection of patterns in the data: During the analysis, the researchers identified data patterns.
- Step 7: Interpret and extract meaning from the data: The researchers discovered topics, which were subsequently broken down into subheadings.

Validity in qualitative studies refers to the closeness of fit between "data" and "reality" (David & Sutton, 2004); in simple terms, it means "truthfulness" and refers to the bridge

between a data and constructs (Neuman, 2003). To ensure the validity of the data, the same sampled group of participants was used throughout the study. Procedures and instructions to be followed in participating in the study were thoroughly explained to the participants. To ensure validity of data, member checking was done, where themes were returned to the participants to verify if the data responded to their lived experiences.

FINDINGS AND DISCUSSIONS

This section will present the results of the research, starting with the challenges faced by progressed learners.

Lack of Special Contact Time or Opportunities for Learners with Teachers

One of the challenges that was discussed in the group was the lack of contact time specifically for progressed learners in ENGFAL and their teachers. Teachers were unable to assist progressed learners in ENGFAL due to lack of time. The participants noted the following;

> *I end up giving them an exercise that they will all pass so that they will feel good about themselves* (Teacher C).
>
> *…it is hard to give progress learners tasks that cater for all the orders of the Bloom's taxonomy because they hardly cope with middle and high order questions* (Teacher D).
>
> *…the task that we are given during the term are so easy, they make us feel like we are ready for the examination, but when it comes, we see ghosts* (Learner A).

The challenge identified in the statements from the participants above, is that the results of the assessments are unlikely to be a true reflection of the learners' ability in the grade.

Motala et al. (2009) argue that teachers are caught between a rock and a hard place when it comes to assisting needy or progressed learners who have a knowledge gap developed in previous grades, as teachers cannot risk failing to complete the annual teaching plan (ATP). This is a valid point, because most progressed learners at the school that was sampled struggled to keep up with the requirements of Grade 12 ENGFAL. These requirements included, among others, writing a longer essay than required in the previous grade, and doing poetic analysis, and drama.

In light of Learner A's statement, bricolage recommends using "resources", which, according to Barney (1997), is defined as all assets, competencies, school attributes, capabilities, organisational processes, knowledge and information controlled by its members, which enable the school to draw up and implement strategies that enhance its effectiveness and efficiency. This definition and its relation to bricolage shows that there is always something that can be done by teachers to address the problem of learner progression in ENGFAL, which could include referencing prior English knowledge and information, the capabilities of learners and school attributes.

Poor Implementation of the Progression Policy

The second challenge identified relates to the implementation of the progression policy. The structural set-up of the progression policy provides little room for accountability, which leads to a blame-shifting game. This was evident in the sample school, which lacked standardised techniques, and evaluation and monitoring mechanisms due to failure by the DBE, principals and department heads. During the discussion, the participants noted the following:

> *…the total number of learners in each class makes it impossible to help those that are in need. I cannot provide individual support to a class when 90% of class of the class failed* (Teacher E).
> *…when progressing learners, second managers tell us to keep up with the average norm or percentage of the past three years. This ends up forcing us to further progress even more learners that failed dismally. Putting even more pressure and workload on our teachers* (Principal).

Educators reported concerns that the progression policy has the potential to hinder learners, instead of assisting them, and to increase the failure rate in higher grades (Spaull, 2013). Botha et al. (2008) report that many teachers in South Africa have an underdeveloped the understanding of teaching literacy, reading and writing. This was confirmed in the focus group discussions:

> *…some learners who performed lower than us are progressed while we remain in the same grade, I really do not understand how we are progressed, sometimes learners with the same marks are progressed while others remain in the grade. This thing is confusing* (Learner A).

The implementation of the progression policy has loopholes. Both learners and teachers argued that the policy has limitations, hence, they end up not working to ensure that it is successfully implemented. Despite this trajectory, the educators are expected to provide expanded opportunities and activities to enable progressed learners to catch up to the level of other learners in the phase. Educators indicated concerns that the progression policy has the potential to hinder learners, instead of assisting them, and to increase the failure rate in higher grades (Spaull, 2013). The following section will discuss the absence of parental support.

Lack of Support by Parents

The next challenge that was noted in the group was the practice of promoting progressed learners without providing them with the necessary support, by teachers and by parents, which could have irreversible and lifelong repercussions, as most of these learners struggle throughout their school careers. Once learners realise that they are unlikely to complete Grade 12, they drop out of school. Some teachers viewed progression as the real problem, while others argued that the absence of support is the problem. Participants reported the challenges associated with the absence of support by parents for progressed learners:

> *I call parents every time. So, ask them to work together with me during the course of the year, but they hardly come some I even recommend a reading material for their kids but I see no difference, even when I give them a homework, they come back showing that they received no assistance at home* (Teacher A).
> *When I call parents of progressed learners, they say they do not have time to come to school, they are working. But when I asked them to buy their kids study guides on language and literature, they say that they do not have money, they are not working* (Teacher B).
> *…when we are progressed, we are treated like those who passed on their own, even at home our parents expect us to just pass like everyone else without any assistance* (Learner C).

The school principal supported these responses by stating that few parents show up for parent meetings. Therefore, the implementation of intervention strategies remained solely the responsibility of the school, obliging them to make time to visit the school and to engage with

teachers on their children's progress during the year, and to discuss the best ways assist them, using newspaper articles and radio and television programmes.

Absence of a Reading Culture

Another challenge that emerged during data gathering is the absence of reading culture. In this regard, Mukhathi (2017) attests that progressed learners often struggle socially in class, because they do not have the required basic reading skills that the learners who were promoted due to having mastered concepts in the previous grade have. This finding could be attributed, to some extent, to a lack of parental participation in promoting reading among progressed learners. Letshwene (2019) argues that progressing learners for psychosocial reasons has a negative impact on learning and teaching, as learners do not possess the requisite literacy skills and have not mastered the reading, writing and listening skills required for Grade 12.

The Grade 12 CAPS document for ENGFAL stipulates that learners must be taught language comprehension, and language structures and conventions, which makes up Paper 1, literature, comprising a novel, short stories, drama and poetry, which makes up Paper 2, and creative writing, which makes up Paper 3. According to the ATP, learners should be taught at least two out the four literature genres to be assessed in the end-of-year examination – teachers are unable to keep up with the ATP, and cannot teach all four genres. This is problematic for progressed learners, because it may be that the the genres a teacher teaches are the ones that the progressed learner struggles to understand, and they might have mastered the genres that are not taught. Teachers find it difficult to decide which genres will be best for the majority of learners, and may end up having to choose between teaching all genres and failing to keep up with the ATP, or teaching two genres and disadvantaging learners who struggle with those particular genres.

Progressed learners struggle to understand figurative language and to express themselves in English, as reported by a teacher:

> *Most of the progressed learners are unable to express themselves in literature questions, they lack basic understanding and interpretations of questions, e.g., when required to justify why a statement is metaphor, they define a metaphor instead of explaining what makes the statement qualify as a metaphor* (Teacher C).

The challenge faced by Teacher C was that the majority of learners in almost every Grade 12 class of this school were progressed, which made it difficult to create a catch-up programme and address each individual progressed learner's needs, while still keeping up with the ATP. Parents also fail to assist teachers at home, by engaging in the language of teaching and learning.

Too Little Special Contact Time and Insufficient Personnel to Assist Learners

In the WhatsApp group, participants stated that there should be time available, specifically, to help progressed learners catch up with their peers, without feeling the pressure caused by being behind in their learning.

> *The government has done a great job by providing an opportunity for the youth to come and work as teaching assistant, however, the appointment of them should not just be based on creating job opportunities, rather more on employing people with relevant subjects capable of teaching so that they can assist learners with catch up programs* (Teacher A).

> *…it is now much easier to ask where we do not understand because there are teacher assistants who were learners not so long ago and we are comfortable around them because we do not fear being laughed at* (Learner C).

It is, indeed, no secret that teaching assistants are not particularly helpful, as each department in the school is allocated one teaching assistant, and is a temporary situation, as the government only employs teaching assistants on three-month contracts. Although teaching assistants do spend time with struggling learners, their contracts expire before they can make a significant difference.

CONCLUSION

In this paper, we discussed the various challenges faced by progressed learners in learning ENGFAL. We reported on the lack of parental support, shortcomings in the implementation of the progressed policy, and the absence of a reading culture as some of the contributors to poor performance of learners. We used bricolage as a theoretical lens to discuss the challenges and to suggest ways in which performance in English could be improved. We argued that progressed learners face challenges that cannot be ignored, and that bricolage as a theoretical lens has the impetus to change the attitudes teachers and learners towards using locally available resources to improve performance ENGFAL. Thus, we make following recommendations;

Recommendations

Having noted the challenges faced by the progressed learners, we make the following recommendations to enhance the performance of progressed learners

- There is need to ensure a reading culture is cultivated among learners from the early years of learning.
- Teachers should encourage collaborative learning among learners and group work is a good starting point to cultivate reading and writing culture among learners.
- Self-discovery learning is critical and should frame teaching and learning among the progressed learners. This requires DBE to restructure curriculum to promote self-discovery which is lacking among the learners especially progressed learners.
- There is need for tracking of struggling students especially in the area of reading and writing. The tracking system would allow teachers to identify and monitor struggling student with the intention to address the experienced difficulties.

REFERENCES

Barbour, B. (2014). *Introducing qualitative research: A student's guide*. London: Sage Publications.

Barney, J. B. (1997). *Gaining and sustaining competitive advantage*. Menlo Park, CA.: Addison Wesley.

Botha, D., Bizos, N., Gains, P., Moris, D., Place, J., and Puwani, H. (2008, February). *National reading strategy.* Pretoria: Department of Education. https://www.education.gov.za/Portals/0/DoE%20Branches/GET/GET%20Schools/National_Reading.pdf?ver=2009-09-09-110716-507

Bromley, H., Dockery, G., Fenton, C., Nhlema, B., Smith, H., Tolhurst, R., & Theobald, S. (2003). *Glossary of qualitative research terms*. London: King's College, University of London.

Cekiso, M., & Madikiza, N. (2014). Reading strategies used by Grade 9 English second language learners in a selected school. *Reading & Writing, 5*(1), Art. 42, 1–7. https://doi.org/10.4102/rw.v5i1.42

Csikszentmihalyi, M., & Larson, R. (2014). Validity and reliability of the experience sampling method. In M. Csikszentmihalyi. F*low and the foundations of positive psychology. The collected works of Mihaly Csikszentmihalyi* (35–54). Dordrecht: Springer.

David, M., & Sutton, C. D. (2004). *Social research: The basics*. Sage Publications.

DBE. (2011). *National policy pertaining to the programme and promotion requirements of the national curriculum statement grades R12*. Pretoria: Government Printer.

DBE (Department of Basic Education). 2012. The South African Schools Act, 1996 (Act No. 84 of 1996): Approval of the regulations pertaining to the National Curriculum Statement Grades R–12. Government Gazette Vol. 570 No. 9886.

DBE. (2013). *Report on the annual national assessment of 2013.* Pretoria: Government Printer. https://www.education.gov.za/LinkClick.aspx?fileticket=aNmoQzuI2_Y%3d&tabid=92&portalid=0&mid=4360

DBE. (2017). *National Senior Certificate school performance report*. Pretoria: Government Printers

DBE. (2018, March). *Report of the ministerial committee on learner retention and promotion in the South African schooling system*. Pretoria: DBE. https://resep.sun.ac.za/wp-content/uploads/2017/10/DOe-2008-Learner-Retention-report.pdf

DBE. (2021). *National Senior Certificate school performance report*. Pretoria: Government Printer.

Ditshego, N. J. (2020). *Teaching English first additional language to Grades 10 and 11 progressed learners to enhance communication proficiency* (Master's thesis)., University of South Africa, Pretoria.

Eilam, B. (2013). Possible constraints of visualization in biology: Challenges in learning with multiple representations. In D. F. Treagust, & C. Y. Tsui (Eds.), *Multiple representations in biological education* (55-73). Springer.

George, J. L. (2019). *The difference between failure and success: barriers and facilitators impacting on academic performance of progressed learners within the FET phase of a school in KwaZulu-Natal* (Master's thesis). University of KwaZulu-Natal, Pietermaritzburg.

Grbich, C. (1999). *Qualitative research in health: An introduction*. Sage Publications.

Greene, J. C. (2008). Is mixed methods social inquiry a distinctive methodology? *Journal of Mixed Methods Research, 2*(1), 7–22. https://doi.org/10.1177/1558689807309969

Guba, E. G. & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (3rd ed., 191–216). Thousand Oaks, CA: Sage Publications.

Hartley, J. (2015). Australian higher education policy and inclusion of people with disabilities: A review. *Journal of Postsecondary Education and Disability, 28*(4), 413–419.

Jimerson, S. R., & Renshaw, T. L. (2012). Retention and social promotion. *Principal Leadership, September 2012*, 12–16. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.445.9362&rep=rep1&type=pdf

Kach, T., & Kralik, D. (2006). Understanding participatory action research: a qualitative research methodology option. *Canadian Journal of Action Research, 13*(2), 34–50.

Kincheloe, J. L. (2001). Describing the bricolage: Conceptualizing a new rigor in qualitative research. *Qualitative Inquiry, 7*(6), 679–691.

Kolobe, L. (2019). *The integration of technology in supporting progressed learners in English first additional language comprehension* (Master's dissertation). University of Pretoria.

Laws, S., Harper. C., & Marcus, R. (2003). *Research for development A practical guide.* Sage Publications. https://dx.doi.org/10.4135/9781849209786

Letshwene, M. J. (2019). *Key generic curriculum factors affecting Grade 12 learner performance: A multiple case study of South African secondary schools* (PhD thesis). University of South Africa.

Lévi-Strauss, C. (1966). *The savage mind*. Eds. J. Pitt-Rivers & E. Gellner. London: University of Chicago Press.

McMillan, J. H. & Schumacher, S. (2010). *Research in education: Evidence-based inquiry*. MyEducationLab Series. Pearson.

Mertens, D.M. (2007). Transformative paradigm. *Journal of Mixed Methods Research, 1*(3), 212–225.

Mertens, D. M. (2009). *Transformative research and evaluation.* New York: The Guildford Press.

Mills, S. (2003). *Gender and politeness*. Cambridge: Cambridge University Press.

Motala, S., Dieltiens, V., & Sayed, Y. (2009). Physical access to schooling in South Africa: mapping dropout, repetition and age-grade progression in two districts. *Comparative Education, 45*(2), 251–263.

Mpumalanga Department of Education (2021). *Speech delivered at the announcement of the 2020 Provincial performance of the National Senior Certificate (NSC) examinations results*. MEC Majuba, MEC for Education. Government Complex, Nelspruit.

Mukhathi, F. (2017). *Challenges that geography teachers encounter in teaching Grade 11 progressed learners in Tshwane South secondary schools, Gauteng* (Master's dissertation). University of South Africa.

Munje, P., & Maarman, R. (2016). A capability analysis on the implementation of the school progression policy and it impact on learner performance. *Journal of Education, 66*, 185–205. http://doi.org/10.17159/2520-9868/i66a07

Neuman, W. L. (2003). *Social research methods: Qualitative and quantitative approaches*. New York: Allyn and Bacon.

Ngoepe, K. (2016, January 6). 'Progressed learners' pushed matric pass rate down – Motshekga. *News24.* https://www.news24.com/SouthAfrica/News/progressed-learners pushed matric-pass-rate-down-20160105

Punch, K. F. (2013). *Introduction to social research: Quantitative and qualitative approaches*. Sage Publications.

Republic of South Africa. (2012, December 28). *The South African Schools Act, 1996 (Act No. 84 of 1996): Approval of the regulations pertaining to the National Curriculum Statement Grades R–12*. Regulation Gazette, Vol. 570, No. 9886.

Rogers, M. (2012). Contextualizing theories and practices of bricolage research. *The Qualitative Report, 17*(48), 1–17. https://doi.org/10.46743/2160-3715/2012.1704

Sen, A. K. (2005). Human rights and capabilities. *Journal of Human Development, 6*(2), 151–166.

South African Government. (2020, January 7). *Minister Angie Motshekga releases NSC examination results*. https://www.gov.za/services/minister-angie-motshekga-releases-nsc-examination-results

Spaull, N. (2013). South Africa's education crisis: The quality of education in South Africa 1994–2011. Centre for Development & Enterprise (CDE).

Vygotsky, L.S. (1962). *Thought and anguage*. Cambridge, MA: MIT Press.

Whyte, W. F., Greenwood, D. J., & Lazes, P. (1991). Participatory action research: Through practice to science in social research. In W. F. Whyte (Ed.), *Participatory action research* (19–55). Newbury Park: Sage Publications.

Wong, L. P. (2008). Focus group discussion: A tool for health and medical research. *Singapore Medical Journal. 49*(3), 256-260.

Zhou, X., & Zhao, Y. (2014). A comparative study of reading strategies used by Chinese English majors. *English Language Teaching, 7*(3), 13–18. https://doi.org/10.5539/elt.v7n3p13

EDUCATORS' PERCEPTIONS OF CONTINUING PROFESSIONAL DEVELOPMENT PROGRAMS IN THE EASTERN CAPE, SOUTH AFRICA

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Abstract
This study explored educators' perceptions of continuing professional development (CPD) in the South African context. A qualitative case study research design was adopted using semi-structured interviews. Six participants were purposively selected, with data analyzed through content analysis. It emerged that educators were both happy and dissatisfied with the CPD programs offered by the Department of Education (DoE). Positive aspects included enhancing group activities, expert visitations, and collaboration, and negative aspects included insufficient time for engagement and poor management and monitoring by the DoE. The conclusion reiterates the importance of DoE policymakers listening to educators' voices as they have implications for teachers' professional development.
Keywords— Continuing Professional Development, Professional Development, Professional Development Programs, Educators, Perceptions

INTRODUCTION
Studies on enhancing quality education are fast gaining traction. Researchers have established that having high-quality educators is an essential key to enacting educational policy, which depends on educators' professional development (PD) (Darling-Hammond et al., 2017; Guskey, 1994). Educators are the cornerstone of any education system and schools need to improve their skills and abilities (Darling-Hammond et al., 2017). Literature has suggested that PD benefits educators, policymakers, and educator unions (Bayar, 2014; Mokhele, 2014). The Bill Gates Foundation (2014) emphasized that educators need support to contribute to their student's academic success.

Several scholars have highlighted the relevancy of educators' PD and its continuity for effective teaching and learning (Guskey, 1994; Zide, 2016). The need for continuity in PD has led to the establishment of Continuous Profession Development for educators. It is essential to highlight that for educators, CPD has increasingly become a priority in most countries worldwide (Kennedy & McKay, 2011). The European Commission (2010) specified that in seeking to meet educators' PD requirements, policymakers and practitioners should consider their need for support and ensure that opportunities should match educators' perceived needs.

The PD of educators is a significant element for educational reform in most countries (Villegas-Reimers, 2003). For example, in the USA, policy has "increasingly focused on bolstering teacher effectiveness and pressing states and districts toward ensuring that all students have access to effective educators" (Archibald et al., 2011, p. 3; Desimone, 2011). Similarly, the South African DoE established reforms to enhance educators' PD. Most of these initiatives aim to develop science and mathematics educators. However, most science and mathematics educators in South Africa are considered either under-qualified or not qualified to teach these subjects (Mokhele & Jita, 2012).

Studies have shown that most education systems strive to ensure that an effective teaching and learning environment prevails (Archibald et al., 2011). In South Africa, scholars have indicated that it is challenging to find CPD formats that can better change educators' knowledge and classroom practices (Mokhele & Jita, 2012). Therefore, educators must be provided with the relevant PD they require.

Theoretical Framework

Many PD programs have been proposed, varying widely in their content and format (Mokhele, 2013). However, in all these programs, the common purpose is to ensure that educators are willing to enlist and believe that the PD programs will change their classroom practices. According to Whitworth et al. (2018), despite the limited research on those who provide PD programs, researchers agree on several components of PD that are likely to support educators' practices (Guskey, 1994; Kennedy, 2016; Luft & Hewson, 2014). The key components of effective PD are: (a) active learning – educators are actively engaged in their learning rather than passively participating in PD; (b) content focus – PD focuses on specific content and how students learn it; (c) collective participation – educators in the same grade, subject, or school participate together; (d) coherence – PD activities align with the school, district, province policies, school curriculum, and goals, and needs of learners; and (e) sustained duration – PD occurs over some time, such as a term or school year, and includes at least 20 contact hours (Kennedy, 2016, p. 948; Guskey, 1994).

Mokhele's (2014) alternative model highlights that effective and productive outcomes expected in a PD program must improve teachers' classroom practices and learners' academic success. This model comprises five main features of a successful PD program. First, the structure of PD refers to how a PD program should be structured. Second, teacher collaboration explains the importance of educators from different schools meeting and conducting activities as a group. Third, the content focus and context of rural settings illustrate the importance of the subject matter in a CPD program, emphasizing diversity in schools. Whereas some are rural, others may be urban, and as such, the focus should be varied to suit the individual needs of the schools involved. The fourth feature is the time of engagement. The amount of time spent in PD activities should be considered because PD, by its nature, should happen while the educators are engaged in their work, advancing the goals of their profession. Lastly, personal transformation and growth are essential for educators who participate in any PD program.

Objective of the study

The objective of this study was to explore educators' perceptions of the CPD programs in the Eastern Cape.

RESEARCH METHODOLOGY

Research approach and design

This study adopted a qualitative research approach to investigate educators' experiences of the CPD programs. Qualitative research refers to a "social action that stresses how people interpret and make sense of their experiences to understand social reality" (Mohajan, 2018, p. 24). Qualitative researchers rely on participants' in-depth responses on how they construct or understand their experiences (Mohajan, 2018). In this study, a qualitative approach was the appropriate choice because open-ended questions were used to stimulate discussion, resulting in rich and thick data being generated. A case study design was used. It suited this study as it produces descriptive data. Participants' written or spoken words about their perceptions of the CPD programs were elicited (Brynard et al., 2004; Lichtman, 2013). As an empirical

inquiry, the case study investigated each participant as a single case to obtain an in-depth analysis of the CPD programs. As a contemporary phenomenon, each case was reflected within its real-world context of educators participating in the CPD programs (Hollweck, 2015; Yin, 2014).

Participants and study setting

The population involved all principals and educators from the teacher-led cluster CPD programs in the OR Tambo Inland district, Eastern Cape Province, South Africa. Participants were selected using purposive sampling. This technique involves deliberately choosing participants based on their qualities being relevant to the study (Etikan et al., 2016). Further, qualitative research samples purposively (Carter & Little, 2007). This sampling technique was suitable for this study because it helped decide what needed to be known and to identify information-rich cases (Etikan et al., 2016). The sample size for this study comprised six participants, but only the data generated from four are presented in this paper: two principals, one deputy principal, and one post-level three educators who participated in the PD programs and were individuals knowledgeable about the CPD programs. In addition, the participants participated in the CPD programs as educators and as cluster leaders who led the programs at different stages except for one participant, Katongo, who, despite being a novice, had the knowledge and experience and, most importantly, was available and willing to participate. Due to their exposure and experiential knowledge, participants could "communicate experiences and opinions in an articulate, expressive, and reflective manner" (Etikan et al., 2016, p. 2).

Case descriptions

A total of six participants who participated in the CPD programs were visited several times to collect the necessary data through semi-structured interviews, of which data from four educators are presented in this study. In line with ethical standards for reporting empirical findings, pseudonyms were used. Case descriptions below provide background information on their situations.

Tuma is employed as a school principal at a senior primary school in Mthatha District and teaches Mathematics and Natural Sciences from grades 4-7. Somiso is a school principal, currently teaching Mathematics and Life Skills in grades 4-7. Katongo is currently teaching Mathematics in grades 4-6. She has many years of teaching experience. Bryson is a male deputy principal, who at the time of data collection, was teaching Mathematics in grades 8 and 10.

Data collection instrument

This study collected qualitative data using an interview schedule. Data were collected using semi-structured interviews with open-ended questions, often accompanied by further probing (Newcomer et al., 2015). The interview questions related to educators' perceptions of the CPD programs in the school district. Field notes were also taken.

Data analysis

Data in this study were analyzed through a content analysis approach which involves "the establishment of categories and then counting the number of instances when those categories are used in a particular item of text" (Silverman, 2011, p. 116). Data collected from interviews and field notes were transcribed and responses from the participants were coded and developed into potential themes. The findings highlight the themes that emerged from the data, which helped answer the objective of this study. In our presentation of findings, we

emphasize the relevance of the model (Mokhele, 2013) to the key findings as a justification for the educators' perceptions of the teacher-led cluster programs within the South African setting.

Ethical considerations

Permission was sought from all relevant stakeholders and informed consent forms were signed to validate their willingness to participate in the study (Lichtman, 2013). After the findings were finalised, they were sent back to the participants to check for authenticity. Participants were consulted before any document for publication was submitted. Silverman (2011, p. 139) explained that anonymity "is required even when we are not dealing with matters that seem to be particularly delicate or intimate" and the study used pseudonyms as adherence to anonymity.

FINDINGS

Participating educators in group activities

Findings indicated that the CPD programs allowed participating educators to engage in group activities. Educators expressed their appreciation and satisfaction with the CPD programs, which enhanced development amongst them. The CPD programs used a group-work approach during cluster activities that involved educators. Further, participants mentioned that educators were passionate and enthusiastic about the CPD programs. Bryson had the following to say: '*The activities are conducted for a group of educators with a lot of hands-on. We work and present as groups with everyone playing a role.'*

Inviting expert visitors

Findings indicated that the CPD programs involved the participation of expert visitors, from inside or outside the schools. Participants stated that the CPD programs brought hope and excitement to educators as an initiative that inspired educators in their classrooms and assisted them in achieving their desired outcomes, which would improve learners' academic performance. Findings were that visits by subject experts meant more growth and development for educators.

Tuma said:

Someone good in the area shows us how to teach it, would lead the workshop; for example, we have a lot of misconceptions on terms, so we are corrected on those misconceptions. For example, we attended a workshop on balancing equations, facilitated by Mrs Zamdela from one of the Mthatha schools. We were then expected to go and use her teaching method back at our school, which helped us a lot. While in Cape Town, I attended a science project for grade 7 educators where we were trained on how to conduct science experiments on electricity. A team of facilitators from Singapore trained us, and we were given material to refer to when we went back to our classes.

Enabling educators to collaborate

Study findings suggested that the CPD programs enabled educators to collaborate, which allowed them to interact and share their experiences and suggest solutions to common challenges. These interactions brought a sense of mentoring and reliance amongst themselves. For example, Tuma shared the following:

Clusters are significant because it is where individuals voice their difficulties, and it is where they get advice, and they go back to classes being refreshed and revived. As we are facing the problem of shortage of educators, especially in Maths and Science, having clusters helps the

disadvantaged schools because the educators who teach those subjects get some advice on how to teach certain topics.

The CPD programs allowed educators to share their experiences. It promoted professional growth and participants developed their identity as teachers.

Enabling educators' growth

The findings showed that the CPD programs enhanced educators' growth. Participants highlighted that these programs were essential; they nurtured their growth as individuals in their career paths. Furthermore, they gained knowledge, skills, and new pedagogical strategies. The following was said by Bryson:

I have grown so much. I am old now, and the experience I have is quite vast because of the CPD programs. When you start teaching, you do not know everything. You learn many things as you execute your duties. You learn a lot from your colleagues because of their experience, which you may not have. So, the cluster workshops provide an opportunity to gain knowledge and skills needed in the teaching profession. Grooming a child's mind is not 'unophuca' (a Xhosa traditional game) because you are working with a mind that represents the future.

Building educators' confidence

Participants indicated that through the CPD programs, educators' confidence was strengthened by promoting professional growth. This development helps educators to endure the difficulties they encounter when teaching. In addition, these programs help to build educator-learner rapport, as Tuma highlighted:

You grow as a person; you gain more confidence in your teaching, especially those of us in disadvantaged schools. As a teacher, no matter how experienced you are, you need such confidence to improve your students' work and to stay motivated.

Developing educators' identity

Participants suggested that the CPD programs assisted in developing educators' identities. It contributed to their identity as a teacher which manifested through identifying themselves as better educators in their classrooms, as Tuma shared.

They play a huge role. I will not lie to you. With me, I had a problem with teaching fractions, and upon attending or having workshops on teaching fractions, through meeting with other educators, they shared other strategies that I did not know at all, and as a result, I can make my learners understand fractions. Most importantly, as early as grade 4, I know that my learners must understand fractions. I am now able to show my learners the bottom line by looking at the real manner of fractions and not just telling.

Bryson stated that: '*The program we attend helps a lot around those areas of creating a real teacher.'*

Developing subject content knowledge

The findings demonstrated that CPD programs could develop educators' understanding of subject content. Thus, these programs created a wealth of knowledge and professional advancement. Educators presented that CPD programs encourage mastering of subject content, which is a priority, as illustrated in Somiso's comment: '*Basically, in all these programs, what has been shared was mostly the strategies on how to teach Mathematics*.'

Bryson explained the following:

Firstly, we do what they call content gap so that when you plan, you can plan with confidence. Some of the concepts we are teaching now are new to the grades that we are

teaching. So firstly, they tackle the content gap. Thereafter we are being trained or developed in planning.

Teaching learners from diverse backgrounds

Findings indicated that CPD programs can assist teachers in effectively teaching classes with learners from diverse backgrounds. Furthermore, the participants claimed that the programs allow the sharing of classroom experiences and the development of educators in various pedagogical practices that assist in teaching learners from diverse backgrounds. The following was shared by Somiso:

Basically, in all these programs what has been shared was mostly the strategies on how to teach Mathematics. The focus was also on how the development of a child relates to knowledge of Mathematics as a subject. It also focused on how Mathematics relates to the child's background and the context from which the child hails.

Insufficient time for engagement

Participants complained the time allocated for educators to engage was insufficient. They indicated that it created several challenges, such as failing to cover other aspects, whether related to subject matter or pedagogical strategies. The following extract by Katongo illustrates further:

If I were to plan or run a cluster program, I would start with time. I would take out the one-day workshop. Some things that I needed attention on were not done, so I realized that time wasn't adequate.

Non-continuity

Participants lamented that the CPD programs do not connect as they are not conducted continuously. Further, they noted that at times only one cluster program is scheduled in a year. Somiso suggested that: '*These must be held continuously and not once in a year as what is currently happening.'*

Poor management of CPD by the DoE

Among the several challenges is that the CPD programs are poorly managed by the Department of Education (DoE), leading to dissatisfaction. Furthermore, poor management could affect educators' attendance of the CPD programs. The following statement from Somiso illustrates this:

In my view, I think the idea of organizing clusters is a good one. However, the way they are organized and managed is problematic. At times you find that there is not good attendance because of logistical constraints. So, once the workshop is organized and educators come to the workshop, the cluster leaders become the sole drivers of the workshop or program, moving the plan and organizing all the materials and running the workshop.

Poor monitoring of CPD by the DoE

Study findings revealed that the CPD programs were poorly monitored. They indicated that poor monitoring was a challenge, causing inconsistencies and poor time allocation. Participants further claimed that educators can only be efficient if they see a DoE official to whom they must report and who is also hands-on and involved in monitoring them. The following was shared by Tuma:

As educators, we see the need for workshops to be conducted more often. They must be monitored in a better way than what the Department of Education is currently doing. They must make it a priority as a platform for the professional development of educators.

Participants' dissatisfaction and several other challenges caused by lack of monitoring are some of the elements that make the clustering system less effective.

DISCUSSION

This study found that educators' perceptions of the CPD programs organised by the DoE were mostly positive. They were happy because the CPD programs enabled them to participate in group activities, invited expert visitors, promoted educators' collaboration, resulted in educators' growth, and helped to build educators' confidence. Further, the programs shaped educators' identity, helped educators increase their knowledge of subject content, and promoted diversity.

The findings revealed that the CPD programs allowed educators to engage in group activities. This aligned with Whitworth et al. (2018) who highlighted that educators should actively engage in their learning rather than passively participate in PD. Group activities enabled educators to actively engage in the meaningful analysis of teaching and learning (Mokhele, 2013). The active engagement created opportunities for educators to observe, receive feedback, analyse student work, or make presentations instead of passively listening to lectures (Guskey, 1994).

The findings also indicated that the CPD programs involved the participation of expert visitors. In a review of studies on CPD, Timperley et al. (2007) explained that experts provide up-to-date knowledge of pedagogy and ongoing support in transferring pedagogical knowledge to the classroom. The findings revealed that visits by experts in the CPD programs triggered hope and excitement among educators.

In addition, the findings showed that the CPD programs enabled educators' collaboration, which allowed them to interact and share difficulties and work-related advice. Collegiality and collaboration "where group members take responsibility for each other's growth and coordinate individual knowledge and expertise to advance the group's collective work" were possible through the CPD programs (van Es, 2012, p. 190). Participating in collaborative activities helped create networks between different schools and helped teachers increase learners' interest and motivation (Visser et al., 2010).

Findings showed that the CPD programs enabled educators' growth. Educators who participated in CPD had expectations that these programs would support standards-based teaching. It is important to note that educators are attracted to PD programs not only because of the five aspects discussed earlier but because such programs can fundamentally change them for the better (Mokhele, 2011). Bayar (2014) noted that, as extant literature shows, CPD programs build better educators and enhance student achievement. Therefore, the potential of PD activities to help both novice and experienced educators in developing their existing skills and acquiring new ones is extensively embedded, according to literature, on the CPD meeting the teacher's expectations.

The acquisition of new skills, knowledge, and values determines the standard of growth for educators. Current findings suggested that CPD programs could build educators' confidence and also help develop educators' identities. Mokhele (2011) argued that content variations recognize that a CPD program does not suit everybody as educators have different needs. In a study by Chaudhuri et al. (2019), educators shared how the PD program rejuvenated them to teach with enthusiasm. The PD program they were engaged in, activated their passion and excitement about being a teacher.

The findings demonstrated that CPD programs can develop educators' knowledge of subject content. These results showed that the CPD programs enabled teaching diversity in the educators' classrooms. This corresponded to Mokhele's (2011) concern, which refers to rural and urban contexts, and emphasizes school diversity as an essential variation in recognizing a PD program. Thus, CPD must not be a one-size-fits-all, as educators have different needs.

This study also found that educators were dissatisfied with the CPD programs due to such challenges as insufficient time for engagement, non-continuity, poor management of the program by the DoE, and lack of monitoring by the DoE. Insufficient time for engagement was a negative perception which dissatisfied educators during the CPD programs. This finding corroborates previous research, emphasizing that a meaningful PD learning program requires duration for its effectiveness and quality for its implementation (Darling-Hammond et al., 2017).

The findings also showed that the CPD programs do not reflect continuity. One of the four critical elements developed by Dyer (2013, para. 4) "that help make teacher professional learning meaningful and worthwhile is that learning is incremental. It takes time to change practice and be lasting, and it must become a part of the teacher's routine". It does not take place in "a once-off workshop, and scholars agree that it is a continuous and dynamic" learning opportunity process (Murtaza, 2010, p. 217).

The findings demonstrated that educators were dissatisfied during the CPD programs due to poor management by the DoE. These findings concurred with previous studies, which indicated that leaders play a critical role in managing PD programs. District and school-level leaders' support and enthusiasm should influence educators' ability, willingness, and motivation to take up ideas, activities, and curricula promoted (Desimone et al., 2002; Guskey, 1994). The teachers' dissatisfaction emanating from poor management was justified, as they felt that an improvement in CPD management programs would improve the results of developing educators leading to learners' academic improvement.

It emerged that the CPD programs were inadequately monitored by the DoE. It is possible that educators were dissatisfied with the CPD programs due to a dire need for the ethos that needed to be put in place by the managers in the DoE to ensure effectiveness through constant monitoring of the programs.

The educators in this study were definite about their needs and views of what a CPD program should or should not have. Despite some reservations, the educators understood the importance of attending CPD programs (Darling-Hammond et al., 2017). In conclusion, it is explicit that CPD programs are an essential tool that contributes to the advancement of educators' instructional skills. They also help increase the pool of existing knowledge on educators' perceptions of what and how CPD programs should be structured for them to be effective. The fragmented CPD programs offered to educators, which do not value educators' inputs, have once more been affirmed by the literature reviewed in this study as dissatisfying to educators, who strongly rely on the effectiveness of CPD programs for their professional development. It is recommended that the DoE, other stakeholders, and policymakers listen to educators' voices. They must continue to add or develop PD programs that educators would want to enlist in, to fulfill their current and anticipated needs.

REFERENCES

Archibald, S., Coggshall, J. G., Croft, A., & Goe, L. (2011). High-quality professional development for all teachers: Effectively allocating resources. *Research & Policy Brief*. National Comprehensive Center for Teacher Quality.

Bayar, A. (2014). The components of effective professional development activities in terms of teachers' perspective. *Online Submission*, *6*(2), 319–327, 2014. https://files.eric.ed.gov/fulltext/ED552871.pdf

Bill & Melinda Gates Foundation. (2014). *Teachers know best: Teachers' views on professional development*. ERIC Clearinghouse.

Brynard, D. J., Hanekom, S. X., & Brynard, P. (2004). *Introduction to research*. Van Schaik.

Carter, S. M., & Little, M. (2007). Justifying knowledge, justifying method, taking action: Epistemologies, methodologies, and methods in qualitative research. *Qualitative Health Research*, *17*(10), 1316–1328.

Chaudhuri, A. R., McCormick, B. D., Lewis Jr, R. (2019). Standards-based science institutes: Effective professional development that meets teacher and district needs. *Science Educator*, *27*(1), 15–23. https://files.eric.ed.gov/fulltext/EJ1267766.pdf

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute.

Desimone, L. M. (2011). A primer on effective professional development. *Phi Delta Kappan*, *92*(6), 68–71. https://doi.org/10.1177%2F003172171109200616

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis*, *24*(2), 81–112. https://outlier.uchicago.edu/computerscience/OS4CS/landscapestudy/resources/Desimone,Porter,%20Garet,%20Yoon,%20and%20Biman,%202002%20(1).pdf

Dyer, K. (2013). *Redefining professional development as teacher-led professional learning*. https://www.nwea.org/blog/2013/redefining-professional-development-as-teacher-led-professional-learning/

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. http://dx.doi.org/10.11648/j.ajtas.20160501.11

European Commission. (2010). *Teachers' professional development: Europe in international comparison. A secondary analysis based on the OECD's teaching and learning international survey*. http://dx.doi.org/10.2766/63494

Guskey, T. R. (1994). Professional development in education: In search of the optimal mix. Paper presented at the *Annual Meeting of the American Educational Research Association*, New Orleans, LA, April 4-8. https://files.eric.ed.gov/fulltext/ED369181.pdf

Hollweck, T. (2015). Robert K. Yin. (2014). Case study research design and methods. *Canadian Journal of Program Evaluation*, *30*(1). https://journalhosting.ucalgary.ca/index.php/cjpe/article/view/31030

Kennedy, A., & McKay, J. (2011). Beyond induction: The continuing professional development needs of early-career teachers in Scotland. *Professional Development in Education*, *37*(4), 551–569. https://doi.org/10.1080/19415257.2010.533598

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research*, *86*(4), 945–980. https://doi.org/10.3102%2F0034654315626800

Lichtman, M. (2013). *Qualitative research for the social sciences*. Sage.

Luft, J. A., & Hewson, P. W. (2014). Research on teacher professional development programs in science. *Handbook Of Research on Science Education, 2*, 889–909. http://doi.org/10.4324/9780203097267.ch44

Mokhele, M. L. (2011). *Teachers' perspectives on continuing professional development: A case study of the Mpumalanga secondary science initiative (MSSI) project* [Unpublished doctoral thesis]. University of South Africa. http://hdl.handle.net/10500/4871

Mokhele, M. L. (2013). Empowering teachers: An alternative model for professional development in South Africa. *Journal of Social Sciences, 34*(1), 73–81. https://doi.org/10.1080/09718923.2013.11893119

Mokhele, M. L. (2014). Individual techniques of professional development: A critical review of literature. *Mediterranean Journal of Social Sciences, 5*(20), 2934. http://dx.doi.org/10.5901/mjss.2014.v5n20p2934

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People, 7*(1), 23–48. https://mpra.ub.uni-muenchen.de/85654/1/MPRA_paper_85654.pdf

Mokhele, M. L., & Jita, L. C. (2012). When professional development works: South African teachers' perspectives. *The Anthropologist, 14*(6), 575–585. https://doi.org/10.1080/09720073.2012.11891283

Murtaza, K. F. (2010). Teachers' professional development through whole school improvement program (WSIP). *International Journal of Business and Social Science, 1*(2). http://www.ijbssnet.com/journals/Vol._1_No._2_November_2010/17.pdf

Newcomer, K. E., Hatry, H. P., & Wholey, J. S. (2015). Conducting semi-structured interviews. *Handbook of Practical Program Evaluation, 492*. https://doi.org/10.1002/9781119171386.ch19

Silverman, D. (2011). *Qualitative research* (3rd ed.). Sage.

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration*. Ministry of Education.

Zide, L. (2016). Teachers' experiences of teacher-led professional development programs: An exploratory study of two clusters in the Mthatha district [Unpublished doctoral thesis]. University of Fort Hare. http://vital.seals.ac.za:8080/vital/access/BibliographyStatistics/Zide,%20Lulama

van Es, E. A. (2012). Examining the development of a teacher learning community: The case of a video club. *Teaching and Teacher Education, 28*(2), 182–192. https://www.learntechlib.org/p/76134/

Villegas-Reimers, E. (2003). *Teacher professional development: An international review of the literature*. International Institute for Educational Planning.

Visser, T. C., Coenders, F. G., Terlouw, C., & Pieters, J. M. (2010). Essential characteristics for a professional development program for promoting the implementation of a multidisciplinary science module. *Journal of Science Teacher Education, 21*(6), 623–642. https://doi.org/10.1007/s10972-010-9212-1

Whitworth, B. A., Maeng, J. L., & Bell, R. L. (2018). Exploring practices of science coordinators participating in targeted professional development. *Science Education, 102*(3), 474–497. https://doi.org/10.1002/sce.21337

Yin, R. K. (2014). *Case study research: Design and methods*. Sage.

PRACTITIONER CONCEPTIONS OF MATHEMATICAL KNOWLEDGE IN EARLY CHILDHOOD DEVELOPMENT IN RURAL DISTRICT OF THE EASTERN CAPE PROVINCE, SOUTH AFRICA

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Abstract
This study explored practitioner conceptions of mathematical knowledge in Early Childhood Development (ECD) in one rural District of the Eastern Cape Province. The study adopted a qualitative research design. Specifically, the study explored how practitioners of rural ECD centres use their conceptions of mathematical knowledge to enhance the children's learning of early mathematics in ECD settings. The study's theoretical underpinning was Pedagogical Content Knowledge (PCK), which enabled the researchers to explore how early mathematical content and pedagogy were being utilised by the practitioners. We thought that the interpretivist paradigm was a good fit because it enhanced the sense-making process of the obtained data. A purposive sample of five practitioners from five ECD centres took part in the study. Semi-structured interviews and observations were used as data generation tools while the obtained data were analysed using thematic analysis in which themes were formed. Some sub-themes emerged from the themes. The findings of the study revealed that practitioners in the five ECD centres that took part in the study lacked conceptions of mathematical knowledge in that they used traditional methods of enhancing early mathematics learning among the children who attended the centres. This study amplifies the call for empowering practitioners with the knowledge of early mathematics curriculum, content and pedagogical knowledge, and cultural knowledge.
Keywords: Early childhood centres, Early mathematics, mathematical knowledge, pedagogical content knowledge

INTRODUCTION

Conceptions of mathematical knowledge have been scrutinised in many countries around the world. Carrillo-Yañez *et al*. (2018) mention conceptions of mathematical knowledge teachers should possess as the understanding of mathematical properties and their underlying principles, particularly in relation to any work on a mathematical item, is the most significant component. However, Hoover, Mosvold, Ball and Lai (2016) mention that in the United Kingdom, the conception of mathematical knowledge is understood in terms of Shulman (1986), who stresses the combined knowledge of content and pedagogy. Furthermore, in Nigeria, Dumma and Mojeed (2015) mention that conceptions of mathematical knowledge are understood in terms of Shulman (1986) proposed three categories of teacher subject matter knowledge which include: content knowledge, pedagogical content knowledge and curriculum knowledge. Additionally, in South Africa, the conceptions of mathematical knowledge are viewed as perception of roles, content knowledge, pedagogical knowledge, as well as children's capital and cultural knowledge. However, Dumma and Mojeed (2015) mentioned a lot about the mathematical knowledge practitioners should acquire but very little or nothing is said about the mathematical knowledge rural practitioners should have for developing early mathematics in the centres.

According to Tlou and Feza (2018), conceptions of mathematical knowledge are crucial in a child's development, particularly throughout the years from birth to four years of age, which is when cognitive development connected to intellect, personality, and emotions occurs. Therefore, practitioners with knowledge and understanding of early mathematics and child development are essential. However, there was no mention in the literature of the knowledge that rural practitioners should have in order to help children develop their mathematical abilities. Hence, this aroused the interest of the researcher to explore how they use their mathematical knowledge to enhance mathematics in their centres.

Since the new South African democratic era in 1994, Early Childhood Development (ECD) has been recognized as a critical component for the country's social and economic change and development. The Departments of the government and non-governmental organizations have collaborated to strengthen ECD services by developing policies and programs. Amongst the policies was White Paper 5 which was developed by the Department of Education in 2001 with the aim of protecting the child's rights to develop his or her full cognitive, emotional, social and physical potential. In this manner, an increased access to ECD programmes is expected to improve the quality of such programmes and provide South Africa's youngest citizens with a solid foundation for lifelong learning and development in the 21st century.

Republic of South Africa (RSA) (2015) also developed a National Integrated Early Childhood Development Policy. The policy states that the Government of the Republic of South Africa has prioritised ECD within its National Development Plan 2030: *Our Future - make it work*. According to RSA, National Integrated Early Childhood Development Policy aims to change South Africa's early childhood development service delivery to close critical gaps and assure the provision of comprehensive, widely available, and equitable early childhood development services. The Department of Basic Education (DBE) (2015) also developed a National Curriculum Framework which provides guidance on how to develop a curriculum appropriate for young children, that would help every child to develop knowledge, skills, attitudes and behaviours for life, learning, schooling and work, In addition, a curriculum for early childhood is about all the experiences that children from birth to four will have in different settings including what children feel, do, hear and see in their early childhood setting is an important part of curriculum. DBE (2009) developed National Eearly Learning and Development Standards (NELDS) for children birth to four years which is a curriculum-related policy initiative, focusing primarily on the early learning needs of children from birth to four years. However, despite several attempts made by the South African government, children fail mathematics.

Researchers Feza (2014), Sinyosi (2015) and Gqoli (2021) highlight the lack of foundational knowledge as one of the key factors for this poor performance. Mathematical underperformance is a problem in other countries as well. The Government of Ghana through the Ministry of Education has shown not only that children in Ghana have struggled to read, but also that performance in mathematics has lagged behind grade expectations, Students' performance in both internal and external mathematics examination has persistently been poor. In Turkey, mathematical communication is also emphasized as an important classroom activity in national elementary school mathematics curriculum. Despite the wide emphasis on mathematical thinking skills in elementary mathematics curriculum, the overall mathematics achievement of students in Turkey is far from being exemplary. Among others, Siyepu (2013) mention that poor performance in mathematics seems to be caused by teachers who lack the knowledge and skills to explain concepts clearly, and a shortage of mathematics textbooks that focus pertinently on prescribed curricula. Nevertheless, the poor performance

in mathematics in higher grades, is noticeable, and little is spoken about what is going on in ECD, which is the foundation for future mathematics learning. As a result, the researcher felt it necessary to investigate this understudied area and determine what went wrong by investigating practitioner perceptions of mathematical knowledge at rural ECD centres in the OR Tambo Inland District of the Eastern Cape Province.

Statement Of The Problem

Selmi (2015) reveals that mathematical skills do not only concern learning numbers and methods of linking them but in understanding of ideas that help young children link concepts, learn critical reasoning, and analyse experiences in their environment. This suggests that mathematics in children might not be a problem. However, most learners in higher grades fail mathematics, especially in the Eastern Cape Province, prompting the need for a strong foundation in learning mathematics in earlier grades. The poor performance in mathematics is revealed by Bosman and Schulze (2018) who mention that South African learners perform poorly in mathematics in comparison with learners of other countries. Although children's underperformance is glaring in higher grades, it is important to trace it back to the early years of their learning by investigating how practitioners utilize their conceptions of mathematical knowledge in ECD settings, especially how they tap into children's pre-knowledge.

Objectives of the Study

The study sought to:

1. understand the importance of early childhood practitioner conceptions of mathematical knowledge in enhancing children's learning of mathematics.
2. explain the kind of mathematical knowledge Early Childhood Practitioners (ECPs draw on to develop early mathematics,

Research Questions

1. What is the importance of early childhood practitioner conceptions of mathematical knowledge in enhancing children's learning of mathematics?
2. What kind of mathematical knowledge do ECPs draw on to teach early mathematics?

Theoretical Framework

The study is supported by Pedagogical Content Knowledge (PCK) which is a theory developed by Shulman (1987). PCK is defined as the integration of content and pedagogy into an understanding of how certain topics, problems, or difficulties are organized, represented, and suited to children's various interests and abilities, and presented for instruction (Shulman, 1987). The study uses PCK because it incorporates the knowledge foundations that practitioners should have in order to successfully teach mathematics to young children. In addition, Shulman believes that PCK in mathematics should be transformed in such a way that practitioners' subject-matter knowledge (SMK) is appropriate for instructional practices in the mathematics classroom. Furthermore, PCK is used as the portrayal of a teacher to teach a subject in understanding the content material, skills, curriculum related to the material, and appropriate method to teach accurately (Fariyani, Mubarok, Masfu'ah & Syukur, 2020).

Review of Related Studies

Feza (2012) also conducted a study on early childhood (0-4) practitioners' views on how children learn mathematics. In the study, eighteen practitioners from ECD centres across the different socio-economic background of Durban in KwaZulu-Natal were selected as participants. Data were generated through the use of a questionnaire to explore how young

children learn mathematics. The data analysis was done quantitatively using frequencies and qualitatively for an in-depth description of the practitioner's views and practices on how young children learn mathematics. The findings of the study reveal that most practitioners believe that young children need to be exposed early on to mathematics learning. Also, practitioners from affluent ECD centres showed sound knowledge of number compared to their counterparts from disadvantaged communities.

Another study was conducted by Martin (2015) focusing on making visible literacy as social practice in early childhood centres in Free State Province. The study adopted a qualitative research approach in which a purposive sample of two early childhood teachers teaching children between the ages of 3-4 years of age in two early childhood centres was used. Observation, interviews and Foucault's genealogical tools were used to generate data on making visible literacy as social practice in early childhood centres. The findings of the study revealed that teacher-directed and child-initiated pedagogical practices were considered best practice for enhancing child development and learning. Also, the discourse of play was rationalised as being important for both the development and learning of young children. However, both the teachers' structured play differently, and this was as a result of the context within which learning and teaching occurred

Gqoli (2021) explored factors hampering the effective use of strategies practitioners used in developing mathematics in pre-grade R children in selected Early Childhood Development centres of Oliver Reginald (OR) Tambo Inland District of education. The study adopted qualitative research method in which semi-structured interviews were used to collect the data from six practitioners of two ECD centres of OR Tambo Inland District in Eastern Cape Province. The findings of the study revealed that in the two ECD centres, both being located in rural districts, practitioners had no or minimal training on ECD.

A study on promoting quality learning environments at Early Childhood Centres through service learning was conducted by Labuschagne (2015). This was a qualitative study conducted in rural districts of Potchefstroom. Two ECD centres in Potchefstroom, North-West Province, were purposefully chosen to be observed. The study used observations, semi-structured interviews, focus group and reflexive journals as tools for data generation. The findings of the study revealed that the lack of sufficient outdoor and indoor learning areas at both centres had a detrimental effect on learning at both ECD centres. Also, inadequate indoor and outdoor learning and teaching support material, as well as basic facilities such as water and sanitation, posed challenges to the pre-service teachers who were involved in service-learning

The review of related empirical studies has shown that most practitioners from different areas in South Africa believe that young children need to be exposed early on mathematics learning. However, nothing is stated about the importance of these pedagogical practices in the discipline of mathematics. Furthermore, they have ideas about pedagogical practices that are considered best practice for enhancing child development and learning. Nevertheless, nothing is stated about the importance of these pedagogical practices in the discipline of mathematics. The studies also show that impact of service-learning on promoting quality learning environments in Early Childhood Centres is also vital. However, nothing or little has been revealed about the impact of service-learning in promoting learning environments for the development of mathematics in children. Moreover, lack of training in practitioners made them use traditional ways of teaching. The gaps in the literature have made the researcher to be interested in exploring how practitioners use their conceptions of mathematical

knowledge, which include pedagogical knowledge and practices to enhance mathematics in rural ECD centres of OR Tambo Inland District in Eastern Cape Province.

METHOD

This study adopted a qualitative research approach. McMillan and Schumacher (2014) describe the qualitative research approach as an analysis of people's individual and collective social actions, beliefs, thoughts and perceptions. This approach helped the researchers in establishing the meaning of a phenomenon (mathematical knowledge) from the views of participants (Creswell & Creswell, 2018). Additionally, the researcher used a multiple case study design as a basic plan.

Participants

In the study, the population was a group of practitioners of ECD centres of OR Tambo Inland District in Eastern Cape Province. Purposive sampling was used to select five early childhood practitioners of rural ECD centres in OR Tambo Inland District, Eastern Cape Province (Robson and McCartan, 2016). The participants included one practitioner from each of the five (5) centres selected as information-rich participants related to the phenomenon of interest (practitioner conceptions of mathematical knowledge), making a total of five (5) practitioners.

Instruments for Data Collection and Procedure

Semi-structured interviews with five early childhood practitioners were used to understand how practitioners use conceptions of mathematical knowledge to develop mathematics in young children within its real-life contexts (Nieuwenhuis, 2016b). Probes were used as encouragement, to fill in details and gain clarification to address the specific objectives (Nieuwenhuis, 2016b). During data collection, the researcher respected the autonomy of the ECD centres involved, the authority of the departments, which included the Department of Social Development, as well as the authority of the centre managers of the respective ECD centres. Therefore, an interview guide with questions related to the phenomenon of the study, which was the practitioner conceptions of mathematical knowledge, was used (Creswell, 2018). During the interviews, a recording tape was used to collect data, and probes were made for participants to provide further information.

Ethical Considerations

Ramrathan (2017) maintains that access to research sites is controlled activity. Therefore, without prior official approval, researchers are not permitted to access a test site and perform research. Hence, the ethical clearance for this research was granted by the University of the Free State Faculty of Education’s research ethics, then, the researcher conducted and assured that a series of ethical protocols were in place to guarantee that the research process was ethical. The protocols included: Participants' right, informed consent, maintaining professionalism, confidentiality, protection from harm, achieving anonymity and participants' vulnerability.

Data Analysis

The study used thematic analysis to identify patterns or themes within qualitative data (Braun & Clarke, 2016). The data for the study were transcribed into segments followed by codes, categories and themes (Creswell 2018).

FINDINGS

Theme 1: Knowledge and importance of early childhood practitioner conceptions of mathematical knowledge and child development

This theme arose during the semi-structured interviews with the practitioners. The knowledge and importance of practitioner conceptions of mathematical knowledge is elaborated through the practitioners' specific roles in the centre, their professional development, and training in ECD, mainly focusing on early mathematics.

Sub-theme 1.1: Specific roles of the practitioners in the centre

In an ECD environment, practitioners play multiple roles. These may vary slightly, depending on the children's ages (Howard, 2010). For children in day-care centres, practitioners must be able to understand and respond appropriately to their basic needs such as feeding and toilet training in a clean, safe and secure environment. This is evident, as practitioners confirmed:

> ***P1:*** "The duty that I do is to change nappies for the babies, feed them, and teach other children that are three and four years old."
> ***P5:*** "In the centre, I teach children and monitor them when they are writing and during their eating time."

In some of the centres, practitioners are aware of the fact that children come to the centre having knowledge gained from their background environments (cultural knowledge) and practitioners have to tap into the minds of the children and develop what they already know. This is confirmed by practitioners who stated:

> **P2*:*** "I help to develop the skills of the children and to make sure what they have and know [knowledge] is developed. I teach children."
> ***P3:*** *The work that I do is to collect the minds of the children through play and scribbling until they write something and understand that they are learning. I also teach them about colours and about toys like shapes and structure formation.*

Practitioners in rural ECD centres understood their roles in the centre, according to the findings. In addition, they acknowledged the need of developing mathematical skills and abilities in children, understanding the significance of guiding them in their play-based learning activities**.**

Sub-theme 1.2: Professional development of the practitioners

The findings indicated that early childhood development centre practitioners had undergone some sort of early-childhood education preparation. These participants indicated their qualification as follows:

> **P1** said, **"**I had a level four certificate obtained from an NGO."
> **P2** indicated, **"I** also had level four training from the Department of Education in 2019, but the certificate is not yet issued."
> ***P3*** *stated, I obtained a level three certificate from an NGO and couldn't study further due to financial constraints, and she felt that not having a level four certificate reduced her chances of having deeper knowledge.*
> **P4** had a level four certificate obtained from an NGO.
> **P5** also had a level four certificate from an NGO.

While there were some expectations originating from introducing practitioners to professional competency, professional practice and ways of improving children's mathematics learning, they thought that the training they received was insufficient. Hence, the study suggests that equipping them with professional development programs can help increase their knowledge and change their instructional practises.

Sub-theme 1.3: Training of practitioners in early mathematics

In order for practitioners to have knowledge and understanding of early mathematics content and pedagogy, they need to attend special training or workshops. These special training and workshops provide practitioners with ECD programmes which are stated in the NCF (DBE, 2015) as planned activities designed to promote the physical, mental, emotional, spiritual, moral, and social development of children from birth to nine years old. However, the findings from the study indicated that in all five centres, practitioners had not received any training or workshop based on early mathematics. This is so upsetting; no wonder our learners lack the basics. Training is CRUCIAL.

The lack of early mathematics training is seen in the responses of the practitioners when asked about their training on early mathematics:

> ***P1:*** "There is no mathematics training or workshops received except the one I got during the level four certificate training and a crash course I got from the neighbouring centres."
> ***P2:*** *I didn't get any mathematics training or workshops except the one I gained when studying a level four certificate whereby mathematics was one of the subjects. I usually get crash course training from neighbouring centres.*
> **P3:** "I didn't gain any training on mathematics except during the time I was in level three training, where we were taught how to use bottle tops to teach counting in mathematics."
> **P4:** "No mathematics training gained, and the only one I got was during the level four training, in which mathematics was one of the subjects taught."
> **P5:** "The only training in mathematics I got was during my level four training, in which mathematics was one of the courses."

In addition, the training should provide practitioners with the necessary knowledge, abilities, beliefs, and attitudes to assist children in developing their math skills and motivating them to solve problems and think critically.

Theme 2: Kinds of mathematical knowledge practitioners draw on to develop mathematics in children

This theme is about the knowledge early mathematics practitioners gained during their professional development training and how they have used it to improve centre-based practices. In addition, practitioners, as early mathematics implementers in children, should have a proper understanding of what early mathematics is, with the perception that mathematical knowledge predicts the future learning of children.

Sub-theme 2.1: Practitioner knowledge of mathematics curriculum

The aim of the early mathematics curriculum is to help every child to develop knowledge, skills, attitudes and behaviours for life, which are done through prescription, materials and methods (DBE, 2015). When the researcher inquired about early mathematics curriculum, the practitioners responded:

P1: *There are guidelines, but they are not clear, and I am not sure about where they come from. I just got them from the centre. Most of the time, I use the knowledge that I got during the training from the NGO.*
P2: "Yes, there is a guide I use for mathematics, but it was extracted from Grade R mathematics. There is no guide or curriculum specific for ECD (0 to 4 years)."
P3: "No curriculum except copying from other practitioners of the nearby centres what is taught and when it is taught."
P4: "I use Grade R guidelines and crash course training and advice we get from other practitioners. Otherwise, there are no guidelines and curriculum, especially for pre-schools."
P5: "I use guidelines that were used during the level four training and no workshop and curriculum I had."

The practitioners' replies, on the other hand, revealed that there was no mathematics curriculum, leaving them unsure of what they were doing in the centers..

Sub-theme 2.2: Early mathematics content and pedagogical knowledge practitioners gained during education and training programmes
Lema (2019) states that many activities involved in the enhancement of mathematics in the early years include linking everyday experiences to abstract ideas. Hence, early mathematical content and pedagogical knowledge practitioners have is vital for the development of early mathematics in children. Furthermore, pedagogical content knowledge should include practitioner conceptions of mathematical knowledge of how to represent the concepts, methods, and rules of the subject (mathematics). Following are the responses of practitioners on the issue of mathematical content and pedagogical knowledge:

P1: *The training I got from the NGO helped to broaden my content mathematics knowledge and gave me a clue on how and what to teach in mathematics in the early years, but it is not easy to apply it because the centre lacks space and a conducive environment. It is difficult to form play areas and outdoor games because of lack of space, as the centre is renting in a yard that is also used by residents that are renting.*
P2: *During the training by the Department of Education, I was taught about play areas and their relationships in which mathematics is the part of those areas. Like if I teach about shapes, I understood that they fall under the mathematics area. I gained knowledge of counting corners of the shape like three corners and four corners. I also gained knowledge about colours in shapes. Also, I gained knowledge of differentiating between mathematics area and phonics area. I learnt that when doing mathematics, you do it for at least a week or two to ensure that they understood before moving to another area like phonics. When teaching phonics, I introduce animals in which counting forms the part of teaching the phonics, e.g. a cow has four legs 1, 2, 3, 4, and then children count the number of legs. Then I understand that there is an integration amongst the areas, which helped me a lot when doing my preparation.*
P3: *As I have mentioned before, in training, we were shown how to use bottle tops to teach children counting from 1-5 and how to add. Boys are to use blue coloured bottle tops and girls red coloured bottle tops.*
P4: *During my level four training, I was taught how to design a learning environment for mathematics, but since the centre lacks space, has congested*

classrooms and lacks resources, I am unable to design according to the training sessions. The only thing that is helping in mathematics are the charts that are hung on the wall.

P5: *When I was doing my level four training, I was taught about the importance of the play areas, which included the mathematics play area. It is not easy to apply that due to lack of space in the centre.*

Practitioner responses show that the pedagogical content knowledge they have was acquired during their training and was insufficient for developing mathematics fully in children**.**

Sub-theme 2.3: Practitioner knowledge of designing mathematics learning environments

Regarding the issue of practitioner's knowledge on designing the learning environment, Lerman (2014) revealed that early mathematics teaching includes providing activities or creating learning environments by professionals, like practitioners and caregivers, in order to offer young children experiences aimed at stimulating the development of mathematical skills and concepts. However, in the ECD centres, practitioners were not trained how to use the few available learning materials efficiently, and the conditions in which the ECDs are housed or run, both indoor and outdoor environments, are typically not up to scratch. This is revealed by practitioners in their responses which included:

P2: *The centre is standing on its own, but the building is unable to accommodate children according to their ages. Indoor learning areas consists of play areas in which mathematics is included. In the mathematics play area, there are a few mathematics toys and objects, which include shapes, numbers, maps, charts, etc. Outdoor learning environments is an open space with swings, ladders which are not in good condition, and sand. All these children use them when playing, in which I direct the play activities.*

P4: *The centre has not enough space as it is in the house also used as residential area so, it is not easy, but we have some toys like swings, slides, and tyres used by children during outdoor play.*

P5: "I was taught about indoor and outdoor during my level four training, but the centre does not have enough space, so it is not possible to apply that knowledge."

Sub-theme 2.4: Practitioner knowledge of play theories in mathematics

Newton & Jenvey (2011) maintain that through play, children develop competence as they acquire skills of social engagement, co-operation, interaction, and sharing.

The practitioners had the following to say about play theories in mathematics:

P1: *I monitor children during play, especially during outdoor play. I am not aware of the theories of learning mathematics; I just watch them so that they must not endanger themselves.*

P2: "I direct and control indoor and outdoor play. I make sure that when playing, they don't get hurt, and I know nothing about mathematics learning theories..."

P4: "I don't monitor children when they are playing. They play swing and hoola hoops games on their own, and I only attend them when they fight. I know nothing about theories."

As a result of their lack of knowledge of play theories, practitioners let children play while they worked on their own tasks.

DISCUSSION OF FINDINGS

According to DBE (2015) the National Curriculum Framework emphasises self-perceptions of the roles of practitioners as observing children in their care, planning, and delivering services that support children's developmental learning needs and expectations. In an ECD environment, practitioners play multiple roles that may vary slightly, depending on the children's ages. For children in day-care centres, practitioners are expected to understand and respond appropriately to their basic needs, such as feeding and toilet training in a clean, safe, and secure environment. This was evident, in the voices of practitioners when that indicated that their primary duties were to change nappies, feed babies and teach young children aged between 3-4 years old.

Furthermore, the findings from the study indicate that in all five centres, practitioners had not received any training or workshops based on early mathematics. The lack of training is not in line with Noviyanti and Suryadi (2019), who stress that practitioners need to possess mathematical knowledge, which is a skill, in order to improve their teaching quality in early mathematics. In addition, the little knowledge of early mathematics practitioners received was gained during their professional development training. This lack of early mathematics training resulted in children lacking a proper foundation and background in mathematics, which might be the cause of poor performance in mathematics in ensuing grades.

Mathematical knowledge development, according to Lema (2019), includes a variety of activities that provide practitioners with the ability to mathematically equip and influence young children, which necessitates that they have basic knowledge and skills, as well as the ability to connect everyday experiences to abstract ideas. Additionally, Nguyen et al. (2016) reveal another branch of knowledge practitioners need for development of mathematics as counting competence, which is the ability to recognise that numbers represent quantities and have magnitudes, as well as mastery of one-to-one correspondence (understanding that each element in one set is paired with exactly one element from the other set). However, practitioner responses on the issue of knowledge of mathematics curriculum indicate that in all five centres, there was no well-defined curriculum and guidelines specific for early mathematics in ECD, especially in rural pre-schools. This is concerning, because practitioners develop mathematics in a variety of ways, as most of them mentioned, through the knowledge they obtained during their professional development training. Additionally, the traditional methods of transmitting early mathematics content and drilling information resulted in children who play a more passive role, increasing their reliance on the teacher's expertise and actions.

CONCLUSION

The findings of the study reveal that for practitioners to successfully enhance early mathematics in children, they need to draw heavily on their own knowledge of early mathematics, which is lacking in rural ECD centres. Moreover, the what (content) and the how (method) of learning was scaffolded through the traditional techniques of telling, direct instruction, and demonstrations in these centres. Additionally, the lack of mathematics knowledge and wisdom in children might lead to poor performance in mathematics in the ensuing grades.

Recommendations

Based on the findings the study recommends that:

1. The Department of Basic Education, in partnership with the Department of Social Development, should make it compulsory for all ECD practitioners in South Africa to receive the appropriate training, capacity building and an appropriately designed

qualification to ensure that they are competent in the teaching of emergent mathematics in the early grades.

2. There are needs to ensure quality education for practitioners and in-service programmes that focus on the following:
   Early mathematics content and pedagogy.
   Developing play-based mathematics programmes; and
   Supporting children's learning through play, which includes indoor and outdoor play.
3. To this end, the current wave of curriculum developers has to undertake the task of designing curriculum materials that will not only provide practitioners with guidance for classroom practice, but also foster practitioners' learning as they use them.

Limitations

The study used a small sample of five ECD centres and five participants of OR Tambo Inland District; therefore, generalisations to include the wider population are difficult to make. Additionally, the focus of the study was on practitioners only as units of analysis, and the findings are only applicable to the sample, which included the five practitioners at the five early-childhood centres. Therefore, future research should be undertaken using mixed research approaches to provide population-level evidence.

REFERENCES

Bosman, A., & Schulze, S. (2018). Learning style preferences and mathematic achievement of secondary school learners. *South African Journal of Education, 38*(1), 1–8

Braun, V., & Clarke, V. (2013). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Carrillo-Yañez, J., Climent, N., Montes, M., Contreras, L.C., Flores-Medrano, E., Escudero-Ávila, D., Vasco, D., Rojas, N., Flores, P., Aguilar-González, Á., & Ribeiro, M. (2018). *Research design: Qualitative, quantitative and mixed methods approaches.* 4th ed. London: Sage.

Creswell, J.W. & Creswell, J.D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches*. Fifth edition. Los Angeles: SAGE.

Department of Education. (2001). *White Paper 5. ECD Policy*. Pretoria: Department of Education

DBE. (2009). *National Early Learning and Development Standards for Children Birth to Four years (NELDS)*. Pretoria: Government Printers.

Department of Basic Education. (2015). *The South African National Curriculum Framework for Children from Birth to Four*. Pretoria: Government Printers.

Dumma, C. M., & Mojeed K. A. (2015). Preparation of mathematics teachers: Lessons from review of literature on teachers' knowledge, beliefs, and teacher education. *American Journal of Educational Research, 3*(4), 505-513. doi: 10.12691/education-3-4-18

Fariyani, Q., Mubarok, F.K., Masfu'ah, S., & Syukur, F. (2020). Pedagogical content knowledge of pre-service physics teachers. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, *9*(1), 99-107

Feza, N. N. (2012). Can we afford to wait any longer? Pre-school children are ready to learn mathematics. *South African Journal of Childhood Education*, *2*(2), 58-73.

Feza, N. (2014). Inequities and lack of professionalisation of early childhood development practice hinder opportunities for mathematics stimulation and realisation of South African policy on quality education for all. *International Journal of Inclusive Education*, *18*(9), pp.888-902.

Gqoli, N. (2021). Factors Hindering Effectiveness of Strategies Practitioners Use in the Teaching of Pre-grade r (3 to 4 years) Mathematics. *International Journal of Sciences and Research, 77*(7), 55-64

Hoover, M., Mosvold, R., Ball, D.L., & Lai, Y. (2016). Making progress on mathematical knowledge for teaching. *The Mathematics Enthusiast, 13*(1), 3-34.

Howard, J. (2010). Making the most of play in the early years: The importance of children's perceptions. *Play and learning in the early years: From research to practice, 145*.

Labuschagne, M. (2015). *Promoting quality learning environments at early childhood centres through service learning*. PhD dissertation. Potchefstroom: North-West University.

Lema, J.E. (2019). *Prekindergarten teachers' beliefs and attitudes toward children's mathematics and learning trajectories.* Doctoral dissertation, Texas Woman's University.

Lerman, S. (ed). (2014). *Encyclopedia of mathematics education*. Cham, Switzerland: Springer.

Martin, C.D. (2015.). *Making visible literacy as social practice in early childhood centres.* PhD dissertation. Bloemfontein: University of the Free State.

McMillan, J., & Schumacher, S. (2014). *Research in education: Evidence–based inquiry*. Harlow, Essex: Pearson. *Early Childhood, 15*(2), 165-175.

Newton, E., & Jenvey, V. (2011). Play and theory of mind: associations with social competence in young children. *Early Childhood Development and Care, 181*(6), 762-773.

Nieuwenhuis, J. (2016b). *Analysing qualitative data.* In Maree, K (ed.). *First steps in research*. 2nd ed. Pretoria: Van Schaik.

Noviyanti, M., & Suryadi, D. (2019), February. Conceptualizing mathematical knowledge for teaching of Indonesian teacher in teaching number sense to early childhood. *Journal of Physics: Conference Series, 1157*(3), 03212

Nguyen, T., Watts, T.W., Duncan, G.J., Clements, D.H., Sarama, J.S., Wolfe, C., & Spitler, M.E. (2016). Which preschool mathematics competencies are most predictive of fifth grade achievement? *Early childhood research quarterly, 36*, 550-560.

RSA. (2015). *National Integrated Early Childhood Development Policy*. Pretoria: Government Printers

Robson, C., & McCartan, K. (2016). *Real world research: a resource for users of social research methods in applied settings*. Wiley.

Selmi, A.M. (2015). *Early childhood curriculum for all learners*. London: Sage.

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1-22.

Shulman, L.S. (1986). Those who understand: A conception of teacher knowledge. *American Educator, 10*(1), 9-15, 43-44.

Sinyosi, L.B. (2015). *Factors affecting grade 12 learners' performance in mathematics at Nzhelele east circuit: Vhembe district in Limpopo*. M.Ed. dissertation. Pretoria: University of South Africa.

Siyepu, S. (2013). The zone of proximal development in the learning of mathematics. *South African Journal of Education, 33*(2) Art. #714, 13 pages. https://doi.org/10.15700/saje.v33n2a714

Tlou, F.N., & Feza, N.N. (2018). Grade R Educators' Perceptions of Their Own Practices: A Case Study of Educators in the Eastern Cape of South Africa. *International Journal of Educational Sciences, 20*(1-3), 33-40.

SUPPORTING DEAF LEARNERS USING UNIVERSAL DESIGN FOR LEARNING IN LESOTHO: ENGLISH TEACHERS'VOICE

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Abstract
The English language does have some economic benefits. It is one of the legislated subjects in Lesotho, even though it becomes a challenge to Deaf learners, as they are included in the mainstream to accumulate critical survival skills. Studies indicate that this is a concern globally as Deaf learners experience poor academic challenges and have lagged behind their counterparts. This prevailing situation prohibited Deaf learners (DLs) from becoming successful participating citizens. The present study is informed by an interpretative paradigm and situated within a qualitative research approach to explore the understanding of Universal Design for Learning (UDL) by Lesotho English teachers working with DLs. Data were generated through interviews with ten participating English teachers who were purposefully selected. The researcher analysed the data thematically through Braun and Clarke's six-phase framework. The findings revealed that some participants did not understand the term 'Universal Design for Learning' since this was the first time they came across such a term. They also revealed that these concerns English teachers involve collaborations of the views by Deaf learners, the curriculum designers, and the Ministry of Education and Training. The participants admitted that since they experience limited knowledge about UDL, they recommend the in-service training, conferences, and workshops by UDL expects professionals, through training of teachers, in different Media and researchers to equip them to understand it better and its principles in practice. The study concludes that improving the English performance to DLs will result from understanding UDL and its usage through practice. The collaboration and interrelationship of all stakeholders through interacting and being involved in deaf education. Therefore, the study recommends considering and identifying the English teachers as agents of change; hence they need awareness of UDL and its practical usage.
Keywords: Asset-based approach, Deaf learners, English teachers, Lesotho, Universal Design for Learning.

INTRODUCTION

English is essential to become a successful participant in educational settings and subsequently acquire professional and employment opportunities. Takalashi et al. (2017) state that the English language plays a vital role in an individual's participation in contemporary industrialised society. However, some studies indicated the concern on the reading literacy challenges of Deaf learners, which has been an upsetting concern in the African context, especially in Lesotho, as described in some studies (Csizer & Kontra, 2020; Hassanzadeh & Nikkhoo, 2019; Mosia, 2017). These studies further asserted that Deaf learners significantly had poorer reading comprehension, literacy skills, and overall depressed academic achievement (Hassanzadeh & Nikkhoo, 2019; Mosia, 2017).

Among this category of impaired learners, some are Deaf, who also seem to struggle with English. Despite all the efforts by the Lesotho government, through the Ministry of

Education, to improve the successful inclusion of Deaf learners in mainstream classrooms, the results are not yet encouraging in some contexts and for varied reasons. The academic achievement of Deaf learners in Africa, including Lesotho, is compounded by issues, such as lack of resources and a lack of adequate skills to meet the English demands of Deaf learners that still hinder their academic achievement (Mosia, 2017).

The tremendous key challenge experienced by Deaf learners internationally is the issue of English writing and reading comprehension, which is high, influenced by poor English vocabulary. However, results from some studies, such as Mwanyuma (2016) have indicated that language seemed to be the barrier. A body of literature shows that inclusive education does not only intend to identify barriers to learning, but it is also an opportunity for teachers to learn, innovate and discover new ways of addressing barriers to learning and development (UK Essays, 2018).

Theoretical Framework

The asset-based theory facilitates UDL and DLs' achievement in the English classroom (Kretzmann & McKnight, 1993). The asset-based perspective contrasts the deficit model towards human learning and development (Wehmeyer et al. 2017). The focus acknowledges gifts, abilities, capabilities, and when these skills are used, people will live and thrive. This implies DLs, English teachers, and their abilities to use UDL are regarded as essential assets in the English classroom. UDL is significantly successful in addressing the barriers to learning optimally for learners who are deaf in South Africa (Mapepa & Magano, 2018) and elsewhere. The centre of the asset-based approach is mobilisation and harnessing local resources, assets, skills, and insights to solve their problems (Wehmeyer et al. 2017). Through collaboration, the English teachers working DLs in Lesotho grow social and academic interaction, assets such as teaching strategies, knowledge, and awareness of UDL. When this happens, these teachers enhance their teaching and improve the academic performance of the learners their working with, in this case, DL in Lesotho. Interestingly, in Lesotho, there was no study exploring the teachers' understanding of UDL when working with DL in the English classroom context in Lesotho. In reference to this gap, this research is essential to understand the English teachers' understanding of UDL especially working with DLs in the Lesotho context.

Review of Related Literature

The Universal Design for Learning (UDL) has emerged as one of the innovative ways to improve teaching and learning in the context. Boothe et al., (2018) define UDL as an approach wherein educators use adaptive learning programs to support and ensure access for learners and equal opportunities to succeed. Similarly, as mentioned earlier, the researchers stated that UDL is a comprehensive and straightforward approach for curriculum differentiation. The goal for UDL is to use a variety of teaching methods; values diversity through productive designs provides learners with alternative materials and tools to monitor their learning progress.

UDL as an approach to addressing barriers to learning and exclusion. It is consistent with a systematic and developmental approach to understanding problems and planning action (Morin, 2018). It is also constant with new international approaches that focus on differentiated teaching approaches that give all learners, including Deaf learners, equal opportunity to succeed.

The use of UDL and its principles, namely multiple means of representation, a variety of expression, and action and engagements, have been shown to be effective in other fields, such as mathematics teaching. Hence, teachers built conceptual understanding, procedural fluency, and positive attitudes towards mathematics teaching (Morin, 2018). Studies conducted in Kuwaiti by Almumen (2020) emphasises the effectiveness of UDL on the learning engagement of learners with behavioural disorder, that through UDL teachers could maximize learning among learners with and without behavioural disorder.

The report by the Alberta Government (2018) illustrates that the UDL approach increases student engagement and academic success, and helps teachers better support every learner in their classroom. Morin (2018) in America affirms the flexibility of UDL as beneficial to all learners, at all grade levels. Hence, its effectiveness has also disseminated in other fields, like as surgical education, as described by Karen and Gronseth (2020).

There is limited research on the use of UDL in inclusive schools especially in the context of Lesotho. The present study intends to contribute to the existing body of knowledge by providing the views and voices of Lesotho English teachers on how they can support DLs using UDL. Our proposition is that Lesotho English teachers will be able to identify, evaluate and discuss the benefits and challenges of UDL. In this connection, share best practices of UDL and improve the academic performance of DL in the English classroom context. The following section turns to the asset-based approach as an essential lens in working with DL in the school context.

Problem Statement

On the backdrop of the discussions in the introduction, it is evident that mainstream schools in Lesotho have not been to the benefit of the Deaf learners. This negates the principles of inclusive education. These Deaf learners will therefore not achieve their full potential as contributing citizens. These challenges require teachers to be creative and use multiple approaches to improve the academic achievement of Deaf learners. The present study focuses on exploring whether the English language teachers who work with Deaf learners in Lesotho do have an understanding of this phenomenon.

Objectives

- To explore the understanding of Universal Design for Learning by Lesotho English teachers working with Deaf learners.
- To explore how the understanding of UDL could be used to improve the teaching of English to Deaf learners in selected schools in Lesotho.

METHOD

Research Paradigm, approach, and design

The study adopted the interpretative paradigm within the qualitative research approach and instrumental case study research design. The qualitative approach allows participants to speak in their voice about their experiences and perceptions and interpret the reality of their natural setting. Through this design, the telephonic interview was employed to gather data and provide insight into supporting DLs using UDL in Lesotho through teachers' voices.

Population and sampling

The population is the entire group to conform to the specific criteria, intending to generalize the research results (Etikan et al. 2016). The target population for this study includes two inclusive primary schools in Leribe District as the research side for the study.

The sample size comprised of five teachers from each participating school that make the sum of 10 teachers. The participants were selected purposively (Etikan et al. 2016) to ensure that only English language teachers working with Deaf learners from grades three to grade seven are participants. In this case, English teachers who were willing to participate were purposively selected. They were chosen according to their experience teaching Deaf learners, their daily interaction, and their ability to communicate with Deaf learners through Sign language. The emphasis is not a large number of teachers because the study is not quantitative.

Data generation method

The data generation method used in this study was the semi-structured interview through telephone. One of the advantages of a telephonic interview is that the phone provides a greater perceived level of anonymity and privacy than face-to-face interviews since the researcher promises to ensure data confidentiality. This interview encourages and gives the researcher and participants much more flexibility to talk freely and openly (Farooq & De Villiers, 2017). The researcher can follow up on particular interesting avenues that emerge in the interview, and the participant can give a fuller picture (Greeff, 2016). The interviews enabled the English teachers working with Deaf learners to share their experiences and express their views on supporting DLs using UDL and how they can use it to improve their performance. In the interview, the researcher probed the participants to gain a deeper understanding and yield rich data (Yin, 2016).

Data Analyses

Once data was generated through telephonic interviews, it was transcribed to allow analysis to take place. The themes were then pre-allocated, according to the research questions. The thematic analysis was used to help the researcher to identify sub-themes in the present study. The following illustrates the phases of the analysis process: familiarising with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report.

FINDINGS AND DISCUSSION

The data analysis yielded two main themes: Lesotho English teachers' constructions of the universal design for learning and the application of universal design for learning in working with Deaf learners in the English classroom. In connection to these themes, five sub-themes emerged diverse teaching methods, including all learners, developing mode of communication; learning resources and in-service development initiatives.

Theme one: English teachers' working with deaf learners construction of UDL

The theme highlighted the participants' understanding of Universal Design for Learning. The findings were elicited from the participants' responses. Meanwhile, the themes and sub-themes are presented below figure 1:

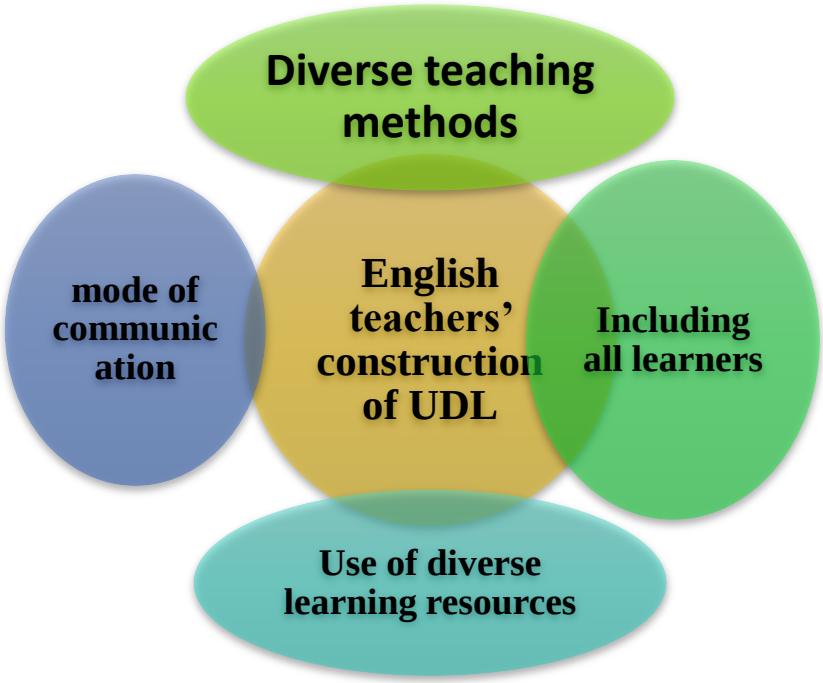

Figure 1. English teachers' working with deaf learners' construction of UDL.

Diverse teaching methods

Though the comments below emanated from two participants of the two schools, most of the other participants during the interview sessions concurred with the view.

Teacher 3 from school A indicated:
"According to my understanding, UDL *is an approach of teaching, which includes various methods to teach a lesson like games, role-play, dancing, music, etc.*"

Similarly, teacher six from school B also commented that:
"Hmm! UDL accommodates the different learning abilities, where lessons should be presented with multiple methodologies using learning materials that are user friendly."

Teacher 2 from School A:
"... we sometimes take field trips for them to get a deeper understanding during the English lessons, thinking we vary methods, but they still experience poor performance in English."

Most of the participating English teachers revealed that UDL enables the flexibility of using various teaching methods, and it is regarded as an essential aspect of teaching Deaf learners. The findings corroborate with the study by Morin (2018) who argues that UDL enables teachers to become more flexible, using non-conventional methods, so they can be more adaptable to the needs of their learners and not use the traditional techniques teaching approach. These findings are supported by Morin (2018) who defined UDL as instrumental approaches that provide learners with choice and alternatives in the materials, content, tools, and its goal is to use a variety of teaching methods to remove any barriers to learning. However, the definition is also associated with inclusion.

Including all learners
The participants indicated that as inclusion caters to all learners' diverse needs, using different approaches in UDL helps to accommodate learners with various disabilities.

Teacher 7 from school B:
"UDL cater for all learners with disabilities to learn harmoniously with other learners."

Teacher 3 from school A
"Yes! In the Universal Design for Learning classroom, all learners with different disabilities are accommodated."

To Teacher 8 agreed with teacher 7 in school B:
"Learners with different disabilities are provided with opportunities to learn in harmony using UDL."

The discussion above shows how UDL in an English lesson enriches inclusive practices, accommodating all learners, including DLs. The findings are essential to the research study; therefore, they similarly corroborate the view that emphasised the accommodation and assurances of quality education to all through inclusive education.

Use of diverse learning resources
UDL is associated with the use of learning resources in English lessons to broaden the learners' understanding.

According to Teacher 7 from school B:
"...learning material should be diverse and user-friendly to all learners because unlike the majority of hearing learners who can learn many things by recalling from language background, Deaf learners only learn by seeing and manipulation of materials to match them with their signs."

Teacher 4 from school A emphasised:
"...the use of different teaching materials is significant; hence the DLs are visual learners."

While Teacher 6 from school B added:
"...the use of diverse teaching material is encouraged for the learning of DLs to associate and match the names of materials with the appropriate language signs and also to improve their vocabulary."

According to Teacher eight school B
"UDL is the flexible way of thinking about teaching and learning during preparation that gives all learners equal opportunities to learn. This includes the use of teaching aids and appropriate mode of communication."

The findings are supported in the asset-based approach, as indicated by Blickem et al. (2018) where they suggested the involvement, identification, and the use of existing and available resources and assets at the school boundaries to address the problem therein.

Teacher 9 from school B:
"The use of various teaching materials is essential as visual learners, but we are only using the available material in our school. No more resources other than that."

Similarly, Teacher 5 from School A added a comment:
"Using different material offers learners an opportunity to make a choice, but we only use drawn chart no another alternative."

Moreover, the quotation discussed the value of the variety of teaching resources in English lessons. The relevance of these findings to the current study is supported by Morin (2018). They value UDL as an approach that signifies freedom of choice and alternatives in the materials to remove any learning barrier.

Mode of communication
According to Teacher 4 from school A:
"Since learners have different abilities and therefore different styles of learning, I suggest the mode of communication should be inclusive, e.g., sign language, lip-reading, and finger-spelling in the classroom of DL.

Teacher 6 in school B added:
"All teachers here should be deaf aware and therefore use sign fluently so that they can easily communicate with DLs."

"The lower grades are taught manual alphabet through Sign language to prepare them for finger-spelling starting with self-introduction, such as the name and surname."
Teacher 1, school A supported the views of teacher 6 in school B.

Teacher 7 in school B also has this to say:
"Almost all of DLs in this school can sing. It is, therefore, helpful to know Sign language as a teacher to communicate with DLs easily."

The excerpts from the teachers emphasised Sign Language as an appropriate mode of communication during the teaching and learning of DLs in an English classroom. Supports Mwanyuma (2016) and justified that Sign language, gestures, and writing are the best modes of communication used to teach DLs. This also resonates with the Lesotho curriculum and assessment policy (2008) which emphasises that teachers should use Sign language in the teaching and learning process. Using Sign Language seems to be characterised by the way teachers felt UDL was used in their schools.

Theme Two: The application of UDL in enriching teachers working with deaf learners in the English classroom
This theme analyses the participants' responses on how UDL can improve or enhance their teaching of English to DLs. The findings are presented as sub-themes and shown below in figure 2:

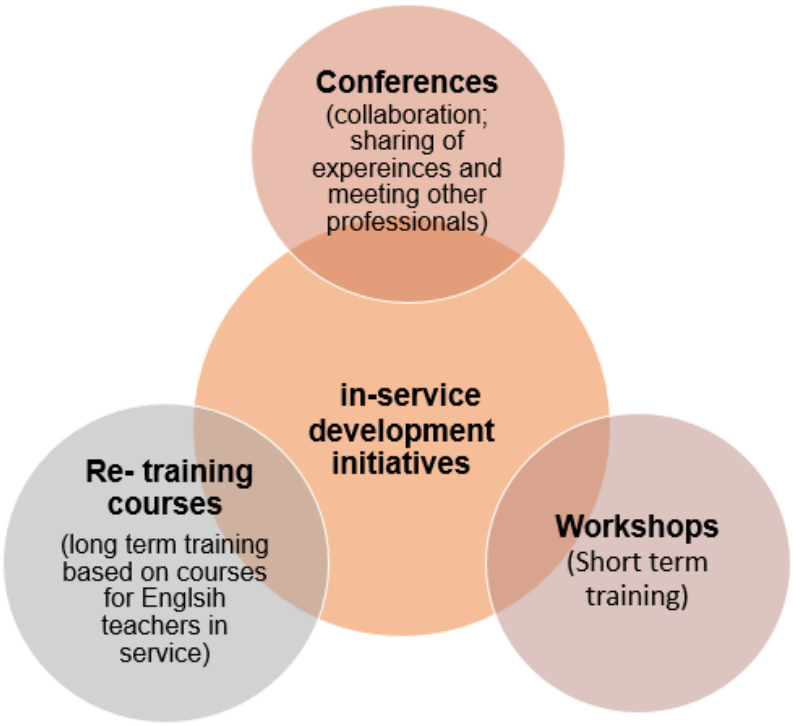

Figure 2. The application of UDL to enrich or enhance the teaching of DLs' in the English classroom

Conferences

The conversation here gives the relevance of attending conferences for teachers to enhance their teaching abilities and skills.

"Yah! Attending conferences for some days or weeks is very crucial for the improvement of our teachings" (Teacher 3, school A).

"...going for conferences as long as two weeks or more training for basically English teachers I think will help us learn about UDL and improve our teachings" (Teacher 7, school B).

"I will suggest as teachers, we need to attend more conferences to meet professionals and stakeholders, to work with them. I think that these experiences will help us improve in our teachings" (Teacher 5, school A).

The above verbatim quotations from the participating teachers revealed that English teachers have a limited understanding of UDL. A common feature among all the teachers' responses was that, they need to enhance their teaching skills by attending conferences and collaborating with other educational professionals aware of UDL principles to share their knowledge of UDL. According to them, this will help enhance the teaching of English to DLs and improve DL's academic performances in English. The study identified that English teachers working with DLs should share their experience, both their success and their failure, with other teachers and DLs. All their success can be facilitated through networking and collaboration among teachers and other professionals serving DLs. They believe that conference attendance can improve their understanding of UDL and their desire to be associated with a successful English classroom.

Therefore, the findings in this theme have shown that applying UDL to teaching requires teachers to collaborate with other English teachers and DLs involved and curriculum developers to improve their skills as experts in performance. This implies building

relationships among DLs, English language teachers, and teaching professionals to collaborate, mobilise and harness their knowledge, experiences, skill, and capabilities to improve the teaching of UDL.

Workshops

The majority of the participating teachers also ascribed that providing regular workshops by the schools and department of education to attend and be trained on UDL will help enhance their teachings of DLs in the English classroom.

"We need regular workshops to improve the performance because most of us have not done special education, the one to two days' workshop can bring the difference maybe."
*"No, I still believe English teachers do not have a deep understanding of the nature of DL, that is why it's hard to use appropriate approach, we need regular workshops, to understand UDL, its application, maybe it can assist in the improvement of our English teaching" (*Teacher 5, school A.

Teacher 2, school A said:
"*Yah! Having regular workshops will assist us in having a deep understanding of the nature of Deaf learners."*

Teacher 7, school B, also responded that:
"*Maybe teachers can share experiences in workshops on how they approach DLs can bring an improvement (cooperative learning) and becoming part of the English language learning solution as full contributors to the performance and improvement process."*

As Teacher 7 from school, B indicated:
"I encounter some problem in teaching reading and writing skills, especially to Deaf learners; I wish the professionals can assist us with the short-term workshops on how to approach DLs concerning UDL."

The findings showed that providing regular workshops on a short-term basis to train teachers is crucial and will help improve their teachings to DLs in the English classroom. To the participants, the regular workshops could provide some refresher courses for English teachers on a short-term basis. They would help enhance or enrich their teachings, gain more knowledge and support of DLs, and improve DL's academic performances. In this case, according to the participants, attending workshops could also be identified as another way of using UDL to enhance their teachings and understand DLs better. This is in line with Morin (2018) who reported that teachers need to be empowered through workshops to design lessons for the broadest possible learners and gradually familiarize themselves with UDL's three fundamental principles, namely representation, action, and expression and engagement.

Re-training courses

Training and workshops play a significant role in nurturing the skill set and knowledge. A workshop is defined as hands-on training where the participants contribute actively and exchange ideas for a few hours or several days. At the same time, re-training provides immediate support and training to employers that may require learning new skills (De Grip & Pleijers 2019).

The participants indicated that the provision of re-training for them on a long-term basis by the school and education department is crucial for improving the quality of teachers in the

teaching of English to DLs. In addition, they pointed out that there is a necessity for teachers to be given some re-training sessions to upgrade their UDL knowledge, skills, and strategies. Some of the participants spoke about the importance of teachers having re-training to acquire knowledge, understanding, and abilities of the UDL approach. Other participants expressed that, despite working in an inclusive setting, they still need more re-training on UDL by professionals during the school holidays to support and boost DLs' academic performances in English and improve their teachings.

Teacher 1 from school A noted:
"Teachers do not have a deep understanding of the nature of UDL. I think in-service training can play a vital role in leading to a new success."

Teacher 9 from school B stated:
"It is hard to answer this question since I do not know UDL, but I believe the intensive training course on UDL can be of significance."

Teacher 3 from school A concurred:
"Teaching DLs is challenging; maybe going for extensive training about UDL during the holidays by the professionals can assist us."
"I believe most English teachers do not understand UDL, if not all, but are very familiar with inclusion since we are working in an inclusive school. Therefore, we are interested in having more training and hearing more about UDL, in using it to improve English performance" (Teacher 2).

Teacher 1 added that:
"I use various teaching methods, but this seemed not enough since the performance is still poor, the in-service training is needed, to better understand DL, as well as apply the UDL."

The findings revealed that the participants have limited knowledge and understanding of UDL. Hence, they need quality re-training to be fully equipped with new teaching techniques and approaches, specifically for gaining UDL skills in English teaching to DLs improve DLs' performances in English. The findings align with Morin (2018), who argues that teachers' acquiring UDL skills and experiences will go a long way towards providing them with the knowledge and skill they need in the training session and for teachers' professional development. Milon et al. (2018) also report in their studies that English teachers need to be given more training before entering service and, most importantly, in-service for professional development.

This should be a continuous facilitative process that updates and upgrades teachers' knowledge to persist with education changes (Milon *et al.*, 2018). The above findings showed that some English teachers desperately need more training to enhance their teachings, improve learners' performance, and comply with the constant educational changes. The participants' verbatim quotes show the relevance of providing teachers with quality in-service training for their professional development activities.

The findings showed the diverse professional development activities required by the teachers, through the application of UDL, to enhance their teachings and improve DLs' academic performances in their English classrooms. It was evident that the participating teachers requested to attend conferences, which will create an opportunity and space for them to collaborate with other professionals and stakeholders in special education. According to

them, participating in conferences will enable them to gain more knowledge and skills and share ideas with others on teaching DLs. Another interesting factor was the insistence by the teachers for a regular workshop to be provided for them by their schools and the department of education on a short-term basis so that they could improve their UDL skills.

CONCLUSION

The teachers seem to value the use of various teaching methods, and this is a good practice, because this strategy is suggested by some researchers like Rao *et al.* (2016) as highly proficient and promotes flexibility in teaching methods

Lastly, another more eminent factor was in-service training for teachers to conform to the constant educational changes, develop more UDL knowledge and skills, and enhance DLs' academic performances and their English teachings. The participants indicated that schools and educational departments need to provide in-service training for the short term and long-term services to help them understand UDL and develop professionally. Hence, CAST (2018) has reinforced that teacher candidates must design lessons, assessments, environment, materials, and methods, using the UDL guideline as part of their in-service training. Literature shows that mobilising English teachers as assets helps the DLs to be engaged and to control their community by defining and solving problems with their resources and connections to other networks for assets and exchange (Bumiller, 2019).

Recommendations

Therefore, the study makes the following recommendation to education stakeholders and English teachers:

- Provision of more learning resources and materials to teach DLs.
- English teachers should make aware of the available resources in their schools.
- There should be quarterly workshops, conferences, and collaboration provided for English teachers to meet, share ideas and knowledge, and look for solutions to address the issue of poor English performance among their DLs, using UDL practices and the application of its principles.

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REFERENCES

Alberta Government (2018). Making Sense of Universal Design for Learning. https://education.alberta.ca/media/464638/video-discussion-guide-4-making-sense-of-universal-design.pdf

Almumen, A., H. (2020) universal Design for Learning (UDL) across culture. *The Application of UDL in Kwaiti Inclusive Classroom.journals*.sagepub.com/home/sgo Doi: 101177/2158244020969674

Blickem, C., Dawson, S., Kirk, S., Vassilev, I., Mathieson, A., Harrison, R., & Lamb, J. (2018). What is asset-based community development, and how might it improve the health of people with long-term conditions? *A realist synthesis*. *Sage Open, 8*(3), 1-13. 2158244018787223.

Boothe, K. A., Lohmann, M. D., & Hall, D. D. (2018) Applying the Principles of Universal Design for Learning (UDL) in the College Classroom. *The Journal of Special Education Apprenticeship, 7*(3), 1-10.

Bumiller, K. (2018). Experiment in the Making. *Inclusive Classroom in Prison on campus. Journals, 52*(1), 100-105. https://doi.org/10.1017/51049096518001051 30 November 2020

Centre of Applied Special Technologies (CAST). (2018). *UDL and the Learning Brain.* Available from http://www.cast.org/binaries/content/assets/common/publications/articles/ cast-udlandthebrain-20180321.pdf

Csizer, K. & Kontra, E. H. (2020) Foreign Language Learning Characteristics of Deaf and Severely Hard-of-Hearing Student. *The Morden Language Journal*, *104*(1), 233-249.

De Grip, A., & Pleijers, A. (2019). Workshop attendance as a mode of learning: Evidence from the Netherlands. *Vocations and Learning*, *12*(3), 361-385.

Etikan, I., Musa, S. A., Alkassim, R. S. (2016) Comparison of Convenience Sampling and *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4. Doi:10.11648/j.ajtas.20160501.11

Farooq, M. B., & De Villiers, C. (2017). Telephonic qualitative research interviews: When to consider them and how to do them. *Meditari Accountancy Research, 25*(2), 1-29.

Greeff, M. (2016). Information collection. In. De Vos, A.S., Strydom, H., Fouche, C.B., & Delport, C.S.L. (Eds.), *Research at grassroots: For the social sciences and human service professions*. Pretoria: Van Schaik Publishers.

Hassanzadeh, S. Nikkhoo, F. (2019). Reading Literacy development of Deaf Students in Special schools in Iran. *International Journal of Special Education*, *34* (1) 245-254

Karen, J., D. & Gronseth, S., L. (2020) Application of Universal Design for Learning (UDL) Principles to Surgical Education during the COVID-19 Pandemic. *Journal of Surgical education 77*(5), 1008- 1012

Kretzmann, J., & McKnight, J. (1993). A path toward finding and mobilizing a community's assets. Chicago: ACTA Publications.

Lesotho Curriculum and assessment policy (2008). *Education for individual and Social Development*

https://planipolis.iiep.unesco.org/site/default/files/resources/Lesotho_curriculum_and_assessment_policy_framework.pdf

Mapepa, P. & Magano, M. D. (2018). Support to Address barriers to Learning for Learners Who are deaf. *African Journal of Disability 7*(0), 381. https://doi.org/10.4102/ajod.v7i0.381

Milon, M. R. K., Hossain, M. R., & Alam, M. R. (2018). Factors Influencing on Dropouts at Undergraduate Level in Private Universities of Bangladesh A Case Study. *Australasian Journal of Business, Social Science and Information Technology*, *4*(4), 177-188.

Morin, A. (2018). Universal Design for Learning (UDL). *What you need to know.* Available from https://www.understood.org/en/learninattention-issue/treatment-aproaches/educationnal-stratagies/universal-design-for-learning-what-it-is-how-it-works

Mosia, P. A. (2017). Access to higher education for students with disabilities in Lesotho. [Doctoral dissertation, University of South Africa]. University of South Africa Research Repository. http://hdl.handle.net/10500/23282

Mwanyuma, R. M. (2016). Factors Influencing the Academic Achievement of Deaf Learners in Kilifi County, Kenya. *A Case of Sahajan and School for the Deaf* [Doctoral dissertation. University of Nairobi]. University of Nairobi Research Repository. http://hdl.handle.net/11295/98964

Rao, K., Currie-Rubin, R., & Logli, C. (2016). *UDL and inclusive practices in IB schools worldwide. CAST Professional Learning.* Available from

https://www.ibo.org/contentassets/318968269ae5441d8df5ae76542817a0/research-udl-full-report-en.pdf

Takalashi, N. Isaka, Y., Yamamoto, T., & Nakamura, T., (2017). Vocabulary and grammar differences between Deaf and hearing students. *Journal of Deaf Studies and Deaf Education, 22*(1), 88-104.

UK Essays. (2018). *The many benefits of learning English language essays*. Available from https://www.ukessays.com/essays/english-language/the-many-benefits-of-learning-english-english-language-essay.php

Wehmeyer, M. L., Shogren, K. A., Little, T.D, & Lopez, S. J., (2017). Introduction to Self – determination through life-course. *Springer, Dordrecht*. https://doi.org/10.1007/978-94-024-1042-6_1

Yin, R. K. (2016). *Qualitative research from start to finish* (2nd ed.). New York The Guilford Press.

INTERNET AND ACADEMIC SELF-EFFICACIES AS CORRELATES OF SCIENCE STUDENTS' PERFORMANCE ANXIETY IN VIRTUAL LEARNING ENVIRONMENT

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Abstract
The COVID-19 pandemic has precipitated a paradigm shift in the methods of teaching from the conventional face-to-face methods, to virtual teaching and learning. The study explored the moderating role of personality traits (openness and agreeableness) on the predictive power of two types of self-efficacy – internet and academic – on science students' performance anxiety. The studyadoptedcorrelational research design. Data from 305 undergraduate science education students were collected using an online questionnaire, comprisingdemographic variables and four scales (personality trait, internet self-efficacy, academic self-efficacy, and virtual learning environment performance anxiety scales). Collected data were analysed using Pearson correlation and Hayes process macro (model 1) regression analysis. Results show that openness and agreeableness are significantly related to science students' performance anxiety in virtual learning environments. Agreeableness significantly moderates the relationship between the two types of self-efficacy and performance anxiety while openness only significantly moderates the relationship between academic self-efficacy and performance anxiety in online learning environments. The study concluded that personality traits like openness and agreeableness are key to students' performance anxiety in online learning platforms. It is recommended among other things that measures be taken to improve students' self-efficacies, as it is key to reducing students' performance anxiety in virtual learning platforms.
Keywords: Anxiety, Internet, Personality traits, Self-efficacy, Virtual learning environment.

INTRODUCTION

Conventionally, academic activities in schools are delivered through a face-to-face, teacher-student interaction approach. Following the lockdown imposed by COVID-19 during the pandemic, schools responded to the call to halt ongoing learning in schools, and resorted to virtual teaching and learning. This approach was necessary to ensure that students continued to learn amid maintaining social distancing guidelines. The transition from face-to-face to virtual teaching and learning systems raised concerns about students' emotional disposition and confidence to learn effectively in virtual learning environments (Abdous, 2019). Students who are confident in their ability o learn in virtual environments have the potential to quickly adapt to this new method of learning and actively deal with all the problems encountered, thus showing positive emotional dispositions towards learning. This notwithstanding, some other students behave differently in virtual learning environments (Hong, Cao, Liu, Tai & Zhao, 2021). This raises the question 'why do students behave differently in similar learning conditions?'

The phenomenon where individuals' function in different conditions and situations is explained by the trait activation theory (Tett & Burnett, 2003). The trait activation theory is a personality theory that proposes a central assumption that the consistency in an individual's

personality traits is demonstrated in his/her thoughts and actions. The trait activation theory is often used to predict human attitudes and behaviours in many empirical studies (Hong et al., 2021; Mount & Barrick, 1995; Costa & McCrae, 1992). This study thus considers students' personality traits as a factor affecting students' performance anxiety (an emotional and behavioural attribute) in virtual learning environments.

Studies have shown that unexpected events precipitate different behavioural adaptations in students. Schipper et al. (2018) reckon that when students are thrown into a new learning environment, which was ab initio unexpected because they have grown so used to the face-to-face mode of learning, the variations in self-efficacy levels among the students, will stimulate adaptive behaviours. These behaviours are what allow students to effectively learn in the new environment. Depending on how well students adapt, learning could be fostered or inhibited. This implies that the level of self-efficacy is directly proportional to the effectiveness of online learning interaction, which has implications for improving students' confidence, and reducing performance anxiety in virtual learning environments (Prior et al., 2016).

Students often demonstrate some form of unease when thrown into virtual learning environments. This has been attributed to a lack of self-efficacy in their academic and technical performance. When it lingers, this unease translates to students experiencing feelings of performance-related anxiety (Hedges, 2017). Suffice it therefore to corroborate the positions of researchers (Onu, 2021; Hong et al., 2021; Bandura, 1977) that self-efficacy is one of the factors that affect students' performance, albeit in virtual learning environments. (Sadaf, Muhammad & Habib, 2016; Eze, 2014; Motlagh, Amrai, Yazdani, Abderahim & Sourie, 2011). However, "the level of students' self-efficacy and anxiety may vary from person to person" (Hong et al., 2021:2). Considering that virtual learning, which came into force in schools as a result of the COVID-19 pandemic has come to stay, exploring the relationship between students' personality traits, self-efficacy, and performance anxiety in the virtual learning environments will provide a new research reference to improve students' performance.

On this premise, a conceptual framework that indicates that two aspects of students' personality traits (openness and agreeableness) can moderate the relationship between students' internet self-efficacy, academic self-efficacy, and performance anxiety in virtual learning environments was generated. The findings of this study provide a series of references related to students' performance anxiety in virtual learning environments within the context of the pandemic and post-pandemic educational era, as well as insights into the development of effective interventions to reduce performance anxiety among students when taught in virtual platforms.

Literature Review

Personality traits (agreeableness and openness)

Personality refers to individual differences in thinking, feeling, and behaviour patterns (Kazdin, 2000). Theories of personality conceptualize behavioural differences in terms of wide psychological characteristics (traits). Personality theorists have proposed different taxonomies of personality traits over the years. The Five-Factor Model of Personality is by far the most popular descriptive taxonomy of personality traits. It posits that there are five major and universal factors of personality, i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Costa & McCrae 1992; Digman 1990; Soto et al. 2011).

According to Chamorro-Premuzic (2012), one of the widely used abbreviations of the Five-Factor Model of Personality is NEOAC (Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness). Recent research studies show that different personality traits can predict students' performance in virtual learning environments (Mark &Ganzach 2014). This study focused on how agreeableness and openness moderate the relationship between students' self-efficacies and performance anxiety in virtual learning environments.

Openness to experience is usually described in terms of behavioural flexibility, intellectual curiosity, aesthetic sensitivity, vivid imagination, unconventional attitudes, need for variety, novelty, and change. Thus, people high in openness to experience enjoy trying new things and usually have a wide range of interests, while people low in openness to experience tend to be more cautious and conservative (Costa & McCrae 1992). Previous research studies show that openness to experience is positively related to using the Internet for random surfing, seeking entertainment and searching for specific information (Tuten&Bosnjak, 2001).

More recent studies indicate that people high in openness to experience are more likely to seek and test more new Internet activities, such as taking part in virtual learning and social media (Correa et al. 2010). Openness to experience seems to be positively related to both overall Internet usage and categories of Internet usage (Kim &Jeong 2015; Mark &Ganzach 2014). In line with previous research, openness to experience is likely to be positively related to performance in virtual learning environments. More so, no specific study explains how openness moderates the relationship between students' self-efficacies and performance anxiety.

Agreeableness is usually described in terms of prosocial behaviour, courtesy, friendliness, flexibility, tolerance, altruism, cooperativeness, good-naturedness, and tender-mindedness. People high in agreeableness also tend to rely more on other people and forgive other people more easily than people low in agreeableness who tend to be more suspicious and argumentative (Costa & McCrae 1992). However, agreeableness was shown to be unrelated to percent time spent on the virtual learning environments. Generally speaking, agreeableness seems to be unrelated to performance in virtual learning platforms (Hughes et al. 2012; Kim & Jeong 2015; Mark & Ganzach 2014; McElroy et al. 2007; Tuten & Bosnjak 2001). Agreeableness has consistently been described as a universal personality factor and as such, for the sake of completeness, it is included in the present study despite the fact that most previous studies have reported null effects of agreeableness on performance. Given this, there is no empirical or theoretical reason to expect a relationship between agreeableness and Internet usage. However, the moderating role of agreeableness on the relationship between students' self-efficacies and performance anxieties.

Self-efficacy (academic and internet)

Self-efficacy is the belief an individual has in his/her ability to succeed/excel at something or successfully complete a task (Bandura, 1977). Put in simpler terms, self-efficacy is an individual's belief in their innate ability to achieve set goals. Bandura (1982) referred to it as a personal judgment of "how well one can execute courses of action required to deal with prospective situations." A greater portion of an individual's self-efficacy is formed during childhood, and its foundation is all the feedback received from parents, friends, and even school teachers. In the view of Stajkovic and Luthans (1998), individuals with high self-efficacy will exert sufficient effort on a task that, if well executed, results in positive

outcomes, whereas those with low self-efficacy are likely to stop trying early, and ultimately fail. Belief in one's innate abilities requires valuing one's cognitive strengths, as well as determining to persevere until obstacles that threaten to interfere with applying those innate abilities towards achieving set academic goals are overcome.

Studies on the dynamics of self-efficacy (and lack of it) in diverse settings reveal that the construct impacts every area of human endeavour, including behaviour (Porter, Bigley, Steers, 2003) and achievement/performance (Stajkovi & Luthans, 1998). One's belief in his ability to overcome challenging situations strongly influences the person's ability to successfully navigate the challenges s/he faces (Luszczynska & Schwarzer, 2005). Empirical evidence shows that researchers (Hodges, 2008; Zhao, Liu, & Su, 2021) have varying perspectives on the application of self-efficacy in virtual learning.

The framework of interactivity in the context of distance education comprises two notable interactions, the first being between the student and the learning environment, and the other being between the learner and the learning content (Moore, 2013). Considering these interactions, two types of self-efficacy important to students' performance in virtual learning environments are academic self-efficacy and internet self-efficacy. Hong et al (2021) describe academic self-efficacy as representing the student-content interaction, whereas internet self-efficacy represents student-virtual learning environment interaction. These two self-efficacies were considered in this study.

Internet self-efficacy represents a students' confidence in their ability to excel at interactions hosted on information and communication technology systems/platforms reflects a person's confidence in interacting with an information technology system. For students to effectively learn and perform in virtual learning environments, they must possess some level of information technology skills that will make them feel confident in their ability to actually learn smoothly (Kuo et al., 2014). By implication, high internet self-efficacy would equip students to take an active part in learning activities provided in virtual learning environments. The reverse applies as well and could trigger a level of dissatisfaction in the student, resulting in performance anxieties in virtual learning platforms (Tsai, 2012; Tsai et al., 2011).

Academic self-efficacy, a self-efficacy domain (Schunk & Pajares, 2002) is a student's confidence in his/her ability to complete a given academic task. Academic and internet self-efficacies are relevant self-efficacy constructs in virtual learning (Kuo&Belland, 2019; Torkzadeh et al., 2006). The psychological stability and behavioural changes of an individual can be affected by sudden changes in their environment (Donovan & Rossiter, 1982). The COVID-19 pandemic affected students' internal psychological stability (Pandita et al., 2021), and the sudden transition to virtual learning further complicated students' learning. In these conditions (virtual), the student's self-efficacy and psychological adaptation can be used to predict the student's performance-related behaviour (Bradley et al., 2020).

Studies have shown that personality traits play an important role in self-efficacy (San-Martin et al., 2020; Özdemir et al., 2019). When students with different personality traits interact in virtual learning environments, their psychological state has the potential to change, which potentially will affect their performance. Therefore, this study explores how students' agreeableness and openness (two personality traits) moderates the relationship between their performance anxiety, academic and internet self-efficacies.

Performance anxiety

Learning in new learning environments can cause performance anxiety among learners (Najjar et al., 2015; Shearer, 2016). Studies have found that virtual learning environments make students more anxious about learning than conventional face-to-face learning environments (Hedges, 2017; Rapp-McCall & Anyikwa, 2016). During the pandemic, the sudden shift from the offline to the online teaching mode has created personal adjustment burdens on students (Hong, et al., 2021). Furthermore, virtual learning environments takes away the thrill associated with actual student-student and student-teacher interactions, limiting the fun associated with learning. This can create anxiety among students, which will affect their performance.

According to Huberty (2009), anxiety is a normal emotional state which may present in a variety of situations, including teaching and learning. The effect of anxiety on students' performance is properly explained by the Processing Efficiency Theory (Eysenck et al., 2007). According to the theory, when individuals think that one of their goals is being threatened, they will identify the source of the threat. During the COVID-19 outbreak, learning settings suddenly changed so that students could not experience real-life learning, causing disruptions in their learning process, and creating some kinds of anxiety (Bao, 2020; Tavitiyaman et al., 2021). Therefore, this study explored performance anxiety in virtual learning environments as students' state of anxiety, related to academic and internet self-efficacy. Based on this, the study set out to test six (6) hypotheses at 0.05 level of significance:

1. Self-efficacy is not significantly related to science students' performance anxiety in an online learning environment.

2. Academic self-efficacy is not significantly related to science students' performance anxiety in an online learning environment.

3. Openness does not significantly moderate the relationship between internet self-efficacy and performance anxiety in an online learning environment.

4. Agreeableness does not significantly moderate the relationship between internet self-efficacy and performance anxiety in an online learning environment.

5. Openness does not significantly moderate the relationship between academic self-efficacy and performance anxiety in an online learning environment.

6. Agreeableness does not significantly moderate the relationship between academic self-efficacy and performance anxiety in an online learning environment.

Research Model

Studies have shown that an increase in self-efficacy has a positive impact on students' efficiency to excel at novel academic tasks, and manage academic-related stressors (Salazar & Hayward, 2018; Sadaf, Muhammad & Habib, 2016). Students with low self-efficacy however display poor performance, lack confidence to carry out learning-related tasks, and demonstrate performance-related anxiety (Heckel & Ringeisen, 2019). A recent study also showed that high self-efficacy may decrease performance anxiety in virtual learning environments (Heckel & Ringeisen, 2019; Huang & Mayer, 2019), whereas low self-efficacy is a potential source of performance anxiety, especially for students in virtual learning spaces (Abdous, 2019).

In searching for the relationship between different types of personality and anxiety, Tavitiyaman et al. (2021) found that students with high levels of neuroticism can predict high levels of anxiety in learning with technology; but those students who with high levels of extraversion can experience low levels of performance anxiety. However, few studies have been done to understand how personality traits can enhance students' perceived self-efficacies in virtual classrooms, and consequently how they affect their performance anxiety. More so, there is limited evidence of how students' personality moderates the relationship between performance anxiety and the two types of self-efficacies in virtual learning environments. The six formulated hypotheses are therefore presented in the model below, which will serve as a guide to the study.

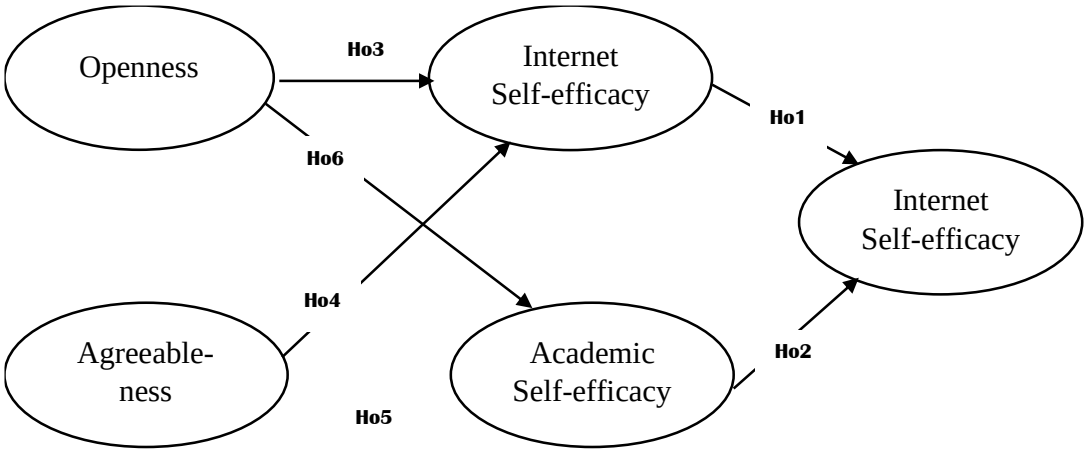

Figure 1. The research model

METHOD

The design for the study is the correlational research design. Data was collected through an online survey.

Participants

Participants included all undergraduate students of the Department of Science Education, University of Nigeria, Nsukka. A random sample of three hundred and five (305) students, randomly sampled across all four levels of students, took part in the study. The participants were aged between 16 and 27 years (Mean = 21; SD = 4.03), with 64% (195) being females, and 36% (110) being males.

Instruments

The instruments for collecting data included the big five personality inventory (John & Srivastava, 1999), the internet self-efficacy scale (Zimmerman & Kulikowich, 2016), the academic self-efficacy scale (Abdul & Ashraf, 2006), and the performance anxiety scale (Kenny, 2009). The personality inventory comprised of four (4) sub-scales – Openness, Agreeableness, Neuroticism, Extraversion, and Conscientiousness. Each of these sub-scales measure a separate aspect of an individual's personality. According to McCrae and Costa (1992), the five-factor model is a universal and comprehensive framework for describing individual personality differences.

This study selected items related to openness and agreeableness from the Big Five Personality Inventory (John & Srivastava, 1999) to design the two types of personality to measure individual differences in these two traits. The openness scale contains such items as 'I see myself as someone who is original and comes up with new ideas' and 'I see myself as someone curious about many different things.' The agreeableness scale contains such items as 'I see myself as someone helpful and unselfish with others' and 'I see myself as someone who is forgiving in nature.' Two items in the internet self-efficacy scale include 'I am able to navigate online course materials,' and 'I am able to find the course syllabus online.' The academic self-efficacy scale had items like 'Irrespective of the subject, I am competent in learning' and 'I can do my Biology assignments very well on my own.' All instruments were designed to have an increasing 5-point rating scales, ranging from 1 – 5.

Data Analysis

Collected data were analysed using Pearson's correlation coefficient, and Hayes Process Macro (Model 1) regression analysis. Hypotheses were interpreted at 0.05 level of significance.

RESULTS

Table 1. Correlation table showing the relationship between Turnover intention and other variables in the study.

	Variables	1	2	3
1	Internet Self-efficacy	-		
2	Academic Self-efficacy	-.119*	-	
3	Performance Anxiety	-.104	.154**	-

Note: ** = p < .05; ** = p < .01; *** = p < .001*

***Correlation is significant at the 0.01 level (2-tailed).*

**Correlation is significant at the 0.05 level (2-tailed).*

The results of the correlations in Table 1 indicated that among the variables of interest, performance anxiety was negatively correlated with internet self-efficacy ($r = -.104$, $p > .05$) and academic self-efficacy ($r = -.119$, $p < .05$). However, academic self-efficacy is positively correlated with performance anxiety ($r = .154$, $p < .01$).

Table 2: Regression analysis of the relationship between performance anxiety and academic self-efficacy as moderated by openness and agreeableness.

Variable	β	SE	T	P	Lower CI	Upper CI	R	R^2
Acad_ SE	.04	.19	2.31	.02	.01	.08	.18	.034
AgrAble	.04	.03	1.43	.15	-.02	.10		
Openss	-.01	.02	-.33	.74	-.04	.03		
Acad_SE X AgrAbl	-.00	.00	-1.35	.18	-.01	.00		
Acad_SE X Openss	-.00	.00	-1.38	.89	-.00	.00		

Note: Acad_SE = Academic Self-efficacy AgrAble = Agreeableness Openss = Openness

Regression analysis (Table 2) shows that academic self-efficacy (β= .04, p = .02) significantly predicted performance anxiety. Agreeableness (β= 0.04, p = .15) did not

significantly predict performance anxiety. Also, openness (β= -0.01, p = .74) did not significantly predict performance anxiety. The R^2 value (0.034) indicates that only 3.4% of students' performance anxiety is predicted by academic self-efficacy. This predictive power was also significant (p = 0.015) at 0.05 level of significance. Academic self-efficacy and agreeableness were positively associated with performance anxiety, but openness was negatively associated with performance anxiety. The moderation analysis showed that agreeableness and openness moderated the power of academic self-efficacy to predict performance anxiety, with a p-values of 0.18 and 0.89 respectively, which was greater than 0.05 level of significance. This shows that academic self-efficacy can predict performance anxiety, irrespective of students' agreeableness and openness.

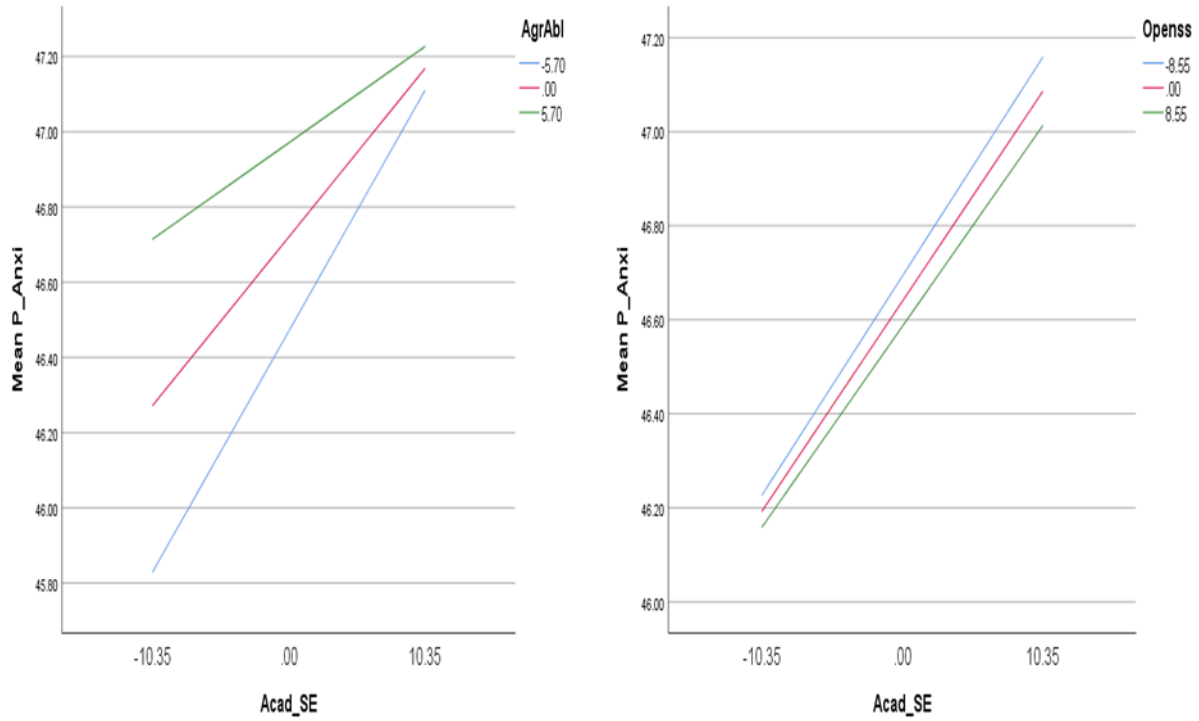

Figure 2: Plots of simple slopes (I and II) generated from the analyses showing the conditional relationship between academic self-efficacy, agreeableness, openness and performance anxiety.

Table 3. Regression analysis of the relationship between performance anxiety and IT self-efficacy as moderated by openness and agreeableness.

Variable	**β**	**SE**	**T**	**P**	**Lower CI**	**Upper CI**	**R**	**R^2**
Int_ SE	-.07	.02	-4.32	.00	-.10	-.04	.27	.075
AgrAble	.15	.03	4.48	.00	.08	.21		
Openss	.03	.02	1.27	.21	-.01	.07		
Int_SE X AgrAbl	-.00	.00	-1.50	.13	-.01	.00		
Int_SE X Openss	-.01	.00	-3.65	.00	-.01	-.00		

Note: Int_SE = Internet Self-efficacy AgrAble = Agreableness Openss = Openness

Regression analysis in Table 3 shows that internet self-efficacy (β= -.07, p = .00) significantly predicted performance anxiety. Agreeableness (β= 0.15, p = .00) significantly predicted performance anxiety. Also, openness (β= 0.03, p = .21) did not significantly predict performance anxiety. The R^2 value (0.75) indicates that only 7.5% of students' performance anxiety in online learning platforms is predicted by internet self-efficacy. This predictive power was also significant (p = 0.00) at 0.05 level of significance. Internet self-efficacy is negatively associated with performance anxiety, whereas agreeableness and openness were positively associated with performance anxiety. The moderation analysis showed that agreeableness and openness moderated the power of internet self-efficacy to predict students' performance anxiety, with a p-values of 0.13 and 0.00 respectively. This shows that internet self-efficacy can predict performance anxiety, irrespective of students' agreeableness, but openness significantly moderates that predictive power.

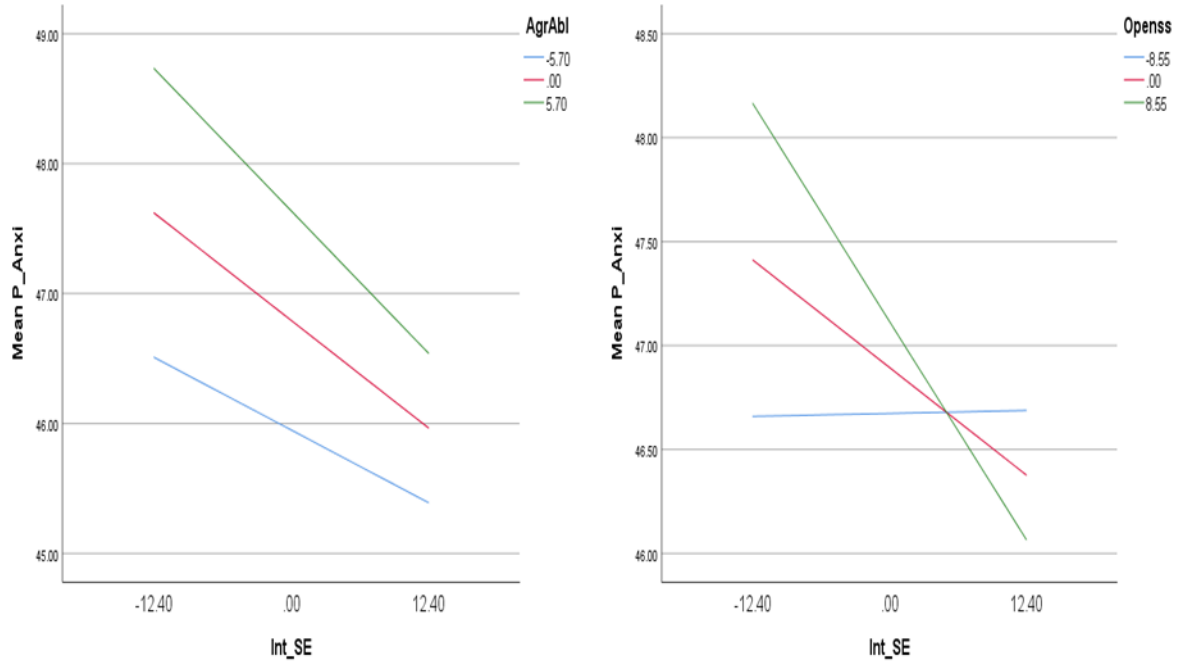

Figure 3: The plots of simple slopes (I and II) generated from the analyses showing the conditional relationship between internet self-efficacy, agreeableness, openness and performance anxiety.

DISCUSSION OF FINDINGS

Performance anxiety negatively correlated with internet self-efficacy and academic self-efficacy. However, academic self-efficacy is positively correlated with performance anxiety. In an online learning environment, a students' self-efficacy is important to the students' performance. Anxiety stems from a students' lack of confidence in his ability to perform properly. Academic self-efficacy varies from internet self-efficacy, but an individual's performance is directly related to the students' academic self-efficacy (Hong et al., 2021; Onu, 2021). This implies that students' self-efficacy is key to students performing at optimum in virtual learning environments (Luszczynska & Schwarzer, 2005). Researchers (Sadaf, Muhammad & Habib, 2016; Eze, 2014; Motlagh, Amrai, Yazdani, Abderahim & Sourie, 2011) also agree that self-efficacy is a significant factor in students overall learning, and it reflects on the academic performance of students.

Considering that students' personality (agreeableness) significantly predicted their performance anxiety but openness did not, teachers in virtual learning environments must identify approaches to improve students' agreeableness. Understandably, a student who is agreeable is open to new experiences and trying new things with no form of inhibitions. This explains why such variables can predict students' performance anxiety. The focus must therefore be on channelling students' personalities, to improve their self-efficacy, and decrease performance anxiety.

CONCLUSION

Internet and academic self-efficacies play a significant role in students' performance in virtual learning environments. The personality traits a student possesses also intersect with these self-efficacies to predict students' performance in virtual classrooms. Teachers should therefore monitor students' personality traits and self-efficacies, to gather information relevant to helping students improve their academic performance. Students' internet self-efficacy can be improved by creating suitable platforms for them to acquire internet-related skills, whereas their academic self-efficacy should be improved by adopting student-centered teaching methods that make students confident in their ability to learn. Students' personality traits should be monitored by the teacher, who will determine the type of virtual learning environment best suited to that student to maximize performance.

REFERENCES

Abdous, M. (2019). Influence of satisfaction and preparedness on online students' feelings of anxiety. *The Internet and Higher Education, 41,* 34–44.

Abdul, G. K & Ashraf, P. M. (2006). Academic self-efficacy scale. DOI: 10.13140/RG.2.1.3930.2640

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215.

Bandura, A. (1982). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2), 113–115.

Bradley, G. L., Babutsidze, Z., Chai, A., &Reser, J. P. (2020). The role of climate change risk perception, response efficacy, and psychological adaptation in pro-environmental behavior: A two nation study. *Journal of Environmental Psychology, 68*.

Chamorro-Premuzic, T. (2012). *Personality and individual differences.* West Sussex: BPS Blackwell

Correa, T., Hinsley, A.W., & Gil de Zúñiga. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247–253.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Model (NEO-FFI) professional manual*. Psychological Assessment Resources.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41,* 417–440.

Donovan, R. J., & Rossiter, J. R. (1982). Store atmosphere: An environmental psychology approach. *Journal of Retailing, 58*, 34–57.

Eze, I. (2014) Influence of home environment and perceived self-efficacy on the mathematics achievement of senior secondary school students. Masters' thesis submitted to University of Nigeria Nsukka.

Eysenck, M.W., Derakshan, N., Santos, R., & Calvo, M. G. (2007) Anxiety and cognitive performance: Attentional control theory. *Emotion 7*, 336-53.

Heckel, C., & Ringeisen, T. (2019). Pride and anxiety in online learning environments: Achievement emotions as mediators between learners' characteristics and learning outcomes. *Journal of Computer Assisted Learning, 35*(5), 667–677.

Hedges, S. (2017). Statistics student performance and anxiety: Comparisons in course delivery and student characteristics. *Statistics Education Research Journal, 16*(1), 320–336.

Hodges, C. B. (2008). Self-efficacy in the context of online learning environments: A review of the literature and directions for research. *Performance Improvement Quarterly, 20*(3-4), 7–25.

Huang, X., & Mayer, R. E. (2019). Adding self-efficacy features to an online statistics lesson. *Journal of Educational Computing Research, 57*(4), 1003–1037.

Huberty, T. J. (2009). Test and practical performance anxiety. *Principal Leadership, 10*(1), 12–16.

Hughes, D. J., Rowe,M., Batey,M.,&Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior, 28*, 561–569.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin& O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 102–138). New York: Guilford Press.

Kazdin, A.E. (2000) *Encyclopaedia of Psychology*, *17*, 212-213. Oxford University Press.

Kenny, D. T. (2009). The factor structure of the revised kenny music performance anxiety inventory. *International Symposium on performance science*, 37-41. Utrecht: Association Européenne des Conservatoires.

Kim, Y., & Jeong, J. S. (2015). Personality predictors for the use of multiple Internet functions. *Internet Research, 25*(3), 399–415.

Kuo, Y. C., &Belland, B. R. (2019). Exploring the relationship between African American adult learners' computer, Internet, and academic self-efficacy, and attitude variables in technology-supported environments. *Journal of Computing in Higher Education, 31*(3), 626–642.

Kuo, Y. C., Walker, A. E., Belland, B. R., Schroder, K. E. E., &Kuo, Y. T. (2014). A case study of integrating interwise: Interaction, internet self-efficacy, and satisfaction in synchronous online learning environments. *The International Review of Research in Open and Distributed Learning, 15*(1), 161–181.

Luszczynska, A. & Schwarzer, R. (2005). The role of self-efficacy in health regulation. In W. Greve, K. Rothermund& D. Wentura (Eds), *The adaptive self: Personal continuity and intentional self-development*, 137 – 152. Hogrefe and Huber Publishers.

Mark, G., &Ganzach. (2014). Personality and Internet usage: A largescale representative study of young adults. *Computers in Human Behavior, 36*, 274–281.

McElroy, J. C., Hendrickson, A. R., Townsend, A. M., & DeMarie, S. M. (2007). Dispositional factors in Internet use: Personality versus cognitive style. *MIS Quarterly, 31*(4), 809–820.

Moore, M. G. (2013). The theory of transactional distance. In M. G. Moore (Ed.), *Handbook of distance education* (3rd ed.,) 66–85. Routledge.

Motlagh, S. E., Amrai, K., Yazdani, M. J., Abderahim, H. A. & Sourie, H. (2011). The relationship between self-efficacy and academic achievement in high school students. *Procedia – Social and Behavioural Sciences, 15*, 765 – 768.

Mount, M. K., & Barrick, M. R. (1995). The big five personality dimensions: implications for research and practice in human resources management. *Research in Personnel and Human Resources Management, 13,* 153–200.

Najjar, R. H., Lyman, B., &Miehl, N. (2015). Nursing students' experiences with high-fidelity simulation. *International Journal of Nursing Education Scholarship, 12*(1), 1–9.

Onu, W. O. (2021). Efficacy of dialogic and VARK instructional strategies on Biology students' achievement and self-efficacy in Genetics. A Masters' degree thesis submitted to Department of Science Education, University of Nigeria, Nsukka.

Özdemir, M., Özdemir, N., Gören, S. Ç., Ötken, ş., Ernas, S., &Yalçin, M. T. (2019). Relationship between personality traits and administrative self-efficacy beliefs among principals. *Ted EğitimVeBilim, 45*(201), 273–291.

Pandita, S., Mishra, H. G., & Chi, S. (2021). Psychological impact of covid-19 crises on students through the lens of Stimulus-Organism-Response (SOR) model. *Children and Youth Services Review, 120.*

Porter, L. W., Bigley, G. A., & Steers, R. M. (2003). *Motivation and work behavior*. Boston: McGraw-Hill/Irwin.

Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self-efficacy Flow-on effects for online learning behavior. *The Internet and Higher Education, 29,* 91–97.

Rapp-McCall, L. A., &Anyikwa, V. (2016). Active learning strategies and instructor presence in an online research methods course: Can we decrease anxiety and enhance knowledge? *Advances in Social Work, 17*(1), 1–14.

Sadaf, N., Muhammad, I. M. & Habib, E. (2016). A Study of Students' Self-Efficacy and Academic Achievement in Mathematics at University Level. *Journal of Arts and Social Sciences 3*(1), 5 – 25.

Salazar, R. L. & Hayward, S.L. (2018), An Examination of College Students' Problem-Solving Self-Efficacy, Academic Self-Efficacy, Motivation, Test Performance, and Expected Grade in Introductory-Level Economics Courses. *Decision Sciences Journal of Innovative Education, 16,* 217-240. https://doi.org/10.1111/dsji.12161

San-Martin, S., Jimenez, N., Camarero, C., & San-Jose, R. (2020). The path between personality, self-efficacy, and shopping regarding games apps. *Journal of Theoretical and Applied Electronic Commerce Research, 15(*2), 0–75.

Schipper, T., Goei, S. L., de Vries, S., & van Veen, K. (2018). Developing teachers' self-efficacy and adaptive teaching behavior through lesson study. *International Journal of Educational Research, 88,* 109–120.

Schunk, D. H., & Pajares, F. (2002). The development of academic self-efficacy. In A. Wigfield, & J. S. Eccles (Eds.), *Development of achievement motivation*. (pp. 15–31). Academic Press.

Shearer, J. N. (2016). Anxiety, nursing students, and simulation: state of the science. *The Journal of Nursing Education, 55(*10), 551–554.

Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology, 100*(2), 330–348.

Stajkovic, A. D. & Luthans, F. (1998). Self-efficacy and work-related performance: a meta-analysis. *Psychology Bulletin, 124*(2), 240 – 261

Tavitiyaman, P., Ren, L., & Fung, C. (2021). Hospitality students at the online classes during COVID-19 – How personality affects experience? *Journal of Hospitality, Leisure, Sport & Tourism Education, 28*.

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *The Journal of Applied Psychology, 88*(3), 500–517.

Torkzadeh, G., Chang, C. J., &Demirhan, D. (2006). A contingency model of computer and internet self-efficacy. *Information & Management, 43*(4), 541–550.

Tsai, C. C. (2012). The development of epistemic relativism versus social relativism via online peer assessment, and their relations with epistemological beliefs and Internet self-efficacy. *Educational Technology & Society, 15*(2), 309–316.

Tsai, C. C., Chuang, S. C., Liang, J. C., & Tsai, M. J. (2011). Self-efficacy in Internet-based learning environments: A literature review. *Educational Technology & Society, 14*(4), 222–240.

Tuten, T., & Bosnjak, M. (2001). Understanding differences in web usage: The role of need for cognition and the five factor model of personality. *Social Behavior and Personality, 29*(4), 391–398.

Zhao, L., Liu, X. H., & Su, Y. S. (2021). The differentiate effect of self-efficacy, motivation, and satisfaction on pre-service teacher students' learning achievement in a flipped classroom: A case of a modern educational technology course. *Sustainability, 13*(5), 2888.

Zimmerman, W.A., & Kulikowich, J.M. (2016) Online Learning Self-Efficacy in Students With and Without Online Learning Experience. *American Journal of Distance Education, 30*(3), 180-191. DOI: 10.1080/08923647.2016.1193801

BUILDING INCLUSIVE PRIMARY SCHOOLS: TEACHERS' PERSPECTIVES ON SUPPORTIVE RESOURCES IN THE RURAL SCHOOLS IN LESOTHO

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Abstract
Twenty-first-century education has brought increasingly complex changes in inclusive classroom practices, along with the development of braille and technology. There is a high demand for primary teachers to adopt supportive resources that address diverse learners' needs and introduce 21st-century braille, digital devices and skills in the inclusive classroom. This research investigates primary teachers' perspectives on the influence of supportive resources in rural schools in Lesotho and explores their impacts on children's learning. Data for the study were collected using a qualitative approach utilising a case study design and was analysed through an interpretative phenomenological analysis (IPA). Primary school teachers participated in the study through one-on-one semi-structured interviews. Purposive sampling was used to select teachers. Although teachers perceived braille technology as a critical supportive resource in their day-to-day teaching and learning, results revealed that the unavailability of braille facilities could hamper building inclusive primary schools. The results further revealed that teachers' situation was disadvantaged by lack of training on the use of braille technology for visually impaired learners. Therefore, the study recommends that the Ministry of Education and Training should facilitate the provision of braille equipment for both primary teachers and as well as learners in remote areas. Additionally, there should be in-service training on braille facilities for teachers so that they could be able to accommodate learner diversity and implement policies such as the Ministry of Education and Training (MOET) Inclusive Education Policy 2018 and the Education Sector Strategic Plan 2016-2026 to achieve Sustainable Development Goals (SDGs) in 2030.
Keywords: resources, technology, braille, diversity, inclusive education, teachers' views, policy, Lesotho

Introduction
This study is prompted by a thematic analysis on the influence of supportive resources in inclusive primary schools (Khumalo, 2018). The study conducted by Khumalo (2018) highlighted that braille technology instruction could support the promotion of inclusive teaching and learning in primary schools in Lesotho. Several studies highlighted the importance of braille technology devices as supportive resources in inclusive primary schools. For instance, Genlott and Grönlund (2016) noted that they might be well used to "reinforce pedagogic factors that have been shown to have a positive impact" (p. 69). Hilton (2018) analysed the importance of computers in the classroom in corroboration with Pohjolainen, Nykänen, Venho, and Kangas (2018), and concluded that Information Communication and Technology (ICT) tools and braille in the classroom have positive effects on learners' learning. Computers and laptops assist learners' research assignments, school projects and can potentially change how they see and learn critical subjects like Mathematics (Hegedus & Moreno-Armella, 2020).

According to Martiniello, Wittich and Jarry (2018), technological devices in schools provide new opportunities to access braille, especially for learners with visual impairment. These technologies include stand-alone braille note-takers (with word-processing capabilities) and braille displays connected to computers, smartphones and tablets that allow users to control and access information on these devices. Martiniello et al., (2018) further argue that technology is finding some use within braille instruction. New developments could make it even more relevant, particularly for older learners who appear to have less exposure to braille technology.

Fatimah and Santiana (2017) conducted a study on 'Student-Teachers' Perceptions of Technology Use in the Classroom' and found that media technologies could improve teachers' creativity, confidence and increase their professional development when preparing teaching material for learners. The findings further revealed that media technologies could enhance the learning experience, increase learners' motivation and assess their learning. In addition, Mokhtar (2016) opines that technology allows teachers and students to communicate with each other via messages, thus providing learners with the chance to communicate and collaborate in a virtual classroom environment. Alsulamini (2016) emphasises that technology has captured the interest of children and adults alike, and this fascination is captured by using it as a medium of instruction for most disciplines.

Statement of the problem

There are no studies in Lesotho conducted to explore the teachers' perspectives about braille technology instruction as a supportive resource in rural schools. This gap in the literature in the Lesotho context necessitated this research. There was a lack of supportive resources to cater for learners with special educational needs. Some of the shortages include books, braille, technological devices, inadequate facilities, and other relevant materials which result in teachers' failure to meet the needs of diverse learners in regular schools (Padayachee, 2017; Ramatea & Khanare, 2021).

Teachers find it challenging to implement the policies such as the Universal Primary Education of 2000, Education Act 2010, Ministry of Education and Training Inclusive Education Policy 2018 (MOET Inclusive Education Policy 2018), the Education Sector Strategic Plan 2016-2026 and as well as Sustainable Development Goals (SDGs) in 2030 (Government of Lesotho MOET, 2016; United Nations Educational, Scientific and Cultural Organization (UNESCO), 2021). Therefore, this study aims to investigate teachers' views on braille technology as a supportive resource to promote inclusivity in Lesotho's rural schools

Theoretical background

This paper is concerned with teachers' views on the influence of supportive resources in promoting inclusivity in Lesotho's rural primary schools. Therefore, this research is underpinned by three theoretical perspectives, namely, the human rights model, the social model and the social constructionist perspective of disability. The human rights model argues that there must be equality, equity and justice for learners with special educational needs. Terzi (2014) declares that social and institutional activities should persuade 'equal consideration to all' and provide 'equal entitlement of every child to education while acknowledging and respecting individual differences' (p. 484). Therefore, for learners with visual impairment to have access to supportive resources in inclusive primary schools, their

human rights, like those of other normal people, should be observed and met by all stakeholders in education.

The social model of disability upholds that the education system should be changed for social inclusion. Anastasiou and Kauffman (2013) indicated that "lack of social participation for disabled persons shaped the development of negative perception towards disability" (p. 442). Implementing the social model in educational environments involves the dismantling of barriers to the engagement and participation of students to create an inclusive and accessible learning environment (Beck, 2013). The social model of disability sees the problems facing disabled people as a result of society's barriers and ultimately, this prevents learners with a visual impairment from full participation in school activities. It argues for the full inclusion of disabled people in educational activities, the larger societal institutions and their complete acceptance as citizens with equal rights, entitlements and responsibilities.

Social constructionism on the other hand tries to address change from the ideological perspective. It explains disability as a social construct through which persons with disabilities are discriminated against and oppressed by members of society who prevent them from maximum participation (Rieser, 2013). Social constructionism views people with disabilities as experts on their needs, and therefore, encourages them to take the initiative, individually and collectively, in designing and promoting better solutions (Weinberg, 2014).

The three models adopted for this study jointly depict the context of the problem the study is centred upon and will be used as the basis for interpretation of data and to give meaning to teachers' perspectives on the influence of supportive resources in inclusive primary education in the rural areas of Lesotho (Casanave & Li, 2015, p. 110; Green, 2014, p. 37). In the context of this study, the right to access education is one of the human rights for every learner as the Education Act 2010 stipulates. Besides that, Constitution of Lesotho (1993) states that "Lesotho shall endeavour to make education available to all and shall adopt policies aimed at securing that – primary education is compulsory and available to all to learners" (p 12). The social model explains how basic education in Lesotho needs to be changed to enable better accommodation of learners with visual impairments to access supportive resources; it describes inclusive primary schools as depicted by the Ministry of Education and Training policies. Additionally, social constructionism explains the underlying values and ideologies which justify inclusive education practices reflected in teachers' views on supportive resources.

Importance/advantages of supportive resources for teaching and learning

Supportive resources

Supportive resources have been observed as a powerful strategy to bring effective teaching and learning in inclusive primary schools. According to Viljoen (2020), braille technology is a tactile reading and writing medium of raised dots, representing the translation of print material but not regarded as an independent language. Braille is written on special paper using a braille writing machine. Braille technology resources could increase participation, independence and achievement of both teachers and learners with visually impaired and low vision. Learners could access an integrated curriculum and at the same time improve their overall academic performance. Braille assistive technology can be in the form of stand-alone braille display, notetakers and smart display devices (Braille Institute of America, 2020).

Again, braille technology refers to a device or service that can help a learner with a disability to meet the goals of their special needs and to participate in the general education setting to

the greatest possible extent (Department of Basic Education (DoE), 2011d; Kelly & Smith, 2016; McNear & Farrenkopf, 2014). Simply put, it can improve the functional performance of a learner with visual impairment. Braille assistive technology is an umbrella term that includes assistive, adaptive and rehabilitative devices for learners with disabilities and also includes the process used in selecting, locating and using them in an educational context.

Advantages of supportive resources

Supportive resources such as braille technology helps learners with visual impairment to access the National Curriculum Standards in an inclusive setting (South Africa's Department of Basic Education (DBE), 2014). According to Ramaahlo (2020), assistive technology as a supportive resource promotes greater independence by enabling people to perform educational tasks that they were formerly unable to accomplish, or had difficulty with, by providing enhancements to, or changing methods of interacting with the technology needed to accomplish such tasks. Ramaahlo (2020) further states that braille technology devices also enhance concept development and are not in opposition with developing new technologies, but braille and technology should be equal partners in the successful teaching and learning of blind learners.

Learners can benefit from the combined use of these resources with information technology, such as screen enlargers (systems that magnify the characters on a computer) and speech synthesizers (specific adaptations with voice output, which convert screen content to speech) (Alves, Monteiro, Rabello, Gasparetto & Carvalho, 2009). (Information technology allows individuals with visual impairment to overcome a major part of the difficulties in daily life and offers them independence and autonomy concerning information management and access to communication, just like their peers with normal vision (Alves et al., 2009). Using the appropriate resources and technology to support teaching through the medium of braille is important; it serves to enhance conceptual understanding, as well as to provide better, and sometimes faster, access to learning support material.

Importance of supportive resources on building inclusive primary education

Several studies have shown that supportive resources play an important role in teaching visually impaired learners in inclusive primary education for centuries. For instance, according to National Braille Week (2020), braille instruction provides learners with visual impairment with letters, numbers and punctuation marks which could be used by learners who are blind or have low vision. Souza (2018) argues that the conversion of textbooks to the braille system provides the domain of the acquisition of Mathematics structures. Souza (2018) further emphasizes that braille instruction is imperative in the sense of enabling a dialogue between hand and brain, as it involves synapses and fundamental connections for the consolidation of the child in the cultural process.

In addition to braille assistive devices and technology, teachers can provide other materials and equipment in accordance with the type of visual impairment. For example, some learners may benefit from enlarged print when accessing written text. Other examples include pictures, graphs, diagrams and maps that can be adapted for learners with visual impairment (Texas School for the Blind and Visually Impaired (TSBVI), 2017), by simplifying the content without losing the meaning of the picture. Other pictures, graphs, diagrams and maps can be replaced by or supplemented with a written description or substituted by a real item or model (DoE, 2011). Besides that, Kelly and Smith (2016) highlight that assistive technology is often considered as an equaliser for learners with disabilities, especially for those with visual impairment as this may provide such learners with access to information and

educational content. Further, Kelly and Smith (2016) argue that braille assistive technology could be utilised to evaluate the learner's ability to access print, produce written communication, and access the computer. Again, braille has been proven to be an effective tool in the teaching of pre-literacy skills to young children as multisensory stimuli are used in the retention of learned skills (Toussaint & Tiger, 2010).

Research questions question

The following research question guided the study:

- How do teachers in inclusive primary schools perceive supportive resources in the rural schools in Lesotho?

METHOD

Research paradigm, approach and design

The researcher adopted the pragmatic research paradigm. This paradigm was relevant to this research because it guides the research design, especially when a combination of different approaches is philosophically inconsistent. Besides, the researcher adopted a qualitative research approach and phenomenological case study research design. This case study focused on one primary school within Lesotho, located in rural communities with low socioeconomic status (Yin, 2017). Data gathering involved ten educators who responded to semi-structured interviews on braille instruction. This design was suitable for the study since the researcher explored the essence of the lived experiences of teachers' views on the influence of supportive resources in the rural of Lesotho on building inclusive primary schools.

Participants

The study was conducted using participants in the Mapoteng area in the Berea district of Lesotho. The target population for this research includes ten teachers from the school. The participants were purposively sampled using a convenience sampling technique (Etikan, Musa & Alkassim, 2016). This was to enable the researcher to select the academics that were willing to participate in the study. Participants were coded as P1, P2 etc.

Instruments for data collection and trustworthiness

Data were collected using a semi-structured and group interview schedule that contained probes on the perceived views on the influence of supportive resources to build inclusive rural primary schools in Lesotho. The semi-structured and group interviews were face validated by experts in instrument development to ensure that they measured what they were supposed to measure. The researcher confirmed the trustworthiness of the interview schedule by subjecting it to a similar sample on two different occasions.

Data collection procedures

Semi-structured and group interview questions were used. But the researcher was flexible to allow research participants to raise issues pertinent to the study. They were free to express their views on their pace (Rahman, 2019) on the influence of supportive resources in rural schools in Lesotho on building inclusive primary schools. Individual and group interviews were used with research participants from primary school teachers. In-depth interviews lasted between 30 minutes and 45 minutes. The interviews took place during lunchtime, and the participants were given adequate time to respond to the interview questions. An audio recorder was used to record the interviews with the participants' permission. Although they responded to semi-structured interviews, follow-up questions were asked for clarity purposes. Manual coding was used throughout the research process; the researchers understood the nature of the data, making transcription easier (Williams & Moser, 2019). Interviews took

place at the school in a room allocated for this purpose. The researcher facilitated all the interviews using English or a combination of English and the participants' home language, Sesotho.

Ethical considerations

According to Arifin (2018), it is the responsibility of the qualitative researcher to ensure participants have the power of freedom of choice to participate in the study, protect their identity throughout the selection and dissemination process, and promote transparency and honest research reporting without deception to readers. Therefore, the researcher approached relevant education authorities in the Berea district and the school principals to request permission to undertake the study. The participants were assured that their experiences and perceptions would be treated anonymously. They were also informed that participation in the study was voluntary and that each was free not to share information they felt uncomfortable with.

Data analysis

Data were collected and analysed through an interpretative phenomenological analysis (IPA) by identifying, coding themes, sorting, categorizing, and transcribing the participants' interview responses (Smith, 2011). To ensure quality data analysis, the participants' responses were read several times to pick points from each of their responses. General observations were compared with analysis from data, and verbatim quotations were used to support the study's findings.

FINDINGS

Participants' general views led to the conclusion that braille technology as a supportive resource could positively influence the building of inclusive primary schools in rural areas of Lesotho. However, lack of supportive resources and lack of teacher-induction and training programmes may hinder the inclusivity of learners with visual impairments in primary schools. The findings of the study are presented under the following theme: (1) Teachers' views on braille technology instruction and are based on the theme that emerged during the thematic data analysis.

Theme One: Teachers' views on braille technology instruction

The participants were asked to indicate their views on using braille technology as a supportive resource in teaching visually impaired learners in rural schools. The participants found it necessary to have appropriate teaching-aid materials in their classrooms. They emphasized that their availability would be essential for the smooth running of educational activities within their schools. For instance, they mentioned that braille machines would assist learners with visual impairments to access an integrated curriculum. P1 explained

> *My view is that it is good to accommodate learners who are visually impaired in the inclusive classroom…I think the provision of braille can help them to access the integrated curriculum and acquire knowledge and skills like other learners whom we consider to be normal. However, I must state that there are no braille machines here in my school, which makes it difficult for us as teachers to accommodate learners with visual impairments. We usually encourage parents to take them to special schools where they will be given special attention.*

The statement from P1 implies that though teachers were willing to accommodate learners with visual impairments, the unavailability of braille machines remained a critical issue, especially in rural areas of Lesotho. As a result, learners with visual impairments were referred to special schools. Furthermore, it was demonstrated that hearing aids and computer devices software could play a critical role for both learners and teachers, but they were not accessible in the participants' schools. P1 stated:

> *We are living in the digital world… I would enjoy teaching learners with visual impairments only if we are given hearing aids and computers with braille software that guides learners with visual impairments…this will help us to teach them. But very, unfortunately, we don't have hearing aids and computers here.*

The comments from P2 highlight teachers' willingness to teach visually impaired learners; however, the unavailability of hearing aids and computers inputted with braille brought a challenge to them.

It was clear that participants had to improvise to teach a learner who had a sight problem. Otherwise, learners would proceed to the next grade without content and skills. P3 put forward:

> *Last year, I had a learner who was partially sighted. I had to sit down during my spare time to prepare the study materials for her. I had to write in bold so that she could see. It was difficult for me because it needed more time and special attention. But their availability would make my work easy and I would accommodate them.*

P3 also suggested:

> *I suggest that the National Curriculum Development Centre has to restructure the current curriculum so that it can accommodate learners with visual impairments. The current one is only addressing the needs of normal children.*

Citing the availability of facilities as the influence in accommodating learners with special needs was raised by P4 as an opportunity for learners to improve their results. In addition, P4 suggested that the current curriculum be restructured to accommodate learners with visual impairments. Further, lack of electricity and internet was seen as an obstacle in small remote schools and as the reason for discouraging learners from attending mainstream schools and also demonstrated the regular schools' rigidity to accommodate learners whose mode of function is different from the norm. P4 declared:

> *We support the accommodation of diverse learners in our school. I believe appropriate resources such as technological braille devices can bring positive results for our schools. Still, the challenge is that in remote schools here, consequently, there is no electricity. Of course, it will be difficult for the Ministry of Education and Training or any organisation to provide us with computers or tablets. We are still behind while people living in urban areas are more sophisticated*

It was further suggested that braille books for different subjects would help learners with visual impairments. P5 asserted:

> *Braille books for different subjects would help us, welcome learners, from different cultures and socio-economic backgrounds. Still, parents cannot afford to buy them because they are expensive.*

The need for braille machines and other relevant teaching aids was emphasised by P6 as essential tools to ease their work and also help learners not squeeze their eyes during classroom activities. P6 mentioned:

> *I have a learner who is partially blind. She squeezes her eyes when she looks at the board. I think she needs braille so that she can read well and do other educational activities. The challenge is that the braille is not there, and again if braille is available, I don't know how to use it. It is a pity that children like the one I have in class are struggling to learn. I wish MOET could do something about the children with visual impairments*

The experiences above reflect how the supportive resources would influence effective and efficient teaching and learning in inclusive primary schools. As the findings have highlighted, schools in remote areas struggle to teach learners with visual impairments.

Participants noted that learners would be more punctual and readily submit the assignments on time. For example, when asked how braille technology could change their learners' experiences submitting the projects on time. P7 remarked:

> *The technology makes it easy for learners to submit the assignment as they are not expected to be on the school compound at the time of assignment/homework submission. The electronic format of submission would be conducive for learners given that they would not have printing facilities.*

It was suggested that braille technology would allow educators to provide learners' feedback directly. The following quote from P8 attested to this:

Through braille technology devices, I would be able to give learners feedback directly and record their work. If a learner wants more information regarding my comments on their work, such information would be readily available.

Participants also indicated that teacher-induction and development programs on the braille technology instruction and technology would equip them with skills, knowledge, values and attitudes to deal with the diverse classrooms, and specifically with learners with visual impairments or any disability that might be the focus of that training. P9 pointed out:

> *Training on Braille would furnish us with knowledge, skills, deals, and attitudes that Braille would equip us with knowledge, skills, values, and attitudes, which will help us, meet learners with special needs. We need training or in-service training so that we can be efficient and effective for our work.*

The training of educators about the use of braille technology devices would serve as a strategic intervention before they could be employed to facilitate teaching and when they were asked about how they would ensure the effective use of braille technology. P10 indicated:

> *The use of braille technology firstly requires that an educator…is knowledgeable about the use of such technology and that you have trained all your learners, and you have some practise sessions before the actual use; otherwise, it could cause problems during the existing genuine service.*

Generally, there is still a gap in terms of implementing policies and practices such as the Ministry of Education and Training Lesotho Inclusive Education Policy 2018 as learners with disabilities are restricted in the mainstream schools for reasons such as lack of supportive resources and the perception that they will not cope in remote schools.

DISCUSSION OF THE FINDINGS

The study investigated teachers' views on braille technology as the supportive resource in building inclusive primary schools in a selected primary school in Lesotho. Certain limitations should however be considered before interpreting the findings of this study. The small sample size and the fact that the study was conducted only at one school limited this study, as the conclusions were quite far-reaching but were based on only one particular context.

The qualitative study revealed that teachers view the availability of braille instruction and braille books as the critical tools that could influence learners with visual impairments to learn how to read and write numeracy and literacy and also prepare them to use their motor coordination and sensory cognitive abilities. According to Tederixe (2019), "the reading and writing method is done by literacy in the Braille System so that this method is effective, the blind child must be well prepared in advance in some aspects: motor coordination, sensory, cognitive, psychological and socio-affective stimuli" (p. 6). Again, it was stated that the unavailability of the internet in some areas where learners live became a challenge. The situation was exacerbated by the fact that coverage of mobile broadband penetration remained relatively low at 28%, and the cost of data is also a barrier to access and use, as are e-skills, especially in remote areas of Lesotho (Lesotho Communications Authority (LCA), 2017; Sefika, Mavetera, & Mavetera, 2013).

Though teachers emphasized how the availability of braille could ease their work, a lack of knowledge of teaching blind children could negatively impact their ability to develop skills (Pasha, 2016). Pasha (2016) further argues that the shortage of teachers who are knowledgeable in braille in rural schools presents a further challenge. In many cases at school, such learners are not accommodated.

Much evidence in the teachers' statements indicated that the provision of braille pedagogies could help them access the integrated curriculum and acquire knowledge and skills like their counterparts who have no visual impairments as National Braille Week (2020) indicates that braille instruction provides learners with visual impairments with letters, numbers and punctuation marks which could be used by learners who are blind or have low vision. Other teachers clearly stated that braille approaches could be meaningful when learners manipulated the braille machines (National Braille Week, 2020). However, teachers suggested that it would be necessary for the National Curriculum Development Centre (NCDC) to restructure the curriculum so that learners with visual impairments could be accommodated as the current curriculum only caters for normal children. This concurs with the study by Asamoah, Ofori-Dua, Cudjoe, and Nyarko (2018), which indicated that the educational curriculum should be structured to accommodate the needs of the visually impaired in an inclusive setting.

Furthermore, the results revealed that despite teachers' intention to build inclusive classrooms and instil knowledge, skills, and values to learners with visual impairment using adequate and appropriate resources, they still faced the unavailability of resources. Asamoah at el., (2018) noted that good sufficient resources should be offered to the teachers to develop their

capacities to teach the visually impaired to help manage the pace of academic work. For instance, the teachers can teach the visually impaired how to use the braille machine to help them keep up with academic work.

Though teachers understood the vital role that braille technology instructions could play in building inclusive primary schools, teachers emphasized that teaching with braille technology devices could seem to be cumbersome to them because they were not trained and traditionally had not been using technology, especially the digital technologies that change almost daily. Padayachee (2017) argued that a lack of ICT resources could potentially hamper the kind of education learners receive, thus affecting their performance. The study also highlighted that teacher- induction, development, and training in braille instructions and technological devices such as computers, tablets, and laptops were needed as they could be used as the medium of instructions. This concurs with the study by Alsulamini (2016) which emphasised that technology has captured the interest of children and adults alike, and this fascination is captured on by using it as a medium of instruction for most disciplines.

CONCLUSION

This research has explored teachers' perspectives on the influence of supportive resources in the rural areas in Lesotho in building inclusive primary schools. Based on the research findings, it could be concluded that many factors remain a challenge, such as the unavailability of braille machines. Again, teachers lack training on braille and digital devices as the government, through the Ministry of Education and Training, lacks the commitment to provide visually impaired learners with facilities such as braille. There is no learner-friendly environment that accommodates the diverse learners' needs. As a result, effective teaching and learning in mainstream schools in the rural areas of Lesotho could be harmed.

The study recommends as follows:

1) The Ministry of Education and Training should create an enabling environment and provide schools with facilities such as braille, tablets, laptops, Wi-Fi and internet connection for effective teaching and learning. These are essential tools for teaching in the 21st century.
2) Teachers should be adequately educated on the use of braille, and digital devices like tablets and laptops, and how to navigate the internet.

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REFERENCES

Alsulamini, S. (2016). The Effects of Technology on Learning English as a Foreign Language among Female EFL Students at Effatt College: An Exploratory Study. *Studies in Literature and Language*, Vol. 4, pp. 1-16. Retrieved from http://dx.doi.org/10.3968/7926.

Alves, C.C .F, Monteiro, G.M.B, Rabello, S. & Carvalho, K.M. (2009). *Assistive technology is applied to education for students with visual impairment*. Rev Panam Salud Publica. 26(2):148-52. DOI: 10.1590/S1020-49892009000800007.

Anastasiou, D. & Kauffman, J.M. 2013. The social model of disability: Dichotomy between impairment and disability. *Journal of Medicine & Philosophy*, 38(1):441-459. https://doi.org/10.1177/0741932510383163.

Arifin, S. R. (2018). Ethical Considerations in Qualitative Study. *International Journal of Care Scholars*. *1*(2) 30–33. Retrieved from https://journals.iium.edu.my/ijcs/index.php/ijcs/article/view/82.

Asamoah, E., Ofori-Duo, K., Cudjoe, E. & Nyarko J. A. (2018). Inclusive Education: Perception of Visually Impaired Students, Students Without Disability, and Teachers in Ghana. *SAGE Journals.* 2018(1–11). DOI: 10.1177/2158244018807791.

Braille Institute of America (2020). *Amazing Benefits of Assistive Technology for Visually Impaired.* Braille Institute of America, Inc 741 N. Vermont Avenue Los Angeles, CA 900029. http://www.brailleinstitute.org1800-Braille (272-4553).

Beck, U. (2013). *Risk, class, crisis, hazards and cosmopolitan solidarity/risk community - conceptual and methodological clarifications*. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00820297.

Casanave, C. P. & Li, Y. (2015). Novices' Struggles with Conceptual and Theoretical Framing in Writing Dissertations and Papers for Publication. 3(2):104-119. DOI: 10.3390/publications3020104.

Department of Basic Education (DoE) (2011) Guidelines for responding to learner diversity in the classroom through curriculum and assessment policy statements, viewed n.d. Retrieved from https://www.education.gov.za.

Department of Basic Education (DBE) (2011d), Life orientation. Further Education and Training Phase. Grades 10–12, viewed n.d. Retrieved from https://www.education.gov.

Department of Basic Education (DBE) (2014). *Government Gazette No 37652, National Policies Pertaining to the Conduct, Administration and Management of Examinations and Assessment for the National Senior Certificate*. Retrieved fromhttps://www.education.gov.za/Portals/0/Documents/Policies/PolCondAdminManageNSC.pdfver=2015-02-03-154737-197.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5, 1-4. https://doi.org/10.11648/j.ajtas.20160501.

Fatimah, S.A. & Santiana (2017). Teaching in the 21st Century: Students-Teachers' Perceptions of Technology, Use in The Classroom, *Journal of Linguistic and English Teaching*. DOI:10.24903/sj.v2i2.132.

Genlott, A. A., & Grönlund, Å. (2016). Closing the gaps: Improving literacy and Mathematics by ICT-enhanced collaboration. *Computers & Education*. (Vol. 99, 68-80). https://doi.org/10.1016/j.compedu.2016.04.004.

Government Gazette. (1993). Constitution of Lesotho. Maseru: Lesotho Government Printer. Retrieved from www.gov.ls/wp-content/uploads/2018/04/Lesotho_Constitution.pdf

Green, H.E. (2014). Use of theoretical and conceptual frameworks in qualitative research. Nurse Researcher, 21(6):34-38. http://doi.org/10.7748/nr.21.6.34.e1252.

Hegedus, S., & Moreno-Armella, L. (2020). Information and Communication Technology (ICT) Affordances in Mathematics Education. In: Lerman S. (eds) Encyclopaedia *of Mathematics Education*. Springer, Cham. https://doi.org/10.1007/978-3-030-15789-0_78.

Hilton, A. (2018). Engaging primary school students in Mathematics: Can iPads make a difference? *International Journal of Science and Mathematics Education*, 16(1), 145-165. Retrieved from https://doi.org/10.1007/s10763-016-9771-5.

Kelly, S.M. & Smith, D.W. (2016). 'Assistive technology', in S.Z. Sacks & M.C. Zatta (eds.), *Keys to educational success*, pp. 416–450, American Foundation for the Blind Press, New York, NY. (Google Scholar)

Khumalo, A. M. (2018). *Attitudes of Teachers Towards Learner Diversity and Inclusive Education at Basic Education Level in Lesotho*: National University of Lesotho, Roma, Maseru Lesotho. Retrieved from https://www.researchgate.net/publication/332625778.

Lesotho Education Act. (2010). *Education vocational guidance and training: Law Act* (Act No.3 of 2010). ISN-2010-L-101099. (Google Scholar)

Mamochana A. Ramatea & Fumane P. Khanare (2021). Improving The wellbeing of learners with visual impairments in rural Lesotho schools: an asset-based approach, *International Journal of Qualitative Studies on Health and Well-being*, 16(1) 1-11. Retrieved from https://doi.org/10.1080/17482631.2021.

Martiniello, N., Wittich, W. & Jarry, A. (2018). The perception and use of technology within braille instruction: A preliminary study of Braille teaching professional; *British Journal of Visual Impairment*. Retrieved from https://doi.org/10.1177/0264619618775765

McNear, D., & Farrenkopf, C. (2014). Assistive technology. In C. B. Allman & S. Lewis (Eds.), *ECC essentials: Teaching the expanded core curriculum to students with visual impairments* (pp. 187-235). New York, NY: AFB Press. Retrieved from: https://doi.org/10.4102/aosis.2020.BK191.

Ministry of Education and Training, Lesotho (2000). *Free Primary Education in Lesotho*: Ministry of Education External Circular Notice No. 9 of October, Maseru: Government Printing. Retrieved from www.researchgate.net/publication/308624631_Implementing_Free_Primary_Education_in_Lesotho.

Ministry of Education and Training (2016). *Education Sector Plan 2016-2026:* Maseru, Kingdom of Lesotho. Retrieved from http://www.globalpartnership.org/content/education-sector-plan-2016-2026-lesotho.

Ministry of Education and Training (2018). *Ministry of Education and Training Inclusive Education Policy 2018*, Maseru Government of Lesotho. Retrieved from www.globalpartnership.org/sites/default/files/education_sector_plan_2016-2026._lesotho_0.pdf

Mokhtar, F. A. (2016). Rethinking Conventional Teaching in Language Learning and Proposing Edmodo as Intervention: *A Qualitative Analysis. Malaysian Online Journal of Educational Technology (MOJET).* 4(2), 22-37. Retrieved from http://www.mojet.net/article/rethinkingconventional-teaching-in-language-learning-and-proposing-edmodoas-intervention.

National Braille Week (2020). *Who was Louis Braille?* Retrieved from https://www.royalblind.org/national-braille-week/about-braille/who-was-louis-braille.

Padayachee, K. (2017). A snapshot survey of ICT integration in South African schools. *South African Computer Journal*, 29(2), 36-65. http://dx.doi.org/10.18489/sacj.v29i2.463.

Pasha, A. (2016). Provision of Braille Reading and Learning Material in South Africa: A Balance between Technology and Braille Adding Value and Creating a Love of Reading. *The Journal of Blindness Innovation and Research*, 6(3). http://dx.doi.org/10.5241/6-ICEB-05.

Pohjolainen, S., Nykänen, O., Venho, J., & Kangas, J. (2018). Analysing and improving students' mathematics skills using ICT tools. *Eurasia Journal of Mathematics, Science and Technology Education*. 14(4), 1221–1227. Retrieved from https://doi.org/10.29333/ejmste/81869.

Ramaahlo, M. (2020). 'Assistive technology assessment and the development of an individual support plan.' Disability Unit, Department of Student Affairs, University of Pretoria, Pretoria, South Africa. Retrieved from https://orcid.org/0000-0002-8684-0726.

Rahman, M. S. (2017). The Advantages and Disadvantages of Using Qualitative and Quantitative Approaches and Methods in Language "Testing and Assessment" Research: A Literature Review. *Journal of Education and Learning,* 6(1), 102–112. Retrieved from http://dx.doi.org/10.5539/jel.v6n1p102.

Rieser, R. (2013) *Educating teachers for children with disabilities: Mapping, scooping and best practices exercise in the context of developing inclusive education* (Bhutan: UNESCO). (Google scholar)

Sefika, M. R., Mavetera, N. and Mavetera, C. G. (2013) Investigating the Benefits of ICT in Lesotho Rural Communities of Mabote and Khubetsoana; North-West University, Mmabatho, South Africa, *Journal of African Research in Business & Technology*. Retrieved from http://www.ibimapublishing.com/journals/JARBT/jarbt.htm.

Smith, J.A. (2011). 'Evaluating the contribution of interpretative phenomenological analyses, *Health Psychology Review*, 5(1), 9–27. Retrieved from https://doi.org/10.1080/17437199.2010.510659.

Souza, J. B. (2018). Blindness, Accessibility and Inclusion: Notes of a Trajectory. Psicologia: Ciência e Profissao, 38, 564-571. https://doi.org/10.1590/1982-3703000092018.

Tederixe, L. C. (2019). Tactile Book: *Teaching and Learning Possibilities for the Blind Child.* Mestrado em Diversidade e inclusao, Universidade Federal Fluminense. 11, 652-673. Doi: 10.4236/ce.2020.115049.

Terzi, L. (2014). 'Reframing inclusive education: Educational equality as capacity equality', *Cambridge Journal*, 44 (4), pp. 479-493. Retrieved from https://doi.org/10.1080/0305764X.2014.960911.

Texas School for the Blind and Visually Impaired (TSBVI) (2017). Guidelines and standards for educating students with visual impairments in Texas. Retrieved from https://www.tsbvi.edu/images/downloads/EducatingStudentswithVIGuidelinesStandards.pdf.

The Lesotho Communications Authority and the International Telecommunication (2017). *The State of ICT in Lesotho; Lesotho Communications Authority*, Princess Margaret Road, Old Europa, Maseru. Lesotho. http://www.EASSy.org/ownership.html.

Toussaint, K.A. & Tiger, J.H. (2010). 'Teaching early braille literacy skills within a stimulus equivalence paradigm to children with degenerative visual impairments', *Journal of Applied Behavior Analysis*, 43(2), 181-194. Retrieved from https://doi.org/10.1901/jaba.2010.43-181.

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2021). The Sustainable Development Goals Report 2021: United Nations Publication. http://www.copyright.com.

Viljoen, H. (2020). 'Teaching literacy and mathematics through braille', in M.M. Sefotho & R. Ferreira (eds.), *Teaching Learners with Visual Impairment* (Vol, pp. 125–170), AOSIS, Cape Town. Retrieved from https://doi.org/10.4102/aosis.2020.BK191.05.

Weinberg D. (2014). *Contemporary Social Constructionism*: Key Themes, Temple University Press, Philadelphia. (Google scholar)

Williams, M., & Moser, T. (2019). The Art of Coding and Thematic Exploration in Qualitative Research. *International Management Review*, 15(1), 45-55. Retrieved from http://www.imrjournal.org/uploads/1/4/2/8/14286482/imr-v15n1art4.

Yin, R. K. (2017). *Case study research and applications*: Design and methods (6th ed.). Los Angeles, CA: Sage. (Google scholar).

TEACHERS' PERSPECTIVES ON HIGH FAILURE RATE IN MATHEMATICS: A CASE STUDY OF LADY FRERE DISTRICT, SOUTH AFRICA

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Abstract
Numerous studies have reported on students' poor performance in mathematics in many countries including the developed ones. The aim of this paper was to explore teachers' perspectives on students' high failure rate in mathematics. The attribution theory underpinned the study, and the qualitative method as a case study guided the study. Purposeful sampling method was used to select three high schools and three teachers one from each of the schools. Semi-structured interviews were employed to generate qualitative data from teachers' responses. The qualitative data were subjected to direct content analysis which starts with a theory or relevant research findings as a guide for initial codes. The semi-structured interviews' responses were manually transcribed, and then similar responses were grouped into annotations from which the themes emerged. The findings categorised in three themes show that students do not perform well in mathematics at Grade 12 level due to: students' behaviour, education system and school's non-teaching activities. Therefore, the study recommends the following: (i) Schools must make sure that mathematics periods are not disrupted at any cost, they must be placed as second or third on the timetable to accommodate overlapping assembly disruptions. (ii) The government must reconsider reducing mathematics content, which is too long to be covered withing a short period of time. (iii) The government must also provide proper training for mathematics teachers through workshops and seminars. (iv) There must be strict measures set by the government to avoid unnecessary absenteeism by mathematics teachers.
Keywords: Comprehend, high failure rate, immediate feedback, mathematics, progression.

INTRODUCTION

Mathematics is an important subject in a person's life as it deals with real life situations which need its application. Nowadays many job require someone with the basic understanding of mathematics and sciences because individuals are expected to solve problems which are appearing day to day, for example, hunger and endangered habitats as well as supporting growth and stability of the global economy (Mullis & Martin, 2017)

In South Africa, research shows that there are several factors that hinder students' learning such as teachers' mathematical content knowledge, students' background in mathematics, under resourced schools, lack of parental involvement in students' learning, students' negative attitude towards mathematics, students' ill-discipline, change of the curriculum, high student-shortage of mathematics teachers, language barrier (Ogbonnaya, Mji & Mohapi, 2016). To improve students' performance in mathematics, Department of Basic Education [DoBE] and other non-governmental organisations [NGOs] tremendously put consolidated effort (for example conducting winter and spring mathematics and physical sciences classes; and hold camps for the students across the country). However, despite the collective effort,

students' performance in mathematics has shown little improvement (Department of Basic Education [DoBE], 2012]. The persistent students' poor performance in mathematics shows that there must be other factors which contribute negatively to this. Such factors are regarded as trivial yet have negative consequences on students' performance in the subject. It is for this reason that this study explored teachers' perspectives on students' failure rate in mathematics.

The subject is applied in many courses such as chemistry, physics, geography and astronomy and many other subjects. With basic mathematics, students can read basic graphs and charts. In science and technology, students can utilise mathematics skills to analyse the movement of the planets and solve equations relating to real life situations. In nursing, it is used by students to calculate dosages to pass their course, and the list is endless. The given examples show that mathematics is significant since it helps mankind to deal with real-life situations, also in the scientific and technological development of the countries (Enu, Agyman, & Nkum, 2015)**.** Despite its importance as highlighted above, many students continue to fail mathematics. Numerous studies have reported on students' poor performance in mathematics in many countries, i.e., the developed ones, the developing ones including South Africa. Many students perform poorly due to lack of problem-solving skills in certain mathematical topics, for example, trigonometry, algebra, and geometry.

Despite numerous interventions like winter and spring classes on mathematics teaching and learning in South Africa, still the Grade 12 mathematics results are faced with several major drawbacks. However, research has consistently shown that, for poor performance, Grade 12 students have not attained an adequate understanding of most mathematics concepts. There is increasing concern that most students are still do not understand mathematics as they should. Tachie and Chireshe (2013) suggest that there is a need for research studies to establish the causes of the high failure rate in mathematics in countryside schools. Despite the large body of research on factors that lead to students' high failure rate in mathematics, there is a scarcity of such research in rural schools in the Eastern Cape Province of South Africa. It was for this reason that the researchers embarked on the study to explore factors that lead to students' high failure rate in mathematics in the Eastern Cape Province of South Africa.

The aim of the study was to explore the causes of the high mathematics failure rate in Grade 12 at three high schools in Lady Frere district in the Eastern Cape Province of South Africa. The paper builds on the contributions from the students' and teachers' responses to the semi-structured interviews on the causes of high failure rate in mathematics.

The study sought to answer the question: What are teachers' perspectives on high failure rate in mathematics?

Literature Review

Many countries are faced with high failure rate in mathematics across the grade. The causes for high failure rate in mathematics have been documented extensively in literature worldwide. Researchers have observed that among the reasons are lack of conceptual understanding, large class size, insufficient class hours, wrong manipulation of approaches in problem solving, shortage of materials, mathematics teachers' incompetency and lack of students' efforts in studying mathematics (Tachie & Chireshe, 2013). Tachie (2020) argues that teachers' methods of teaching contribute to students' understanding and performance in mathematics. This implies that poor teaching methods contribute to high failure rate because students learn mathematics superficially. A study in Malaysia on the factors that lead to high failure rate in mathematics revealed three main factors that were identified from the survey

conducted with engineering students as: students' attitude (study style =73%; class absenteeism-12.0%), students' background (Course difficult = 51.3%, unable to understand the problem = 38.0% personal problems = 6.2%) and teacher's-related factors (change of lecturers = 22.0%) (Alwadood, Halim, Sulaiman & Noor, 2018). In another study in Kenya, Kamau, Kiprono and Langat (2020) added to the factors above, inadequate teaching force, poor teaching methods, poor entry marks and poor assessment techniques.

Turning to another factor, for example, is unskilled mathematics teachers. Mathematics teachers have much to offer for improving students' performance in mathematics. Despite their major role in students' mathematics learning, some teachers lack mathematical teaching skills; 60% of students in Tachie and Chireshe's (2013) study in South Africa ascribed high failure rate in mathematics to unskilled teachers. Some teachers are not skilful in teaching mathematics and use of inappropriate teaching methods. Unskilled teachers always face challenges in assisting students with mathematical problems that require high order thinking or different methods to solve problems. Perilous shortage of skilled mathematics teachers affects mathematics teaching globally. Shortage of skilled mathematics teachers leads to some schools opt for unskilled teachers with the intention of using them as babysitters. Due to the delay by the same governments in employing mathematics teachers, the babysitters end up being mathematics teachers. Du Preez (2016) argues that unskilled teachers lack mathematical content which lead to surface learning. Surface learning promotes rote learning and no cognitive demanding tasks are set. In addition, Tachie and Chireshe (2013) argues that unskilled mathematics teachers are selective in their teaching; they teach topics which are understandable to them. This in the long run leaves students with limited conceptual understanding and develop negative attitude towards mathematics.

Attitude is a mental concept that describes favourable or unfavourable tendencies towards an entity or a situation (Sarmah & Puri, 2014). Attitude impedes students' progress in mathematics if students doubt themselves by thinking that they cannot solve mathematics problems proficiently. The persistent doubting attitude in students' minds, end up developing in them a phobia towards mathematics. Phobia towards mathematics simply means the hate of mathematics for no apparent reason. The study conducted in Kenya by Kamau, Langat and Kiprono (2020) revealed that 65% and 60% of the teachers and students, respectively, said that poor performance is influenced by the negative attitude towards mathematics. Ngussa and Mbuti's (2017) study in Arusha, Tanzania, involving secondary school students, it was revealed that there is moderate correlation between student's attitude and performance when teachers use humour as a teaching approach. They concluded that the enhancement of students' positive attitude can boost students' performance in mathematics. Similarly, Mensah, Okyere and Kurancie's (2013) study in Ghana found a significant positive correlation between students' attitude and performance in mathematics. In some cases, the negative attitude is developed when mathematics is considered as a subject for a certain gender. For example, some people believe that mathematics is for males not females. The present researchers' experiences in a South African context of learning and teaching mathematics refutes this claim; there are so many female students who outperform male students.

The way mathematics concepts are taught can yield either positive or negative results. The teaching method that promotes rote learning are more likely to contribute to the poor performance of students. Students who are very much exposed to surface learning where memorisation is promoted cannot think out of the box when the mathematical question requires the application skills. Teachers must apply diverse ways of teaching mathematics for

understanding. Ogbonnaya, et al., (2016) argue that lack of teachers' mathematics content knowledge contributes to students' poor performance in mathematics. It is difficult for a mathematics teacher who lacks content to effectively teach. Teachers must make use of different ways of teaching to ensure that all students are catered for in the lesson.

Students' backgrounds have been identified by Ogbonnaya, et al., (2016) as one of the hindrances to students' learning. This implies that students' backgrounds play a vital role in their mathematics understanding and performance. It is quite clear that mathematics topics are interlinked, so if the students are lacking an understanding in the preceding topic, they are more likely to struggle in the subsequent topic. For example, to understand multiplication, a student must first conceptually understand addition. In many schools, there are many learners with deficit in mathematics content which reflects poor background.

Theoretical Framework

Weiner's (1992) attribution theory underpinned the study. The attribution theory explains the failure as caused by internal or external factors. The concept of attribution describes the reasoning process by which people observe the cause of what has happened to them as either being caused by them or by others. The attribution theory is relevant to this study since some students most likely attribute their high failure rate in mathematics to intrinsic and extrinsic factors. For example, they say: mathematics is tough; educators are incompetent, and educators are not serious, not working hard and having negative attitude towards mathematics. The study employed the attribution theory as the lens of looking into internal and external factors that affect students' performance in mathematics.

METHOD

The study employed a qualitative method driven by a case study design. Purposeful sampling method was utilised to select three high schools and three teachers, one from each of the schools. Semi-structured interviews were employed to generate qualitative data from teachers' responses, which were then manually transcribed for annotations and theme development.

Thematic analysis was used to provide a thick explanation about the participants' views, perceptions and experiences about the high failure rate in mathematics. The present researchers analysed every recorded copy by carefully listening and noting the highlights, which were then developed into themes. The response patterns from participants' direct quotes were listed to identify and code interesting concepts into categories systematically across the entire data set. Codes were translated into themes, sub-themes and higher order themes, relationships between themes were explored and annotated to create themes The trustworthiness of the interpretations leading up to the thematic synthesis were also assessed using an iterative design of interviews and interview transcripts.

The ethical clearance was sought from the university way before the study commenced and all the instruments which were used to collect qualitative data were ethically cleared.

Equality, morality, openness of intent, revelation of methods and veneration or the integrity of people were all taken into consideration. The purpose of research was clearly explained to all the participants. The researcher negotiated a formal agreement with the participants to ensure that they understood the nature of the research and its likely impact on them. This was intended to avoid bias and suspicions. For anonymity, codes were used, i.e. Teacher 1 School 1 (TS1:1), Teacher 2 School 3 (TS2:3), etc.

This section presents the findings of the research study focussing on teachers' perceptions on students' high failure rate in mathematics, as: students' negligence to work. High absenteeism rate, social behaviour, natural phobia of the subject, mathematics syllabus is long, teachers' teaching methods, tuition time hindered by other non-teaching activities s, teachers' personal excuses and mathematics lesson disruption.

FINDINGS

The semi-structured interviews with teachers were intended to elucidated information on their perceptions on the causes of students' poor performance in mathematics. In harmony with Weiner's (1992) attribution theory, this section presents the findings of the research study focussing on teachers' perceptions on students' high failure rate in mathematics, as: students' negligence to work, high rate of absenteeism, social behaviour, natural phobia of the subject, mathematics syllabus is long, teachers' teaching methods, tuition time hindered by other non-teaching activities s, teachers' personal excuses and mathematics lesson disruption.

Three major themes emerged from the interviews responses, viz: students' behaviour, education system and school's non-curricula activities.

The teachers from sampled schools ascribed poor performance in mathematics as students' own making through the way they behave students' behaviour), the education system and the non-teaching activities.

Students' behaviour

Lack of practice is considered as a contributing factor to students' poor performance in mathematics as the two teachers put it "students' negligence to practice mathematics result in background gaps*"* (TS1:1; TS2:1). It is imperative that if students want to achieve highly in mathematics, much practice is done, failing which the results can be poor.
The regular class attendance helps students not to lose momentum in any subject, it is worse with mathematics where new concepts build upon the preceding ones. According to one of the teachers allude to this by saying that "high absenteeism rate has a negative impact on students' performance in mathematics" (TS2:3).

Under the same theme, another teacher said that "social behaviour such as addition to drugs contribute to poor performance" (TS3:3). The students who are drug addicts cannot concentrate fully in class and plays truancy most of the times. Non-attendance of mathematics lessons has the same effect. In addition to the social behaviour TS3:1 said that "social networks can also distract the students form concentrating on their academic work".

According to TS3:3, some student fail mathematics because they hate it, as TS3:3 puts it, "some students have natural phobia towards the subject*".* This implies that there are students who just feel that mathematics is not in their veins. Such phobia creates anxiety in learning the subject, in such circumstances no effort is applied to try and perform well in the subject.

Education system

The poor performance in mathematics is also ascribed to the education system as TS1:3 puts it, "some students don't have calculators for practice, yet the subject requires intensive engagement*".* Considering that many students come from low-income families, the DoBE is supposed to meet the parents halfway by supplying students with calculators. There are so many mathematics topics that need the use calculators, for example, trigonometry, calculus,

financial mathematics, etc. Therefore, TS3:1 is of the opinion that a student without a calculator in a mathematics class, is more likely to underperform.

In addition to social behaviour which TS3:1 mentioned as a factor that lead to poor performance, this teacher also said that "long mathematics syllabus which makes it difficult for some teachers to complete within the required time frame". TS3:1 expressed a concern on how the grades 8 and 10 syllabuses are packed with content to teach within a year.

Schools' non-teaching activities

Some teachers indicated that teaching time is lost because of different schools' activities that take place on day to day. According to TS1:1 & TS2:3 "tuition time is hindered by non-teaching activities such as labour union meetings, sport days and staff meetings". School disruptions, for example, causes problems. If the mathematics lesson is in the first period and the assembly time overlaps into the first period, the lesson is forfeited (TS3:1). The factors highlighted in this paragraph might be considered trivial by some people, but the impact in a year or two-year period amounts to something major.

Another teacher said that "teachers' personal excuses during school days which amount to reduced tuition time" (TS2:1). The present researchers' high school teaching experiences reveal that some teachers have a tendency of being absent from work for no tangible reason. On the other hand, other teachers go to work regularly, but don't go to class to teach the students. These behaviours have a negative contribution to students' achievement in mathematics.

DISCUSSION OF THE FINDINGS

As discussed in the literature review, there are different factors that hinder students' performance in mathematics. This study has explored other factors that seems to be trivial, yet have negative impact on students' performance in mathematics, namely: (i) students' negligence to practice mathematics lead to background gaps, (ii) Some students don't have calculators for practice, yet the subject requires intensive engagement, (iii) high absenteeism rate, especially in rural areas, other social behaviour such as addiction to drugs and social networks, (iv) natural phobia of the subject, (v) long mathematics syllabus which makes it difficult for some teachers to complete within the required time frame, (vi) teaching methods used by other teachers are not easily understandable, (vii) tuition time hindered by non-teaching activities such as labour union meetings, sport days and staff meetings, (viii) teachers' personal excuses during school days which amounts to reduced tuition time and (ix) school disruptions. For example, if mathematics lesson is in the first period and the assembly time overlaps into the first period, the lesson is forfeited.

Students' negligence to practice mathematics leads to background gaps, mathematics is a subject of skill attainment through practice. To understand and retain the learnt mathematical skills much engagement with the content is required, but some of the students do not do the classwork and homework as expected.

Some students don't have calculators for practice, yet the mathematics requires intensive engagement. This finding was expected because it has been widely documented by other researchers, for example, Ogbonnaya, Mji and Mohapi (2016). In mathematics, there are topics that students cannot calculate mentally; the calculator is needed when learning such complicated mathematics.

The finding of high rate of absenteeism cited by the teachers as one of the factors to hinder achievement in mathematics agrees with the study by Coelho, Fischer, McKnight, Matteson and Schwartz (2015) which revealed that excessively chronically absent students from school are likely to display lower average test scores in mathematics than their daily attending counterparts. Correcting absenteeism later in schooling is too expensive, to avoid this research highlights that, early identification and correction is critical (Genao, 2015).

The study also revealed that social behaviour such as addiction to drugs and social networks contribute to the poor performance in mathematics. Other researchers, for example, Ogbonnaya, Mji and Mohapi (2016) calls such behaviours including others, ill-discipline. Drug abuse leads to students care less of their schoolwork start to abscond from school which in the long run affects their mathematics performance. In addition, the study revealed that the use of social networks, for example, WhatsApp, Facebook, etc, rob students of their study time. The time they are supposed to practice mathematics, it is invested in attending to the social networks.

Responses from another teacher show that natural anxiety of the subject leads to students constantly failing mathematics. Students with anxiety of mathematics may develop a phobia of the subject. Hembree (1990) highlights that math phobia is the negative attitude towards mathematics which results in mathematics avoidance. The findings of this study agree with the study conducted by Sule, Hussaini, Bashir and Garba (2016) amongst the secondary school students in Nigeria where those without phobia achieved more in mathematics than their counterparts with phobia.

Turning now to the time lost in schools, TS1:1 said that in most cases tuition time is lost to other non-teaching activities, such as labour union meetings, sport days, staff meetings and prolonged school assemblies. When teaching time is lost to such activities no one is accountable to recover such time, students are the ones that are disadvantaged. TS3:1 further elaborated on the issue of the assembly by saying that if a maths lesson is in the first period and the assembly time overlaps into the first period, the lesson is disrupted. The activities highlighted in this paragraph might be considered trivial, but they have a negative effect on students' performance in mathematics, as it is always difficult to gain the time lost.

Finally, mathematics teachers' regular absent from lessons also has a negative impact on students' achievement in mathematics. Students are supposed to learn mathematics daily so that difficult concepts can be grasped and understood with practice.

CONCLUSION

This study revealed that the major causes of the high failure rate in mathematics in Lady Frere district of the Eastern Cape province of South Africa are: (i) students' negligence to practice mathematics lead to background gaps, (ii) Some students don't have calculators for practice, yet the subject requires intensive engagement, (iii) high absenteeism rate, especially students in rural areas, other social behaviour such as addiction to drugs and social networks, (iv) natural phobia of the subject, (v) long mathematics syllabus which makes it difficult for some teachers to complete within the required time frame, (vi) teaching methods used by other teachers are not easily understandable, (vii) tuition time hindered by non-teaching activities such as labour union meetings, sport days and staff meetings, (viii) teachers' personal excuses during school days which amounts to reduced tuition time and (ix) school disruptions, for example, if mathematics lesson is in the first period and the assembly time overlaps into the first period, the lesson is forfeited.

Recommendations

The study has made the following recommendations:

- Schools must make sure that mathematics periods are not disrupted at any cost. They must be placed as second or third on the timetable to accommodation overlapping assembly disruptions.
- The government must reconsider reducing mathematics content which is too long to be covered within a short period of time.
- The government must also provide proper training for mathematics teachers through workshops and seminars.
- There must be strict measures set by the government to avoid unnecessary absenteeism by mathematics teachers.

Limitations

This study was conducted in three schools in Lady Frere district of the Eastern Cape province of South Africa. Therefore, the findings cannot be generalised beyond the specific population. tIf the same study is conducted in many districts, the results might be different from what has been revealed by this study. With a bigger sample, the factors that lead to poor performance in mathematics might be many compared to those identified by this study.

REFERENCES

Alwadood, Z., Abd, H.S., Sulaiman, H., & Mohd, N.N. (2018). High failure rate in mathematics subject: influencing factors and study styles. *Social and Management Research Journal (SMRJ), 15* (2). 108-118.

Coelho, R., Fischer, S., McKnight, F., Matteson, S., & Schwartz, T. (2015). The effects of early chronic absenteeism on third-grade academic achievement measures. Wisconsin Department of Public Instruction. www.lafollette.wisc.edu/research-public-service/workshops-in-public-affairs publications@lafollette.wisc.edu

Department of Basic Education (2012). *National Senior Certificate Examinations, National diagnostic report on learner performance*. https://www.gov.za/sites/default/files/gcis_document/201409/national-senior-certificate-examination-national-diagnostic-report-learner-performance-2012re.pdf

Du Preez, M. A. (2016). *The factors influencing mathematics students to choose teaching as a career* [Master's dissertation, University of the Free State].

Enu, J., Agyman, O. K., & Nkum, D. (2015). Factors influencing students' mathematics performance in some selected colleges of education in Ghana. *International Journal of Education Learning and Development, 3*(3), 68-74.

Genao, S. (2015). Utilizing data to combat absenteeism and decrease dropout rates. *Education and Urban Society. 47* (4), 463- 475.

Hembree, R. (1990). The nature, effects and relief of mathematics anxiety. *Journal for Research in Mathematics Education. 21*, 33-46.

Kamau, F., Kiprono, G., & Langat, A.K. (2020). Factors contributing to poor performance in mathematics by students. A case study of Ndemi secondary schools in Kipipiri subcounty, Nyandarua county [Bachelor of Arts Research project, Gretsa University].

Mensah, J. K., Okyere M. & Kuranchie, A. (2013). Student attitude towards Mathematics and performance: Does the teacher attitude matter? *Journal of Education and Practice, 4*(3), 132-139.

Mullis, I. V., & Martin, M. O. (2017). *TIMSS 2019 Assessment Frameworks*. International Association for the Evaluation of Educational Achievement. Herengracht 487, Amsterdam, 1017 BT, The Netherlands.

Ngussa, B. M., & Mbuti, E. E. (2017). The influence of humour on learners' attitude and mathematics achievement: A case of secondary schools in Arusha City, Tanzania. *Journal of Educational Research, 2*(3), 170 -181. Retrieved from https://www.researchgate.net/publication/315776039

Ogbonnaya, U. I., Mji, A., & Mohapi, S. (2016). Identifying some hindrances to students' achievement in mathematics in South Africa. *Dirasat, Educational Sciences, 43*(2), 705-714.

Sarmah, A., & Puri, P. (2014). Attitude towards Mathematics of the Students Studying in Diploma Engineering Institute (Polytechnic) of Sikkim. *Journal of Research & Method in Education, 4*(6). Retrieved from http://www.academia.edu/download/36434404/B04630610.pdf

Sule, B., Hussaini, M.M., Bashir, U. S., & Garba, A. (2016). Mathematics Phobia among Senior Secondary School Students: Implication for Manpower Development in Science Education in Nigeria. *International Journal of Education and Evaluation, 2*(8), 16-21. http://www.iiardpub.org

Tachie, S.A. & Chireshe, R. (2013). High failure rate in mathematics examinations in rural senior secondary schools in Mthatha district, Eastern Cape: learners' attributions. *Studies of Tribes and Tribals, 11*(1), 67-73. DOI: 10.1080/0972639X.2013.11886667

Tachie, S.A. (2020). Teachers' attitudes towards lesson study as a viable strategy to improve the teaching and learning of mathematics. *Universal Journal of Educational Research 8*(6), 2326-2334.

Weiner, B. (1992). *An attributional theory of motivation and emotion*. New York: Springer Verlag.

NON-VIABLE LIBRARY ENVIRONMENTS: CAN THERE BE ANY PLANS TO BE PUT IN PLACE FOR DEVELOPING ENGLISH LANGUAGE PROFICIENCY?

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Abstract
Comprehending texts written in English language prove to be devastating for learners whose home language is not English. In this study investigation of language proficiency levels was conducted. Authors' attention to embark in this enquiry is that reading is amongst the key components that lay the foundation for language learning, thereby becoming a successful scholar. For this qualitative enquiry a case study design was embarked on when the problem's complex phenomenon was studied. The sample comprised of ten conveniently selected primary school teachers. Data collection measures used were semi-structured interviews, with the main objective to investigate whether non-viable library environments produce learners who can read fluently and effectively. Through the analysed data themes emerged by grouping similar responses. It was discovered that libraries designed in classroom settings proved to be of benefit as they become a great place to impart knowledge to learners in relation to effective reading strategies. It is recommended that language teachers have to re-consider tasks of designing mini libraries in their classrooms. This paper therefore concludes that if establishing mini libraries could be vibrantly adhered to, a culture of reading would be instilled among learners.
Keywords: library, Language, Reading, Proficiency, Development

INTRODUCTION

For a maintained and economically enriched environment, there is an urgent need for an available, well-resourced and accessible library as a resource center (Polger & Okamoto, (2013). The library has a fundamental objective for provision of resources and services for diverse users in relation to personal capacity building, information and education. Library users strive for accessing a comprehensive range informed opinions from a variety of sources (Helen, 2010). As such valuable information sources, libraries need to embark on marketing strategies for all community members to be conversant of these academic centers. For the purposes of this investigation, when libraries undergo marketing they need to consider making available comprehensive material for language development in learners, with specific focus on reading. Such material may either be electronic or in the form of hard copies (Joseph, 2011). A reading nation is indeed a wealthy country.

In some areas of the world some countries have been declared by research to be categorically falling into a group of non-viable library environments (Adekunmisi, 2013). This is the case with certain African countries where limitation of reading resources exists due to logistics factors like finance and infrastructure, let alone staffing issues especially that job insecurity factors have impacted negatively in most household members ever since the eruption of COVID 19 pandemic era that resulted in job losses. In line with the statement above, findings by (Kaur, 2010) discovered some decline in library usage within users from Nigerian and

Indian communities respectively. In line with this discovery Duiker (2019) postulates that the case in the South African context revolves around limited access to data coupled with poor access to the least available library facilities, all these problems have since led to approximately fifteen libraries around Eastern Cape being shut down, this on the other hand being a call to a transformed approach that would accommodate all users.

With findings like these, on lacking interest to interrogate libraries, as authors we really wonder how learners in the studied schools would attain the intended reading proficiencies yet the government established these public libraries to develop and enhance reading skills for an improved reading culture, and when learners can read fluently in a range of platforms, this calls for an excelled academic excellence.

Review of Literature

For information to be disseminated to all users, there is really an urgent need that libraries be established across all zones or circuits in the South African Education Districts, further than that, such resource centers have to motivate learners and embark on continued marketing strategies. Research reports lack of promotion services by libraries. Morris (2009) argues that services offered by librarians need to be marketed in a much better and proactive manner. In the same vain, Burungu (2010) notes that librarians are obliged to devise some emergent strategies that would help publicize information services rendered. When such services are rendered by public libraries there will be provision of knowledge and information correspondingly made available to a wide range of users irrespective of their cultural differences inclusive of nationality, language and educational accomplishments (World Economic Forum, 2009).

Moreover, Slebodnik (2016) has noted that by virtue of libraries being service oriented, they are measured with regards to the provision of services to diverse users. As core function for improved reading proficiency lies at the heart of the library, this being a vital instrument to develop and sharpen learning skills, it is worth to note that as the drastic shift of the emergence of digital technologies in this 20th century, development has resulted in libraries also storing electronic information. Schlebusch (2015) harmonises that introduction to the use of digital learning aim at helping students to also understand the implications of computer technologies better within the society. This means there are now currently diverse kinds of information sources available, learners need to be acquainted with such sources hence the digital world. Both teachers and librarians need not tailor down learners towards obtaining information through the previously known traditional approaches, there is a dire need for users to have all necessary exposure to new e-learning devices. If these services are also entirely marketed by libraries, the latitude of users would then be extended in interrogating all electronic-related networking systems (Education Guidance, 2020).

However, the current situation in the investigated schools becomes a major concern due to non-functional limited libraries around the district. Interrogating this situation, as authors we are likely to explain reasons for the decline in reading proficiency among learners (Ibrahim, 2010). For school libraries discovered to be in such non-viable conditions, this complicatedly relates to inadequate learner performance as observed by the South Africa Department of Basic Education (2012). This calls for work in collaboration by both teachers and parents to motivate the young to have consistent integration with the least available library resources coupled with establishing adequate school libraries for a maintained reading culture. If learners become fluent in reading a wide range of texts, they are likely to comprehend with

whatever material they come across, this being an indicator for improved academic excellence (Mutungi 2012; Anderson, 2009).

When libraries are established within adequate proximity to schools, they become directed towards attainment of the intended educational objectives well known by all the affected stake holders like teachers, learners and library staff (Peter, 2014). Zhixian (2016) concurs that it is really a functional practice for a school library to aim at supporting teaching and educational engagements, appending classroom exercises with enhanced reading, creating love of comprehending with texts among learners, instilling a culture to read for enjoyment whilst behind the scenes information is being gathered, as well as engaging with varied material sources. It then becomes the task of English language teachers to motivate and encourage learners to have an instilled culture of reading. When this culture has been rooted in learners, as authors we anticipate great improvement in relation to reading skills, language development and fluency in the English medium.

Theoretical Framework

This investigation is underpinned by Opinion leadership theory (Chatman, 1985). The theory perceives that within a given social environment there are people who are information seekers, regarding such persons as leaders ready to share gained information with others. These leaders are noted by this theory to have an added characteristic of being exposed to mass media yet with observance of system norms. With such distinctive character, such leaders take into account that they continuously distribute information, meaning, they act as information resources.

Information dissemination for the purposes of this investigation is attributed to libraries as suppliers of knowledge to all users as a fully-fledged resource center is denoted for the material it supplies. For success and academic excellence, not specifically improved reading proficiency in English language, but across all subjects offered in the school curriculum, there is a dire need for the establishment of school libraries (Yi, 2016). Libraries are regarded as suppliers of information because of the characteristics they pose: providing supplementary reading material for schools and communities in general, making available some multiple copies for loaning, and also availing varying materials in their diverse forms, inclusive of the accessing information through the use of digital technologies. As education is one of the children rights, there really is a huge need for provisions of school libraries to stimulate education with increased reading levels among learners (Yi, Lodge & McCausland, 2013).

METHOD

This is the segment where research procedures have been embarked on in relation to the process of collecting data for the current enquiry (White, 2003). For the purposes of ethical consideration, participants were approached by the researchers and were granted permission to conduct the investigation, as such participants were made aware that all their responses would be kept anonymous, and also that they were free to withdraw if they might feel intimidated during the course of the inquiry. The research question to this enquiry was: Can there be any plans put in place for developing English language proficiency in non-viable library environments? In conjunction with the main research question, the main objective of this paper was to investigate whether non-viable library environments produce learners who can read fluently and effectively.

Research Approach

This qualitative investigation allowed authors to explore issues and better understood phenomena from firsthand responses, truthful reporting as well actual dialogues obtained through participant engagement. Language learning theories with regards to viability of library environments were issues explored by the authors and participants through this research approach (Fisher, 2003; Seal, 2015).

Research Design

As a leading factor to the disposal of tools that facilitate at interrogating complex phenomena located within their environments, a case study was used. It would have been really difficult for the authors to consider the case studied, without prior interrogations of the teaching and learning contexts (Maree, 2008; Nueman, 2013).

Study Participants

Comprising the sample of this examination was ten conveniently selected primary school teachers. Participants were selected from various schools in one education district of the Eastern Cape Province, as they offered English language as one of the subjects engulfed in the prescribed school curriculum. It was specifically for that reason that they were considered as the pertinent ones to supply relevant evidence pertaining the problem under study (Moffat, 2015).

Instrument

Brinkman (2013), Seal (2015) and Fick (2014) share the same idea as they advocate using interviews when collecting qualitative data; and also that semi-structured interviews are data collection tools that encompass open-ended types of questions, as perceived for use in this investigation by the authors. It is of this reason that interviews with open- ended questions were conducted to obtain in-depth information from participants in relation to plans to be put in place to develop English language proficiency in non-viable library environments.

Data Analyses Techniques

For this investigation content analysis was used as a method of analyzing data, where common and differing aspects were identified. On grouping of data, categories that later transcribed to themes were identified (Miles & Huberman, 2014).

FINDINGS

In line with participants' responses in consideration of library environments that were discovered to be non-viable with regards to developed language proficiencies, authors in this part outlined their argument of findings. Findings are discussed in accordance with the themes that emerged.

Motivation Factors

Concerning enthusiasm factors pertaining reading abilities in learners, one participant responded: *Learners in all the classes that I teach seem to be lacking motivation to become proficient readers. As I closely interrogate reasons for these not so-impressing learner attitudes, they would tell me that they are troubled by comments commonly whispered by other learners to those who proved to have better reading abilities.* On this aspect another participant opined that: *I have since observed a recent tendency that learners no longer willingly read texts in a classroom setting, instead they would request me to let them read as a group, instead of reading in singles. When I further investigated reasons for such, they would report that those who always show diligence and volunteering to read some texts for me were teased by other classmates that they thought they are the best.* As Authors we noted

that the entire group of participants had similar responses around issues of demotivation caused by other learners towards those who displayed willingness towards improved comprehension.

Limited Resources Versus Accessibility

When asked whether the least available libraries were appreciated for use by learners, one participant argued: *The library corner that I designed specifically for my learners in the classroom allocated under my management has very few reading materials. This makes it difficult for me to accommodate all learners to access books to be read. As I divide them into small groups, I have observed that this somehow impacts on time constraints because there are more than forty learners, which makes it impossible to allow them individual chances of comprehending with texts. Lack of reading books really hinders progress with relation to improved reading aptitudes.*

Efficient Library Users

Most participants were eager to share their wonderful stories with regards to indicators of improvement: *Despite that the library in the school where I teach has few resources to assist in reading, those few learners who always show enthusiasm have made me very proud in the last couple of months. This has made me to constantly consult my line manager for improved library resource conditions.* In line with this response, another participant reiterated almost the same sentiments: *I have since made it a norm to give group learners and allocate some reading material as take-home tasks. It really makes me so proud to mention that ever since I have engaged on vigorous reading practiced as a daily routine, I have been observing momentous improved reading abilities even among learners who had initially displayed great difficulties comprehending with texts.*

DISCUSSION OF FINDINGS

Out of the findings from data analysed, it emanated that the major finding denoted learners who got an active exposure or direct engagement with the least available reading resources established as mini libraries in various classrooms, seemed to have benefitted. Through this exercise reading comprehension levels had improved within a limited space of time. Mini libraries designed in various classrooms have ascertained some benefits in learners. Those who consistently engaged on reading activities were identified to have obtained some drastic improvement with regards to enhanced reading proficiency. As authors we opine that indeed libraries are resource centers to convey information to all users, specifically learners, for the purpose of this investigation. These findings are in line with views by Garoufallou, Zafeiriou, Siatri and Balapanidou (2013) who note that libraries need to embark on marketing strategies so all users to be enlightened of how important it is to be consistently engaged on comprehending texts. Reading lots and lots of varied texts is tantamount to wealth in someone's mind, which makes us to pronounce that indeed a reading nation is an affluent one.

It is a prerequisite for all individuals to have the necessary information as an essential resource leading to success in diverse fields, meaning, it is necessary that libraries should market themselves and make available all the necessary, relevant reading material, be it online or in the form of hard copies, so that necessary services are made available for all users. Such marketing strategies would provide opportunities for valuable benefits to the South African youth.

Findings for this investigation have been discussed in proportion to the Opinion leadership theory by Chatman (1985) who alludes that people who tend to seek information from diverse sources are considered as leaders who in turn have the necessary function to disseminate information obtained, to others. This is why such a cohort is noted as information resources. For developed language proficiencies, teachers have an obligation to expound the importance for love of text comprehension, so that in turn there is a maintained culture of reading among learners.

CONCLUSION

Research has exposed that engaging on continued, consistent reading of texts is aligned with improved academic excellence. Despite limited reading resources in the libraries established in schools, it still remains of paramount importance to encourage teachers to institute self-mini libraries in their classrooms as these have been proved by research to instill the culture of reading in learners, thereby improving their language proficiency.

Recommendations

To regulate the problem, as authors, we already believe that libraries as resource centers need to market themselves as this functional strategy would stimulate recognition and library image, thereby leading to awareness of the value brought about, in turn resulting at improved language proficiencies. If there is proficiency in language development, there would be an upgraded academic performance as all subjects in the prescribed curriculum have texts to be comprehended.

REFERENCES

Adekunmisi, S. R. (2013). Strategies for marketing library services and information products in Nigeria. *Global Advanced Research Journal of Educational Research Review*, 2(6), 240-245.

Anderson, V. (2009). Desperately seeking alignment: reflections of senior line managers and HRD executives. *Human Resource Development International,* 41(3), 263–277.

Brinkman, S. (2013). *Qualitative interviewing.* New York: Oxford University Press.

Burugu, J. N. (2010). *The county: understanding devolution and governance in Kenya*. Nairobi: Clead International.

Chatman, E. A. (1985). Information, mass media use and the working poor. *Library & Information Science Research*, 7, 97-113.

Duiker, K. S. (2019). *Too many libraries are forced to close their doors*. Retrieved from https://www.thejournalist.org.za/books/too-many-libraries-are-forced-to-close-their-doors/.

EDUCATION GUIDANCE. (2020). *Guide to Computer Applications Technology (CAT) Education*. Retrieved from https://fundi.co.za/fundiconnect/guide-to-computer-applications-technology-cat-2020/.

Fick, U. (2014). *The Sage handbook of qualitative data analysis.* Boston: Sage.

Garoufallou, E., Zafeiriou, G., Siatri, R., & Balapanidou, E. (2013). Marketing applications in Greek academic library services. *Library Management*, 34 (8/9), 632-649.

Helen, H. &. (2010). *Marketing Academic libraries in USA: Challenges and opportunities*. Poland, Oregon: Emerald Group publishing.

Ibrahim, K. M. (2010). *Marketing Definitions*: Review and Analysis. London: Scarecrow.

Joseph, J. K. (2011). *Marketing of Information products and Services in India. Library Philosophy and Practice*, 1.

Kaur, A. (2010). Marketing of information services and products in University Libraries in India: An explanatory Study. *Electronic Journal of Academic and Special Librarianship.* Retrieved from *https://www.researchgate.net/publication/238324853_Marketing_of_information_services_and_products_in_university_libraries_of_Punjab_and_Chandigarh_India.*

Maree, K. (2008). *First steps in action research.* Pretoria: Van Schaik.

Miles, M. B., & Huberman, A. M. (2014). *Qualitative data analysis: An expanded source book*. Washington: Sage.

Moffatt, S. S. (2015). *Contextualizing Scientific Research Methodologies*. Retrieved from https://yuli-elearning.com/mod/resource/view.php?id=677.

Morris, B. J. (2009). *Principal support of media specialist and teacher collaboration. A research study, in Educational media and technology yearbook, ed. M Orey*. Retrieved from http://www.springerlink. com/content/m7n7813546758784/.

Mutungi, B. K. (2012). *The status of school libraries in Kenya: the case of public secondary schools in Nairobi County*. MA thesis, University of South Africa, Pretoria.

Neuman, W. L. (2013). *Social research methods. Qualitative and quantitative approaches.* Thousand Oaks: Sage.

Peter, A. (2014). *Marketing strategies for information services: A case study of the institute of chartered accountants*. Ghana: Library Philosophy and Practice.

Polger, M. A., & Okamoto, K. (2013). Who's spinning the library? Responsibilities of academic librarians who promote. *Library Management*, 34(3), 236-253.

Schlebusch, C. L. (2015). *An exploration of grades 10 - 12 computer applications technology teachers' problem-solving skills in the Free State*. Retrieved from http://hdl.handle.net/11462/678

Seal, C. (2015). *The quality of qualitative research.* London: Sage.

Slebodnik, M. (2016). Marketing and output of Science and Technology Libraries: Selected Resources. *Issues in Science and Technology Librarianship*. Retrieved from https://scholar.google.com/citations?user=i721x6EAAAAJ&hl=en.

South Africa Department of Basic Education. (2012). *National guidelines for school library and information services.* Pretoria: DoBE.

White, C. J. (2003). *Research: an introduction for educators*. Pretoria: Ithuthuko Investments.

World Economic Forum. (2009). *The global information and technology report 2002–2009*. Retrieved from http:// www.insead.edu/v1/gitr/wef/main/fullreport/indexhtm.

Yi, Z. (2016). Effective techniques for the promotion of library services and resources. *Information Research*. Retrieved from http://InformationR.net/ir/21-1/paper702.html.

Yi, Z., Lodge, D., & McCausland, S. (2013). Australian academic librarians' perceptions of marketing services and resources. *Library Management*, 34 (8/9), 585-602.

Zhixian, Y. (2016). *Effective techniques for the promotion of library services and resources,* 21 (1).

CHALLENGES FACED BY ECD TEACHERS IN THE TEACHING OF SCIENCE PROCESS SKILLS IN ECD CLASSROOMS OF ZIMBABWE

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ABSTRACT
This paper explored the challenges teachers are facing when teaching science process skills (SPS) in early childhood development (ECD) classrooms. The study adopted a multiple case study involving three primary schools where three ECD teachers were purposively sampled. Data was solicited from participants through interviews, observations and document analysis. Findings reveal that despite commendable efforts by teachers to teach SPS in ECD classrooms, a number of challenges were being encountered which include poor and inadequate infrastructure, inadequate teaching and learning resources, inadequate support from administrators, lack of knowledge on SPS and poor syllabus interpretation skills. The challenges adversely thwarted the teachers' efforts to teach SPS in ECD classrooms. Despite the challenges being faced, findings indicate that teachers were teaching the basic SPS namely: observation, measuring, classifying, communication, predicting and inferring. The study recommends school administrators to support the teaching of SPS in ECD classrooms through adhering to policy guidelines during enrolment to avoid overcrowded classrooms; purchasing of adequate teaching and learning materials; and organising staff development workshops on syllabus interpretation.
Keywords: ECD teachers, SPS, classrooms, teaching and learning, science lessons.

INTRODUCTION
The teaching and learning of science process skills in early childhood development (ECD) classrooms has been advocated for by many scholars in the contemporary educational framework (Mugweni, 2016; Samkange, 2016 & Hamlin & Wisneski, 2012). Globally, scholars advocate for and support the notion that science education is essential for young children and the teaching science process skills (SPS) serves as a foundation and background of learning science concepts (Eshach & Fried, 2005; Samkange; 2016; Mugweni; 2016). They argue that young children's characteristics of being energetic, curios and playful; place them at a pedestal to learn science skills easier and faster. On the same note, Mugweni(2016) views that science by nature is a practical subject which can be learnt hands-on, during play episodes organised by the teacher. As such, the characteristics place the ECD learners in the best frame of mind to internalise scientific concepts and skills. Teachers should therefore tape into these characteristics to plan relevant and interesting activities for the learners to be engaged in during the teaching and learning of science. Despite all these scholarly arguments and views there is not much literature to speak on challenges faced by teachers when teaching SPS in ECD classrooms (Mugweni, 2016).

The arguments have led to some policy makers crafting policies which ensure that SPS taught and learnt in ECD classrooms. For example, in South Africa, The National Curriculum Statement, Curriculum and Assessment Policy Statement (CAPS) (Ambross, Meiring and Blignaut, 2011; DoE, 2002). In Zimbabwe, the teaching of science, technology, engineering

and mathematics (STEM) is being implemented in schools as stated in the Mathematics and Science syllabus as early exposure of learners to meaningful scientific activities in their classrooms (Mathematics and Science Syllabus, 2015; Clyton & Kufakunesu, 2017). Science is one of the curriculum subjects taught in the ECD classes and the curriculum emphasises that science concepts and skills should be taught to equip learners with life-long skills (Mathematics and Science Syllabus, 2015). Significant strides on the teaching of STEM subjects are evident in the new curriculum where the development of life-long skills are emphasised (Mugweni, 2016; Mathematics and science syllabus, 2015). While it is significant to consider the teaching of SPS in ECD classrooms, these considerations have led to broad concerns of the knowledge of teachers on SPS and the challenges they might be facing.

Statement of the Problem

A significant number of researches advocate for the teaching of science process skills in early childhood development classes (Clyton & Kufakunesu, 2017). The argument being that young children should be taught lifelong skills that will enable them to solve problems they encounter in life (Mugweni, 2016, Mathematics and science syllabus, 2015). Some scholars however argue that there is no specific funding available to support the teaching of science in ECD classrooms in Zimbabwe (Chikutuma, 2016, Samkange 2016). There seems to be limited empirical literature currently available to speak to the essence of teaching science process skills In ECD classrooms and the challenges that teachers might be facing in the process. This study was an attempt to add to that scant literature by exploring challenges that teachers are facing when teaching science process skills at early childhood level in Zimbabwe.

Purpose of the Study

The study was conducted at a time when development scholars in ECD are advocating for the teaching of science skills in ECD classrooms. In agreement, many countries are crafting policies which ensure that STEM subjects are introduced to learners at a tender age (Ambross, Meiring & Blignaut, 2011; Clyton & Kufakunesu, 2017; Mugweni, 2016). The study contributes to knowledge development in the area of teaching science process skills to young children and the challenges that teachers are facing in ECD classrooms.

Research Questions

The study was guided by the following research questions:

1. What are the SPS taught in ECD classrooms?
2. Are there any challenges that teachers are facing when imparting the knowledge of SPS in learners?
3. To what extend do the existing policies assist to alleviate the challenges that ECD teachers are facing?

Research Objectives

The study was guided by the following research objectives:

1. To explore the SPS taught in ECD classrooms.
2. To identify the challenges that teachers are facing when imparting the knowledge of SPS in learners.
3. To inform policy makers such as education officials, school administrators and curriculum planners on the need to enforce existing policies that alleviate the challenges that ECD teachers are facing.

Review of Literature

Science is a crucial subject that learners should study in ECD centres from early childhood to higher and tertiary education (Ng'asike, 2011; Susanne & Shu-nu, 2014; Andiema, 2016). Science processing skills can be regarded as the basic foundation of industrial development and the significant connection between technology and socio-economic development (Bose & Seeto, 2016). This claim is supported by Ntuni (2016) and Haile and Mohammed (2017) who submit that any country that fails to provide good quality science education may quickly find itself the dumping ground for other people's innovations. In this regard, the teaching and learning of science in early childhood is substantiated by numerous studies in many African countries (Ng'asike, 2011; Kitta & Kapinga, 2015; Bose & Seetso, 2016; Mugweni, 2016; Ntuni, 2016). The quest for development in most countries in African research studies has resulted in education policy makers beginning to appreciate the need to support, fund and evaluate the teaching of science skills at all levels.

There are different science process skills that can be taught in ECD classrooms. Mugweni(2016) and Murunga(2016) identified six basic SPS as follows: communicating, observing, classifying, measuring/quantifying, estimating/predicting, inferring/researching. In addition, Bose & Seeto, (2016) asserts that SPS are not step by step activities per se but are integrated and occur in different combinations which come up naturally during planned or unplanned activities.

Observing

Young children are curios and the curiosity led them to use their five senses to observe and describe the world around them (Charlesworth, 2016). During science lessons, experiments for example, learners can use magnifiers to notice details on objects. The teachers' role during the observation activity is to encourage learners to talk, discuss or ask questions on what they observe (Lind, 1999; Trundle, 2015). During the observations, they use new words to describe things they see (texture words or colour words). Against this background, it became prudent to observe how the teachers were executing their roles through engaging learners in observation activities and how they use their language for easy communication in the classroom. Despite the skill being useful and significant in ECD classes, it was essential to observe how ECD teachers were arranging learners for crucial activities during science lessons. Observation activities require adequate and appropriate learning materials and proper planning of activities (Mugweni, 2016). The study established the challenges that teachers were facing when executing their roles during the teaching and learning of SPS. Maponga(2014) argues that ECD teachers should manage their time properly and pace the activities evenly if they are to produce quality outcomes.

Classifying

Classifying is a foundational science skill crucial to be taught from an early age. The skill is in math and literacy (Lind, 1999; Kuru & Akman, 2017). The skill enables learners to develop broader concepts as they classify and group items in different categories (Charlesworth, 2016). The items can be classified in different ways, for example, size, shape or colour. From the above sentiments, the skills require many different teaching and learning materials for learners to sort and classify. To avoid learners from scrambling and fighting materials, adequate relevant materials should be available. The study explored the availability of relevant, age appropriate and adequacy of learning materials to teach classification skill. This resonates well with the views of Andiema(2016) who found that inadequate play materials, lack of physical facilities such as classes, do not promote quality education.

Communicating

Young children usually connect their observations and experiences to previous knowledge (Andersson & Gullberg, 2014) and during this connection process, they talk about what they think and share the observations with others (Lind, 1999). In addition, Kuru and Akman, (2017) alludes that communication is a science process skill which includes listening to others, contributing insights by connecting their ideas to the ideas of others. The ECD children can communicate through writing, drawing pictures of their observations or they can cut and paste pictures from old magazines and create a picture story at the end of a science exploration or activity (Charlesworth, 2016; Kuru & Akman, 2017; Andersson & Gullberg, 2014). It can be concluded that research consistently shows that communication skill is an integral part of teaching and learning in ECD classes. During communication of results after an experiment, learners should maintain social distancing and wearing of face masks in this era of Covid 19 pandemic. The research established how teachers were developing the skill in learners given that young children are energetic and playful.

Measuring

During science lessons, young children can measure using non-standard measures like, spans, feet, rocks, day and events (Kuru &Akman, 2017). In support of the previous views, Neaum (2016) says that engaging learners in informal scientific experiences during science teaching is vital because they develop scientific concepts and skills. For example, learners can count the number of days it takes a bean to sprout; they can also measure through counting (the number of rocks needed to fill a bucket). Given the previous situation, it becomes vital to study on the activities that learners are engaged in during science lessons and to explore adequacy of space in the classrooms for learners to carry out the explorations freely. Besides adequate space, the activities require additional materials for explorations. The study established different strategies employed by teachers in order to support from different stakeholders. Literature suggests that provision of broad- based learning materials and items capturing require the involvement of different key players (Esau & Mpofu, 2017).

Predicting

Before the science activity, learners can use their imagination to predict the results or findings of the exploration (Kuru & Akman, 2017). As part of their predictions, they can ask questions for example, “What if we do not water the plants for two consecutive days?” More importantly, the predictions can be true or false but even if they are wrong, they still learn something new. Important to note is the fact that predictions promote listening, imagination, speaking and fine motor skills in learners. The study explored if teachers had knowledge of teaching the skill and how they were teaching it.

Conceptual Framework

The study was anchored on the science processing skills taught in ECD classrooms. SPS are also called science practices and have been considered as an important strategy and an inseparable part of science education as they help children to construct knowledge, solve problems, and formulate results (Tsakeni, 2017; Duruk *et al.*, 2017). The skills are central to the acquisition of scientific knowledge that is so critical in solving problems in society (Abungu *et al.*, 2014; Tsakeni 2017). On the same note, Trundle (2015) suggests that the science process skills are integrated skills that occur at different intervals during the lesson as children interact with a variety of learning materials in the classroom during activities. The main thrust of the study was to explore the teacher’s knowledge on SPS and the challenges

that they were facing. In this study, the science process skills include observation, prediction, inferring communication, classification, and measuring.

METHOD

The section explained the limns the research design methodology and employed in this study. It discusses the relevant the selected research methods and the techniques adopted to realise findings to the research questions.

Research design

The study adopted multiple interpretive case study design to get 'in-depth' and 'in-sight' data from teachers on the challenges they were facing when teaching SPS in ECD classes (Ponelis, 2015). The design was a multiple case in the sense that all the three teachers were sampled from three different schools. The approach enabled the researcher to get detailed information by studying small numbers of participants through semi structured interviews and documents that they were using in their day-to-day teaching experiences. The multiple case study design was adopted to explore the real -life experiences of ECD teachers when teaching the SPS. The design assisted in collecting data from multiple sources of information which involved three primary schools in Harare Metropolitan Province. On the same note, (Algozzine & Hancock, 2016) alludes that data from multiple cases are usually reliable and strong.

Sampling Procedures

Three teachers, one from each school were purposively sampled due to their relevance in the study (Maxwell, 2013). Purposive selection assisted the study to focus on participants who had the knowledge, expertise and experience about the phenomenon understudy (Yin, 2017). The three female participants were qualified and had more than five years teaching experience in ECD classes and were able to communicate their thoughts and ideas appropriately (Mukherji & Albon, 2015).

The pseudonyms were assigned to the teachers to provide anonymity (Yin, 2017). Teacher X from School A, Teacher Y from School B and Teacher Z from School C. Participation of children and teachers in this study was solely voluntary. Written consent for children participation in the study was obtained from parents and it was explained that consent could be withdrawn anytime (Mukherji & Albon, 2015).

Data collection instruments

Data was gathered through document analysis, semi-structured interviews and still photos of learners for the period of three months. The documents analysed included the syllabus and schemes of work. The field notes were handwritten, as I observed the lessons. In three of the classrooms visited, science lessons were being taught as per timetable.

In order to keep a good record of events, I recorded the lengthy of each activity. I recorded the activities that the learners participated in whether in groups or individually paying special attention to the SPS being taught. More importantly, I also transcribed the field notes with any supporting details daily.

Still photographs were captured when children were busy doing activities assigned to them by the teacher. The photographs were captured using my phone to capture 'visually important matter' during the course of the activities (Yin, 2017, p78). Photographs were used to recall

details of context when transcribing field notes and as a visual record of events (Maxwell, 2013).

Semi-structured interviews with ECD teachers were conducted in order to get first-hand information on the SPS that they were teaching and the challenges they were encountering (Leedy & Ormrod, 2013). The interviews were useful as they provided in-depth and insightful responses of ECD teachers on the SPS they were teaching in ECD classes (Marshall& Rossman, 2016). Before the interviews, participants were briefed thoroughly and reassured them of their rights and responsibilities in the study (Marshall& Rossman, 2016). The interviews were conducted mostly after teaching the lesson.

Data analysis

Data from interviews and documents were coded to generate themes. The coding process involved reading through the data in order to get the overall overview (Leedy & Ormrod, 2013). The excerpts were coded and placed into themes. The codes which emerged from the data and those sharing the same meaning were grouped together into sub-themes and eventually into themes.

FINDINGS

The collected data was categorised into the following sub-themes: SPS taught in ECD classes and challenges faced by teachers in the teaching of SPS.

Science Process skills taught in ECD classes

Data gathered from the three teachers' documents reveal that teacher's scheme, plan and teach SPS as stipulated in the current Mathematics Science Syllabus, schemes of work and syllabus. The study observed that the syllabus is a single document which covers content from ECD A to grade two. Despite their agreement on teaching SPS, teachers identified them differently. Teacher X acknowledged them as basic skills needed by learners to develop scientific concepts. She mentioned communicating, measuring, observing, describing, identifying, predicting and inferring. Similarly, Teacher Y referred SPS as content or activities taught during science lessons. She identified the following as SPS: experimenting, observing, communicating, asking questions, measuring and counting. She added that SPS are better taught in prepared environments inside or outside the classrooms. Contrary, Teacher Z had a different opinion. She said:

SPS are not taught, but learners develop them unconsciously as they engage in planning activities that they engage in during the teaching and learning process. They are not taught in science lessons only but in other subjects like: languages, arts, physical education mass displays and mathematics. The above findings seem to suggest that it is essential to expose SPS to learners at an early age. The SPS can be content, activities or skills that enhance concept formation and development in learners.

Challenges faced by teachers in the teaching of SPS

The three teachers were in agreement that they were encountering challenges when teaching SPS in ECD classes. The challenges include: inadequate space and overcrowded classrooms, inadequate and poor quality infrastructure, inadequate teaching and learning resources, lack of support from stakeholders, poor syllabus interpretation and Covid 19 pandemic.

Inadequate space and overcrowded classrooms

Teacher X from School A reported that overcrowded classrooms were a result of the school administration failing to adhere to recruitment policy. The three teachers were all teaching more than 45 learners instead of 20 as stipulated by the guiding statutory instrument. The study observed that there were too many learners posing difficulties for them to move freely during activities. Activities like measuring and classification demand space for leaners to display the materials and to move around in order to record findings. Inadequate space will lead to inaccurate results.

Below is a picture taken from Teacher X's classroom during an activity.

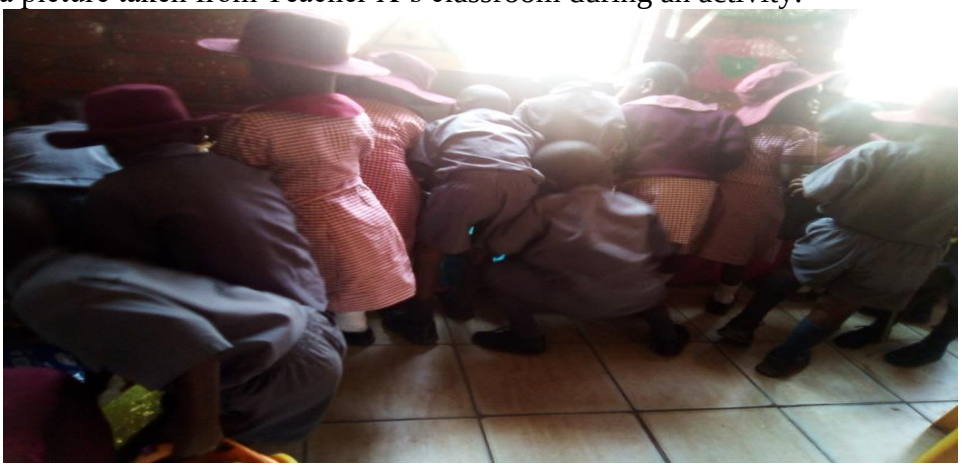

Figure1. Learners in Teacher X classroom during an activity

The study observed that in Teacher Y's classroom from School B, much of the space was occupied by learning centres which are dotted around the classroom. In agreement, Teacher Z from School C highlighted that the higher teacher-pupil ratio sways the teachers' attention fuelling chaotic behaviours among young learners. Activities like inferring and observation learners should work without being disturbed by other learners, but when there is inadequate space, learners disturb each other and fights easily occur posing some disciplinary challenges. She added that an overloaded classroom hinders classroom discipline and becomes a challenge to the ECD teacher considering the age and characteristics of the learners. Figure 2 is a picture of an overcrowded Teacher Y's classroom

Figure 2. Overcrowded classroom

Figure 2 shows an overcrowded classroom and the little space learners have to conduct activities. Teacher X explained that she can hardly move around to monitor and guide learners' activities due to inadequate space. The teaching of SPS was affected adversely as she failed to meet the individual needs of learners in an overcrowded classroom. The teachers agreed that the large numbers of learners in ECD classes were a result of the school administrators who fail to adhere to recruitment policy. The teacher-pupil ratio should be 1:20.

Inadequate and poor quality infrastructure

Besides being poor, the study observed that infrastructure in the three classrooms visited was also inadequate. The infrastructure include: the classroom, child sized tables and chairs, flannel boards and cupboards. Due to inadequacy, some materials were kept in sacks and very big cupboards which were inaccessible to learners. The cupboards in ECD classrooms should be child sized so that learners can access the learning materials easily. If learning materials are accessible to learners, much time will be spent performing the activity instead of learners to spend time waiting for the teacher to distribute learning materials.

Teacher X alluded that infrastructure need to be improved for the effective teaching and learning of SPS. In addition, Teacher Y lamented that whenever learners were uncomfortable, it was difficult for them to pay attention that they lose interest and got demotivated to learn. Teacher Z pointed out clearly that if learners are squeezed and uncomfortable, this will adversely affect their attention span.

Inadequate teaching and learning resources

Data gathered suggested that ECD classrooms need resources like sorting trays, magnifiers, building blocks, buckets of water for measuring activities, flowerpots, pattern and blocks, magnets, puppets, scales, magnifying glasses, computers, cooking utensils, puzzles with large and small pieces, measurement tools, toy construction equipment and models Teacher Z complained about the shortage of resources at the school. She added that learners scramble for learning resources each time they carry out activities. The resources were supposed to be provided by the school and parents working together. She decried the shortage:

> Since we opened school in January, we have not been allocated our resources which comprise of paints, crayons or even charts. Grades 1-7 classes were already given. They segregated us in many ways. Our concerns are not taken seriously. We are the last to be given stationery. These learners have paid their fees in full and are paying the same fees as those in grades 1-7. This is not fair to us.

From these sentiments, inadequate teaching and learning act as an impediment in the development of skills in young learners. It seems that the school administration was very much concerned about examinable classes while neglecting ECD ones. The shortage of resources greatly compromises the quality of science lessons.

Lack of support from stakeholders

Some participants blamed parents and school administrators for not supporting their efforts of teaching science process skills. However, at School B, parents assisted by availing some learning materials, such as hand-made toys, although these were not adequate. All participants pointed out that despite commendable efforts by some parents to assist by making learning materials for learners, the school administrators were reluctant in allocating

learning resources to ECD classes on time. In most cases, teachers received their allocation of resources at the end of the year, making it difficult to teach science process skills.

At school C, Teacher Z complained that the ECD class was given the last priority when it came to the allocation of resources in the school. Up to the time data was collected, the class was not allocated its share of resources. Learners needed crayons, brushes, books, ruled paper, bond paper, paint, and books.

Poor syllabus interpretation

The study found out that The Ministry of Primary and Secondary Education changed the syllabus which was used in schools and implemented the Zimbabwe Curriculum Framework (ZCF) 2015-2022. The ZCF 2015-2022 was rolled out into schools in January 2017, although its planning had started in 2015. Due to lack of exposure, most teachers would call it the new syllabus. The syllabus development and designing in Zimbabwe is done by the Curriculum Development Unit (CDU). As such, Teacher X said:

We wish to have workshops on current approaches in the teaching of science as a subject in general. The TIC should arrange these for us so that we share ideas on how we can effectively teach the subject. We also need personnel from the Curriculum Development Unit (CDU) who can come and facilitate on syllabus interpretation. Workshops are good, they are eye openers. The syllabus that we are implementing is still new and we need workshops on that.

Teacher Y from school B concurred and remarked that:

> The implementation of the new curriculum started in 2017 and we do not have much knowledge on how to interpret and implement it. As teachers, we need assistance from the syllabus designers because we have a lot of questions but they continually say they have busy schedules to come and assist us. Due to lack of knowledge of how to interpret the science syllabus, the teaching and learning of SPS becomes difficult.

From the above narrative, it is clear that Teachers X and Y were willing to learn more about the teaching and learning of SPS although they were not being afforded the opportunity to do so. For example, Teacher Y mentioned that she had difficulties in teaching inference skills and she needed assistance. According to them, poor syllabus interpretation leads to poor teaching of SPS. The teaching and learning of SPS in ECD was an important aspect as reflected in the policy documents such as the syllabus which all teachers should consider.

Teacher Z from School C admitted that staff development workshops were necessary in developing staff members on how to teach the subject pointing out that some of the concepts appear to be complicated. The teacher also highlighted that the syllabus was an important official document used when drawing schemes of work. As such, the document should therefore be availed to teachers on time so that teachers had adequate time to read the syllabus and interpret it when scheming.

Covid 19 Pandemic

The study's findings reveal that with the advent of Covid-19, Ministry of Primary and Secondary Education has engaged Ruzivo digital learning platform which offers e-learning services in Zimbabwe and is available free of charge to those able to access it via the internet. Teacher X explained that Ruzivo is an online interactive digital learning platform targeted at both primary and secondary school learners. In addition, Econet wireless (local internet

provider) also made it possible to access the Ruzivo platform free of charge when using Econet cell phone lines (UNICEF, 2020b). The teachers however argued that the platform was not benefiting the ECD learners due to unavailability of the technological gadgets. In the three schools visited, all classes from ECD A to grade seven are divided into two, group A and group B. The two groups alternate to report to school. Each group attend school three or two days per week.

The teachers said that schools were implementing this strategy in order to maintain social distancing since the classrooms were already overcrowded. The study concludes that it is difficult for learners to maintain social distancing during activities like measuring and classification because the activities were mainly done in groups or pairs. After the activity, learners were observed communicating their findings and sharing results very close to each other. Furthermore, it is almost impossible for schools to buy tests kits given the current economic situation in the country.

DISCUSSION OF FINDINGS

The tree teachers shared different opinions on their knowledge of SPS. It was identified as content, skills or activities; children are engaged in for concept formation. The idea is supported by Charlesworth (2016) who alludes that SPS are the skills that allow children to acquire new information through concrete experiences. In addition, the study conclude that the SPS are developed or taught as children engage in hands- on teaching and learning episodes in a prepared environment. This resonates well with Covil and Pattie (2012) who support the idea that SPS are integrated skills that are developed naturally in learners through active engagement in science activities.

The three ECD teachers complained during the interviews that their classrooms were overcrowded. The overcrowding was as a result of school administrators who were not adhering to recruitment policies. The teacher-pupil ratio in the three classes observed ranged from1:33 to 1:48. This is at variance with the Ministry of Primary and Secondary Education's requirement to have twenty learners (1:20) in each classroom (S.I. 106 of 2005:544). A teacher-pupil ratio of 1:20 is generally regarded as manageable and could result in effective teaching and learning. Higher teacher-pupil ratios made it difficult for the teacher to maintain discipline during teaching and to move around monitoring and assisting all learners.

In addition, the Statutory instrument 106 of 2005 specifies the regulations and requirements for the operation of the ECD centre. On page 542 the instrument states that total indoor playing space to allow for at least 2,5 square metres for each child, and of such playing space at least 1,75 square metres for each child or a total of 42 square metres. The findings reveal that these guidelines were not being followed. The classrooms were not built following these specifications leading to overcrowded classrooms. On the same note, (Mahoso and Kuyayama-Tumbare, 2014) argue that the teacher would not be able to cater for the individual needs of the learners in overcrowded classrooms. Similarly, a study carried out by Samkange (2016) on management of early childhood development centres found that ECD teachers had classes that had fifty learners. This compromised classroom management by the teachers. As Zhai and Tan (2015) observe, the teacher, as an authoritative figure, is responsible for designing and controlling learners' behaviour during the teaching and learning process. However, large class sizes compromised effective teaching and learning in terms of limited movements of the teacher during activities as well as maintaining classroom discipline.

The overcrowded classrooms made it difficult for the teachers to cater for individual child's interests and needs during lessons. If the leaners are too many, it means more time is needed to perform an activity. The more the learners, the more their needs and interests in a particular lesson.

The mathematics and science syllabus as a policy document stipulated time of 20 minutes per lesson. Teachers lamented that the time was too short considering the characteristics of the children. They explained that due to high-teacher pupil-ratio, much of lesson time was lost trying to maintain order and discipline in the classroom. Research carried out by Bukalia and Mubika (2012) on the challenges and benefits of early childhood development education in the Zimbabwe education system found that there was inadequate space and standard equipment at the play centres.

Learners were observed pushing, squeezing and shoving each other during an activity trying to grab limited learning materials. This behaviour was evidence that the resources were inadequate in the classroom. As discussed earlier, if the resources are limited the findings or results of the experiments are compromised. The scenario resonates well with the views of Samkange(2016) and Mugweni(2016)who found that inadequate play materials, lack of physical facilities such as classes, do not promote quality education.

During this period of Covid-19**,** UNESCO (2020) recommends that schools should create or update safeguarding policies to ensure safety of children at learning centres. During lesson observations, learners were observed working in groups during activities like measuring, classification and observation. Teachers also reported that it was difficult to practice social distancing during lessons because young learners are energetic and mobile. Munshi (2020) concurs and mentions recommendations which include screening learners and staff before coming into the centre each day, maintaining social distancing and, if the child gets sick, he/she should be tested. According to Munshi (2020), groups of learners should be kept as small as possible.

Findings from the study reveal that there was inadequate and furniture in the classrooms visited. Learners were observed seated on benches with tables which were not age appropriate. Teachers reported that when learners were not seated comfortably, chances are that their attention is diverted from the lesson. They became demotivated to learn and lose focus of the lesson. In a research carried out by Chikwiri & Musiyiwa (2017), the findings suggests that there were inadequate provision of appropriate infrastructure and furniture at most ECD centres. In addition, the 2015 study also found out that most of ECD classrooms in Zimbabwe do not have proper infrastructure. The present study concluded that poor and inadequate infrastructure, coupled with crowded classrooms, have detrimental effects on the teaching and learning of ECD learners.

The participants echoed that lack of support from the parents and the school administration had effects on the teaching and learning of SPS. Activities like measuring and classification required a variety of learning materials for learners to sort, classify, group and measure. Conversely, evidence suggests that ECD classes were the last to receive their share of resources despite the fact that learners would have paid their fees in full. It was also reported that resources were allocated to examinable classes first and ECD classes were last to get their allocation. This act had detrimental effects to the teaching and learning of ECD learners because they lost out due to inadequate learning resources. Mahoso and Kuyayama-Tumbare (2014) have also condemned the curriculum of Zimbabwe for being exam-oriented and

suggested that the curriculum should focus on learner interaction and sustainable development. The teachers at School A had resorted to engaging parents to support them in providing some learning resources. However, the teacher said that she reported parents who failed to bring the learning resources to the school administration, but she was told that there was no policy which compelled parents to provide schools with teaching and learning materials.

CONCLUSION

The SPS taught in ECD classrooms include communication, observing, classifying, measuring, inferring and predicting. The skills are developed when learners are engaged in play or hands on experiences in well prepared environments inside or outside the classroom. The study concludes that despite the teachers' efforts to teach SPS, challenges they are facing include: inadequate space and overcrowded classrooms, poor and inadequate infrastructure, inadequate teaching and learning resources, lack of support for stakeholders, poor syllabus interpretation skills and Covid 19 pandemic. Evidence gathered indicates that this reality existing in the ECD classrooms greatly compromises the quality teaching of SPS. Such a scenario does not place the ECD learner in the best frame of mind to internalise and conceptualise the required SPS. To mitigate the challenges, the two stakeholders should work together and support the idea of making materials available in ECD classroom; this would go a long way in promoting teaching and learning of SPS. The support includes the school administration adhering to policy guidelines on recruitment of learners, purchasing and supplying of relevant, adequate and appropriate teaching and learning resources.

Recommendations

The following recommendations were made on the basis of the findings and conclusions drawn from the study.

It is recommended that teachers should always look for opportunities to teach SPS because the acquisition of scientific skills leads to scientific literacy which, in itself, is another way of developing 21st century skills such as critical thinking, problem-solving, life-long learning, and creativity.

Teachers to be work-shoped on the syllabus interpretation so that they scheme and plan as per syllabus requirements. The workshops should be held at the end of each term so that teachers are guided during the scheming and planning process.

The school heads should adhere to enrolment guidelines in order to avoid overcrowded classrooms and maintain the stipulated teacher-pupil ratio. The stipulated ratio of 1:20 in ECD classes should be followed.

School administrators should fully support and fund ECD centres through purchasing of relevant and appropriate teaching and learning materials. It is also prudent to include the teachers during the procurement process so that relevant and age -appropriate learning materials are purchased.

All classes should be treated equally, especially in the allocation of resources such as classrooms, learning equipment and materials. The ECD classes are important just like examination classes, as such, teaching and learning resources should be allocated on time and equally to all classes.

Area of Further Research

The three ECD teachers were sampled from the same province which may make the results of the study not generalisable to other districts and provinces. The researchers recommends that future research on the teaching and learning of SPS in ECD classrooms be conducted in other provinces.

REFERENCES

Abungu, H.E., Wanga, S.W., & Okere, M.I. (2014). The Effect of Science Process Skills Teaching Approach on Secondary School Students' Achievement in Chemistry in Nyando District, Kenya. *Journal of Educational and Social Research, 4*(6), 359. DOI: 10.5901/jesr.2014.v4n6p359

Algozzine, B.; Hancock, D. (2016). *Doing Case Study Research. A practical Guide for Beginning*. https://books.google.co.zw/books?isbn=3957101751

Ambross, J.; Meiring, L.; Blignaut, S. (2014). The implementation and development of science process skills in the natural sciences: A case study of teachers' perceptions. *Africa Education Review*, 11 (3), 459-474.

Andiema, N.C. (2016). Effect of child centred methods on teaching and learning science activities in pre-schools in Kenya. *Journal of Education and practice, 7*(27), 1-9.

Andersson, K. & Gullberg, A. (2014). What is science in preschool and what do teachers have to know to empower children? *Cultural studies of science education. 9(2),*275- 296.

Bose, K. & Seetso, G. (2016). Science and mathematics teaching through local games in preschools in Botswana. *South African Journal of Childhood Education 6*(2), 2223-7682.

Bukaliya, R. & Mubika, A.K. (2012). Assessing the benefits and challenges of the introduction of early childhood development education to the infant grade in the Zimbabwean education system. *Journal of Education and Instructional Studies in the World, 2*(4), 78-85.

Charlesworth, R. (2016). *Understanding child development. 10th ed*. Cengane Learning: Arlington.

Chikutuma, T. (2016). Parental involvement in early childhood development (ECD) programmes: A case of Harare primary schools in Zimbabwe *African Journals Online,* 29(1), 553-662.

Chikwiri, E. & Musiyiwa, J. (2017). Challenges and gaps in children's transition from early childhood development to grade one in Zimbabwe. *International Journal of Educational Administration and Policy Studies, 9*(7), 91-102.

Covill, M. & Pattie, I. (2002). Science skills – The building blocks. Investigating, 18(4), 27-30.

Clyton, D. & Kufakunesu, M. (2017). Implementation of STEM curriculum in rural secondary schools in Zimbabwe: Limits and possibilities. *Journal of Emerging Trends in Educational Research and Policy*8 (1),11-15.

DoE: (Department of Education). (2002). Revised Curriculum Statement: Grade R- 9 (schools): Natural Sciences: Department of Education.

Duruk, U.; Abuzer. A.; Ceylan, D.& Gülsuyu, F. (2017). "Examining the Learning Outcomes Included in the Turkish Science Curriculum in Terms of Science Process Skills: A Document Analysis with Standards-Based Assessment." *International Journal of Environmental and Science Education,* 12 (2), 117-142.

Esau, H. and Mpofu, J., (2017). The preparedness of primary schools to implement the grade 3 new curriculum in Zimbabwe: Case study of Bulawayo metropolitan primary schools. *European Journal of Social Sciences Studies,* 3(4), 102-110.

Eshach, H., & Fried, M. N. (2005). Should science be taught in early childhood? Journal of Science Education and Technology, 14(3), 315-336.

Haile, Y. & Mohammed, A. (2017). Practices and challenges of public and private preschools of Jiga City Administration. *International Journal of Research-Granthaalayah, 5*(12), 17-32.

Hamlin, M. and Wisneski, D.B., (2012). Supporting the scientific thinking and inquiry of toddlers and pre-schoolers through play. *YC Young Children*, *67*(3), 82-88.

Kitta, S. & Kapinga, O.S. (2015). Towards designing effective preschool education programmes in Tanzania: What can we learn from theories. *Journal of Education and Practice*, *6*(5), 180-185.

Kuru, N.; Akman, B. (2017). Examining the science process skills of pre-schoolers with regards to teachers' and children' variables. *Education and Science* ,42 (190), 269- 279.

Leedy, P.D. & Ormrod, J.E. (2013). The nature and tools of research. *Practical research: Planning and design*, 1-26.

Lind, K. L. (1999). *Exploring science in early childhood education*: A developmental approach, (3rd). Delmar Thompson Learning, Africa.

Mahoso, T. & Kuyayama-Tumbare, A. (2014). *Curriculum issues in early childhood development*. Harare: University of Zimbabwe.

Maponga. S. (2014). *Early childhood development centres*. Harare: ZPH.

Marshall, C.; Rossman, G. (2016). *Designing qualitative research*. CA: Sage, Thousand Oaks.

Mathematics and Science Syllabus. (2015). Curriculum Development Unit. Harare.

Maxwell, J.A. (2013). *Qualitative research design: An interactive approach*. 3rd ed.: Sage. Thousand Oaks.

Mukherji, P, Albon, D. (2015). *Research Methods in Earlychildhood: An introductory Guide.* Sage, London.

Mugweni, R.M. (2016). Early childhood (ECD) teachers' conceptions and implementation of the child-centred approach to teaching science. *International Journal of Academic Research in Progressive Education and Development,* 5(4), 2226-6348.

Munshi, D. (2020). *American Academy of Paediatrics*. Retrieved from www.healthychildren.org. Retrieved on 2 September 2020.

Murunga, J.W. (2016). Devolving early childhood development education in Kenya: Policy Challenges and opportunities. *International Journal of Education and Research* 3(2), 1-10.

Neaum, S. (2016). *Child development for early year's students and Practitioners*. (*3rd).* Sage: London.

Ng'asike, J.T. (2011). Turkana children's rights to education and indigenous knowledge in science teaching in Kenya. *New Zealand Journal of Teachers' Work*, *8*(1), 55-67.

Ntuni, S. (2016). Challenges preschool teachers face in the implementation of the early childhood curriculum in the Cape of Coast Metropolis. *Journal of Education and Practice, 7*(1), 54-69.

Ponelis, S.R. (2015). Using interpretive qualitative case studies for exploring research in doctoral studies: A case of information systems research in small and medium enterprises. *International Journal of Doctoral Studies, 10* (1)535-550.

Samkange, W. (2016). Management and administration of early childhood development centres: the roles of school heads. *Scholars Journal of Economics, Business and Management*, 3, (1), 44-55.

Susanne, W. & Shu-Nu.C.,R. 2014. Investigating preschool and primary school teachers' self –efficacy and needs in teaching science: A pilot study. *CEPS Journal*, *4*(1), 51-67.

Trundle, K.C. (2015). *Research in early childhood science education*. Springer: Dordrecht.

Tsakeni, M. (2017). Science teaching orientations for physical sciences practical work. ISTE UNISA 2017 Conference (22-26 October), Kruger National Park, South Africa.

UNESCO. (2020). New recommendations released. Retrieved from www.en.unesco.org. Retrieved on 2 September 2020.

Yin, R.K. (2017). *Case Study Research and Applications: Design and Methods*. (https://books.google.co.zw/books?isbn=1506336183).

Zhai, J. & Tai, A. (2015). Roles of teachers in orchestrating learning in elementary science classrooms. *Research in Science Education*. Doi:101007/s11165-014-94519.

FROM PERSECUTION TO EMPOWERMENT: THE BREAKING DOWN OF CULTURAL BARRIERS TO EDUCATION OF CHILDREN WITH DISABILITIES AMONG BONO OF GHANA.

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Abstract
Culturally, the Bono of Ghana regarded any form of disability as a curse hence disabled children were neglected, maltreated, kept away from the public and never sent to school. In recent times however, the conservative cultural practice and negative attitude towards the education of disabled children is breaking down among the Bono; giving way to empowerment of the disabled. The objective of this exploratory study was to establish the motive behind this paradigm's shift in cultural practices. The qualitative (ethnographic) study employed interviews to explore the views and experiences of 60 purposively selected information-rich individuals associated with disability [i.e. parents, disabled people, teachers and traditional leaders] to participate in the investigation. The data which were analysed thematically revealed that negative cultural attitudes toward people with disability are no longer tenable among the Bono due to democratization, government policy and the influence of religion and the media. The study concluded that although culture is what identifies people, it is important for ethnic groups to refine some aspects of their culture in line with modernity- economic needs, democracy, human rights.
Keywords: Persecution, Empowerment, Education, Barriers, Disabilities, Culture

INTRRODUCTION

Persecution, maltreatment and neglect of people with disabilities is rife in most parts of the globe. Abusive and criminal acts against individuals with disability or perceived to deviate from the *norm'* have a long standing in history (Quarmby, 2011). Aristotle is infamously reported to have advocated for a law that barred children with disability from being raised (Gracer, 2007). This advocacy which appears to render people with disability less deserving is still practiced in the modern world. In some jurisdictions today, there is a legislation that proscribes people belonging to some categories of disability from conceiving, bearing and raising their own children (Bagenstos, 2020, Tilley et al., 2012). The authors of this paper regard such a practice as a modern day eugenics with its moral implications. In Nigeria, people with disability could be killed for ritual purposes whilst others are reduced to beggars due to cultural beliefs (Etieyibo &Omiegbe**,** 2016,). Similarly in Kenya discriminatory practices are meted out to people with disability (Winters, Langer & Geniets, 2017).

In Ghana, most ethnic groups culturally view it as a curse or punishment from the gods to the parents of any child with disability. Among the culturally conservative, Bono [a subset of the broader Akan ethnic group] culture has been a barrier that has denied children with disabilities education. Since time, immemorial children with disabilities were never enrolled in schools because of the Bono negative attitudes towards them. Attitudes, towards people whether positive or negative are emotional reactions based on values and beliefs as shaped by social experiences (Shapiro, 2014)

The negative attitude of the public towards disability and cultural beliefs made most parents to keep disabled children away from the eyes or ridicule of the public. They were ostracized and remained in perpetual exclusion from community interactions. The consequence of this cultural barrier was that many people with disabilities grew into adulthood without relevant knowledge and skills to become economically independent. Without any form of education and training disabled people were literally perpetual beggars because they lived in poverty and depended on the generosity of others.

The irony is that while the West advances policies and programmes for the advancement of disability, this is not so much in some African countries (Haang'andu, 2018). In recent times the conservative cultural practice and negative attitude towards the education of children with disabilities seems to be breaking down within the greater Bono Takyiman Municipality and the curiosity of the authors to explore this apparent paradigm's shift informed the choice of this investigation. The study used the qualitative research methods of interview and observation to explore the current positive dispositions of the Bono towards the education of children with disabilities.

Background

Bono is a sub-set of the Akan (the largest ethnic group in Ghana). As the cradle of the Akan, the Bono are culturally conservative and neck-deep in cultural practices and traditions that distinguish them. They regard physical fitness as a prerequisite for the attainment of certain positions such as chieftaincy, family headship and other important positions in society. In consonance with Bono tradition, disabled people are not allowed to come into close contact with royals and other community members who are perceived to be "clean". Any child born with disability is seen as accursed or punishment from the gods of the land. Badu (2011) affirms that in many communities in Ghana, if a child is born with a deformity, it is deemed to be a result of evil spirits, a failure of the family to keep taboos, or some type of witchcraft. A family of a disabled child was treated with scorn and marginalization. Consequently, such children were taken to the shrine for some rights to be performed for their '*return*' to where they might have come from (Achuroa,2019). There might be instances where infanticide ensued or the child and the family could be ostracized. In recent times however, there seem to be a departure from the conservative tradition as people with disability are enrolled in schools. Others are learning one form of trade or another whilst many more have found themselves in economically productive ventures.

Problem Statement

As indigenes, the authors are well informed about the cultural beliefs of the Bono regarding disability and witnessed through lived experiences how various forms of persecution practices were meted out to those with disabilities. They were sometimes killed during infancy, denied education and employment, made to beg for alms, ostracized and treated with contempt. Even, suitors might be hesitant to marry from such families. In recent times, however, there seems to be a paradigm shift from the cultural beliefs of the people. More people with disability are going to school, learning some trade, or engaging in economically productive activities. The above snapshots motivated this investigation.

Objectives of the Study

The objectives of this study were to;

- investigate the motive behind the sudden change of attitude towards the education of children with disabilities among the Bono.

- make other ethnic groups, communities and education stakeholders aware of the current positive dispositions of the Bono towards the disabled.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW.

This study is grounded in the *Human Capital* theory of which Schultz (1971) and Sakamota and Powers (1995) are among the chief proponents. Human capital is the theoretical framework that has adopted education and training as the vehicle for socio-economic advancement of humans and society. Le Grange (2011) affirms that the theory which emerged in the 1960s has its origins in neo-classical economics in the second part of the 19th century. The theory is based on the assumption that formal education and training is an investment to improve the productive capacity of any country. The advocates of the theory argue that an educated population is a productive population and the engine for a country's advancement. Referring to education as the engine for human capital, Schultz (1960) writes:

> *I propose to treat education as an investment in man and to treat its consequences as a form of capital. Since education becomes a part of the person receiving it I shall refer to it as human capital… it is a form of capital if it renders a productive service of value to the economy (p.571).*

The central thesis of this theory which focuses on the development of human capabilities through education in that the economic growth of any country depends on the investments people and the nation make in education and training. Thus, human capital represents the investment people make in themselves to enhance their economic productivity. Central to the modern form of human capital theory is the idea that investment in education is the most important determinant of economic growth in today's world. In other words, a nation's human capital, is the sum of skills, talents and knowledge embodied in its population (Le Grange, 2011). The theory advocates for full investment to be made in all people, *abled* or *disabled*, through education and training to enable them to contribute effectively to the socio-economic development of their respective communities and countries. The tremendous social and economic advancement of every nation depends on its human capital stock or human capabilities. The theory emphasizes how education can increase the productivity and efficiency of workers, by increasing the level of cognitive stock of economically productive human capability which is a product of innate abilities and investment in human beings (Olaniyan & Okemakinde, 2008). The provision of *education* ***for all*** humans, no matter their circumstances, is therefore a great investment in human capital development and capabilities, something more important in the contemporary world of knowledge economy than physical capital. Olaniyan & Okemakinde, (2008) intimate that the rationale behind investment in humans is based on the following three elements:

- that the new generation must be given the appropriate parts of the knowledge which has already been accumulated by previous generations.

- that the new generation should be taught how existing knowledge should be used to develop new products, to introduce new processes and production methods and social services and

- that people must be encouraged to develop entirely new ideas, products, processes and methods through creative approaches.

Olssen, Codd and O' Neill (2004) point out that the main propositions of human capital theory are that education and training increases an individual's cognitive capacity which in turn increases productivity, and an increase in productivity tends to increase an individual's earnings which becomes the measure of human capital.

The theory is in line with democratization and liberalism that have characterized today's world and implies that whether people are *abled*, or *disabled*, they must be provided with education and training to enable them to contribute to their own wellbeing and that of their communities and nations. These researchers contend that human resources constitute the ultimate basis of wealth of nations because capital and natural resources are passive factors of production. Rather, human beings accumulate capital, exploit natural resources, build social, economic and political organization and carry forward national development. It is for this fact that education and training should be a priority for every family, community and nation.

The Development of Inclusive Education in Ghana

The constitution of Ghana recognized the need to make formal education inclusive, long before the international community ratified the inclusive educational policy as an important development in contemporary education (Gadadgbui, 2008). The 1951 Accelerated Development Plan and the 1961 Educational Act set the goal for inclusive education in Ghana. The two policies sought to give educational access to ***all*** children of school going age by making school attendance free and compulsory (Gadadgbui, 2008). Indeed, it was this provision (1961 Educational Act) that made it possible for children from very disadvantaged rural communities including one of these authors to get the opportunity to attend school. Whilst the 1951 policy laid the foundation for six years of free education, the 1961 Educational Act extended the free and compulsory education for a further four years into the middle school. These policies boosted enrolments in the country's schools and through voluntary work by communities; more schools were built throughout the country. However, as Akyeampong, Djangmah, Seidu, Oduro and Hunt (2007) affirm, serious economic downturns and political instabilities in the 1960s and 1980s rendered the policies unsustainable. A major consequence of the constant unwarranted military interventions in politics between the mid-1960s and the 1980s resulted in poor educational performance, falling enrolment and poor completion rates. This affected the education of children with disabilities since there was no constitutional enforcement to ensure that they had access to education. Thus, in 1975 there were more than 2.3 million children in primary school in Ghana, but by the early 1980s, this number had dropped by over one million (World Bank, 2004). The 1992 Constitution re-emphasized the Free Compulsory Universal Basic Education (FCUBE,) which restarted in 1995 and increased access to basic schools ***for all*** children. This policy did not however enforce proper inclusive education and so only parents who were willing to educate their disabled children enrolled them in special schools.

Perspectives on Inclusive Education

Inclusive education is the current most widely educational policy pursued by countries in both policy and practice (Muntaner, Rossello & de la Iglesia, 2016). However, the approaches to it vary across different countries. The variation stems from how people conceptualize the inclusive policy. Amor, Hagiwara,Shogren et al. (2018) for instance, illustrate the different approaches to inclusive education. In spite of the differences in approaches, the fact is that globally the attitude towards people with disability is changing. In spite of the change in attitude the majority of children with special needs in developing countries are believed to be currently out of school, while many of those enrolled are not learning (Haddad, 2009). This may be so because environmental and attitudinal factors have

not encouraged the enrolment of children with special needs whilst those enrolled have not been given the necessary support to remain in school and reduce or eliminate their impairments. Thus, advances made towards achieving full inclusion in education have been very slow in the developing world. It is crucial for society to change in order to solve the problems faced by those with disability (Haegele & Hodge, 2016). The proponents of inclusive education place emphasis on changing the system rather than the child. Thus, if societies and school systems continue to be rigid, stereotypic, ritualistic and unaccommodating, we risk compromising the child's right to education. Parents cannot be happy if their children who have disability find themselves in classroom without any support for them. In fact, the philosophy of inclusive education acknowledges the ability of every learner to learn and participate in relevant education programmes. Inclusive education faces challenges in Africa where there is paucity of human and infrastructural resources including classrooms (Engelbrecht, 2020). The paucity of resources is mostly due to lip services, corruption and lack of political will by African leaders to ensure proper provision of inclusive education in their countries.

METHOD

A qualitative explorative (Creswell, 2009) method of interview was employed in the study to obtain the views of purposively selected information-rich individuals regarding the change of attitude towards the education of the disabled. The investigation into the motive for the change of Bono attitude towards disabled children took the form of ethnographic and phenomenological study. The two qualitative research approaches in the form of interviews were deemed the most suitable tools for data collection for a study that focused on cultural practices and lived experiences of an ethnic group. Whilst phenomenology assisted the researchers to describe and understand the 'lived' experiences of the phenomenon, *the attitude of the Bono* (Johnson and Christenson 2004), ethnography enabled them to uncover and explicate the ways the Bono understood their negative cultural disposition and took action to improve it.

Population and Sampling

Due to the nature of the study – i.e. investigating the views of people on disabled people in a culturally conservative area- it was difficult to determine the actual number of people with disabilities in an area with a population of about 100,000 people. More so, people with disabilities are not many and commonly found in the area. The researchers therefore used the snowball approach to purposively reach out to 60 individuals comprising people associated with disability such as parents (15), teachers (15), traditional leaders (15) and children with a disability (15). Bowling (2004) describes the snowball approach as a technique where initial respondents are requested to suggest others whom they know to be in the target group to be invited into the study. Purposive sampling is a deliberately non-random sampling method which aims to sample a group of people or settings with a particular characteristic. It is also called judgmental sampling because respondents are selected on the basis of their knowledge of the valuable information to the study (Bowling, 2004). In view of their association with disability, the 60 people were deemed information-rich to provide in-depth data on the phenomenon understudy.

Data Collection

The study which lasted for three months used one on one face-to-face in-depth interview as a technique to explore the current dispositions of the Bono towards people living with disability. The use of the snowball approach in the midst of Covid-19 restrictions made the

data collection process a bit slow because the researchers had to follow important protocols in order to identify some of the participants who were scattered in various towns and villages. Although covid-19 restrictions were relaxed at the time of data collection, the protocols of social distancing, wearing of masks and sanitizing were duly observed by the researchers throughout the period of data collection. The researchers provided participants with masks and sanitizers where such people did not have these personal protective equipment (PPE).

Participants were interviewed at their workplaces or homes, to collect data through unstructured interviews which focused on participants' previous and current dispositions towards children with a disability, reasons for the change in attitude, and the result of that. The researchers made copious notes throughout the interviews that lasted for three months (August-October 2021) because of the slow pace of the process.

Data Analysis

The data collected from the participants were analysed manually through the use of open coding approach. The aim of the analysis was to understand the various constitutive elements in the data through an inspection of relationships between concepts, constructs and variables and to see whether there were any patterns or trends (Mouton 2004). After the field work, the data were pruned, broken down into smaller units and categorized under specific relevant themes to make the analysis easy, logical and manageable.

Trustworthiness

Qualitative research requires trustworthiness which is the level of dependability or reliability of the data collection instrument, the process of data collection and the quality of the data collected (Quan-Baffour, 2012). To ensure trustworthiness in this study, the researchers conducted the interviews in the local language of the participants (Bono), wrote down all what they heard or saw verbatim, requested the participants to repeat answers where they were unclear and did not deviate from the items posed to participants. Triangulation was also achieved by comparing the responses from the four categories of participants. The above measures ensured trustworthiness for the study.

Ethical Considerations

Ethical issues for participants, anonymity, informed consent and protection of information are very important in qualitative research (van Wyk, 2015). The researchers obtained the consent of all the participants and assured them that the information they shared would not be divulged to any person or organisation. They did not ask for the names of the participants to ensure that the information provided could not be associated with any particular respondent. The researchers explained the purpose of the interviews to the participants and told them that their participation was voluntary, and as such, they could withdraw their participation at any time they wanted to do so. The previous measures were taken to ensure conformity to qualitative research ethics practices and standards.

RESULTS AND DISCUSSION

This ethnographic study set out to explore the Bono change of attitude towards the education of children with disabilities through interviews. The analysis and discussion of the data were done in line with the following themes:

Participants' Views on Disability

Although all the participants agreed that the negative attitude towards disability is cultural they added that no one chose to be born disabled. They corroborated in their responses that

the disabled are also human beings and must not be mistreated. An overwhelming number of them (49 out of 60) agreed in their responses that they enjoyed being with the disabled whilst 11 said the disabled were their close friends. As one participant said; (reproduced verbatim):

> *I attend the same computer training with two disabled youth and I learn a lot from them. Whenever I get stuck with the tasks from the trainer, I get assistance from them. The disabled are just like us, but our village people used tell us to keep away from them because they are evil.*

This response implies that disability might be a medical condition that could affect anyone, hence; families and community members should not mistreat or discriminate against people with disability. The respondents corroborated in their answers that people has made the disability situation worst through ignorance and negative attitude from obsolete culture and illiteracy and lack of education. Fifty-three (53) participants blamed the Bono obsolete cultural practices which previously ostracized the disabled instead of empowering them to become useful people to their communities.

In spite of the general change of attitude disabled people still face some challenges in their communities because of their physical conditions. As one disabled cobbler put it: *We cannot compete with others in activities that require physical dexterity…Sometimes we are shunted by some teachers and our peers and this makes us feel bad.*

In affirming this finding, Woodgate et al. (2019) report that learners with severe disabilities constantly face social exclusions in schools. The respondents (N=60) however agreed that giving the opportunity for education and training the disabled can unearth their potential and become independent instead of depending on the generosity of family members.

It can be deduced from these responses that by denying the disabled the right to education the Bono denied itself of economically active individuals who could contribute to the development of their respective communities. These responses suggest the need to teach the disabled how to fish instead of giving them fish. This finding is consistent with that of Beadle-Brown et al. (2020) who found that only 5 out of 110 people with intellectual disability received any form of educational support programme in England.

Motive for the change of attitude towards the education of the disabled.

Currently, the Bono have positive attitude towards the disabled; hence, the researchers asked the participants what could be the motive for the positive change. The respondents gave various reasons for the change of attitude which has given way to the empowerment of the disabled through educational opportunities. They mentioned education (of parents), democratization, human rights, government policies, influence of religious organisations, international organisations (UNESCO) and the media as the major causes for the positive change in attitude among the Bono.

One parent's response below seems to epitomise the views of others.

> *As a Christian and educated woman living in an ever changing world where education is a right, I cannot deny my disabled son education. Who knows who will care for me when I am old?*

These reasons from the respondents confirm the change of attitude of the Bono towards children born disabled. Education is a right and every human being, no matter their physical condition has the right to attend school (1961 Education Act, Ghana). We live in a world of constant changes and for any ethnic group to advance it must refine its cultural practices in tandem with general positive changes in society. Disabled people have potentials which when given the opportunity could be nurtured for the benefit of families, communities and nations. One traditional leader who participated in the study remarked (reproduced verbatim):

> The *disabled can do almost everything others do. They can be teachers, nurses, doctors and entrepreneurs when given the opportunity and support. Gone are the days when such potentials were killed by traditions. Culture should be dynamic in order to ensure development. Because of education a blind person is now a Minister of State in charge of Chieftaincy Affairs.*

This observation from a traditional leader confirms Rodd and Sanders' (2018) position that education is the mainstay of emancipation. Thus, with education, the disabled could be productive contributors to socio-economic development. For example, the fact that a visually impaired person is a Minister of State confirms the importance of enrolling all disabled children in schools. This realization of the importance of education and human right in the modern world coupled with religious beliefs might be a major motivation for the change of attitude towards the disabled among the Bono.

Results of the change in attitude towards the disabled

The participants recounted some instances to affirm the change in attitude towards the disabled. Forty-five (45) of them reported that they were aware of government directive for all public buildings in the area including schools and libraries to be architecturally redesigned to make them accessible to the disabled. The participants however conceded that the architectural changes have not yet been done to some of the public buildings in the Takyiman Municipality where this study was conducted. Thirty-nine (39) of the participants affirmed that the department of local government provides financial support for disabled children and this has increased the enrolment figure in the schools' the municipality.

It was revealed that the Catholic Church has a taken a strong lead in motivating its members and the broader community to change their attitude towards the disabled and this has seen some positive results. The head of inclusive education at the St. Paul's Catholic School affirmed it thus: *Parents inform their counterparts who have hidden their children that, there is hope here and now our enrollments keep increasing every term.*

Thirty–seven (37) participants comprising parents, educators and learners reported that the Mission school also provides training in sewing, shoe making and basketry to the out of disabled people to enable them earn a living. The effort of the church effort aims to ensure that all the disabled within the Takyiman diocese get access to education and training in order to become independent and productive members of their communities. One of the educators had this to say (reproduced verbatim):

> *Our mission is to empower all citizens no matter their physical circumstances. Those who cannot go to school should be given a starter capital and those in small scale business should be helped to build their capacity.*

The indication here is that the initiatives and efforts by the Catholic Church to empower the handicapped are already underway among the Bono people within the Takyiman municipality through enrolment in schools and skills training for the out of school. The majority of the participants (N=55) advocated for affirmative action to ensure that every disabled person who completes high school, college or university gets employed in the appropriate government department to ensure social and economic integration and cohesion.

Twenty–five (25) of the respondents revealed that previously, most handicapped people were beggars on the streets, but now with access to education and training, a number of them are gainfully employed either in the formal sector or are engaged in self-employment activities e.g. dressmaking, tailoring, basketry and shoe making. One community leader acknowledged the benefits of education for the handicapped (reproduced verbatim):

> *The best watch repairers and gold smiths and dress makers in this community are Yaw Bene, Kwadwo Damoah and Amma Saase. These young people are so gifted and have even trained over 10 boys in the community in trades.*

The information from the participants indicates that empowerment through education and training is the major opportunity available to the disabled within the Bono communities. Once they are equipped with practical skills the disabled can engage in productive activities to care for themselves. Education is therefore the only way to empower the handicapped in society. However, to ensure access to education and training parents, communities and the government should work in tandem to provide the disabled with material and social support needed to become productive independent citizens of their communities.

CONCLUSION

The study set out to investigate the sudden positive change of attitude towards the disabled among the Bono whose obsolete cultural practices made them torture, and hide deformed children. The study has revealed that today because of democratization, human rights, civilization, education, religious and media influences the Bono conservative attitude have broken down the barriers to education for the handicapped. The empirical study therefore concludes that since society is dynamic ethnic groups must refine their culture in line with modernity to move away from persecution to empowerment of their disabled community members.

Recommendations

Based on the findings the study recommends that;

- Parents, community leaders, municipalities, religious bodies and the ministry of education should pull resources together to ensure that no disabled child is left out of school in the Bono region.

- The municipality and NGOs should provide funds to assist the disabled who graduate from training in the trades to establish their self-employment enterprises.

REFERENCES

Achuroa, D. (2019). Conceptualizations of Children with Disabilities among the Bulsa of Northern Ghana (Unpublished Master's Dissertation). University of Calgary, Calgary, Alberta, Canada.

Akyeampong, K., Djangmah, J., Seidu, A. Oduro, A. & Hunt, F. (2007). Educational Access in Ghana, Country Policy Brief, Winneba/ Brighton: The University of Education Winneba/University of Sussex

Amor, A.; Hagiwara, M; Shogren, K., Thompson, J.; Verdugo, M. Burke, K., Aguayo,V. (2018). International Perspectives and Trends in Research on Inclusive Education: A Systematic Review. *International Journal of Inclusive Education, 2 (1), 1–19.* doi:10.1080/13603116.2018.1445304

Badu, K. (2011). Debunking Cultural Beliefs and Marginalization of the Disabled in Ghana Available online www.ghanaweb.com. Retrieved on 17-06-14.

Bagenstos, S.R. (2020). Disability and Reproductive Justice. *Harv. L. & Pol'y Rev*. 14(2): 273-92.

Beadle-Brown, J., Beecham, J., Leigh, J., Whelton, R. & Richardson, L. (2020). Outcomes and Costs of Skilled Support for People with Severe or Profound . Intellectual Disability and Complex Needs. *Journal of Applied Research in Intellectual Disability. 34(1),42-54*

Bowling, A. (2004*). Research Methods in Health; Investigating Health and Health Services*. London. Open University Press

Creswell, J.W. (2009). Research Design: Qualititative, quantitative and Mixed Methods. SAGE.

Engelbrecht, P. (2020). Inclusive education: Developments and challenges in South Africa. *Prospects* 49**,** 219–232 (2020). https://doi.org/10.1007/s11125-020-09499-6

Etieyibo, F., & Omiegbe, O. (2016). Religion, culture, and discrimination against persons with disabilities in Nigeria*. African Journal of Disability, 5(1)a192 doi:10.4102/ajod.v5i1.192*

Gadagbui, G. Y. (2008). Inclusive Education in Ghana: Practices, Challenges and the future implications for all stakeholders, UNESCO.

Gracer, B. (2007). What the Rabbis Heard*. Journal of Religion, Disability & Health, 10(3-4), 85–99.* doi:10.1300/j095v10n03_07

Haddad, C. (2009). Teaching Children with Disabilities in Inclusive Settings. Bangkok. UNESCO Asia and Pacific Regional Bureau for Education.

Haang'andu, P. (2018). Transnationalising Disability Policy in Embedded Cultural-Cognitive Worldviews: The Case of Sub-Saharan Africa. Disability and the Global South, 5 (1), 1292-1314

Haegele, J. & Hodge, S. (2016) Disability Discourse: Overview and Critiques of the Medical and Social Models, *Quest*, 68(2), 193-206, DOI: 10.1080/00336297.2016.114384912(9)

Johnson, B., & Christenson, L. (2004*). Educational Research; Quantitative and Qualitative Approaches.* Allyn & Bacon.

Le Grange, L. (2011). Human Capital, (human) capabilities and Higher Education. *South African Journal of Higher Education 25(6)1039-1046.*

Mouton, J. (2004). *How to succeed in your Masters and Doctoral Studies. A Southern African Guide and Research Book*. Pretoria. Van Schaik Publishers.

Muntaner, J. J., Rosselló, M. R. & de la Iglesia. B. (2016). Buenas prácticas en educación inclusiva *[Good practices in inclusive education]. Educatio Siglo XXI, 34 (1), 31–50. doi:10.6018/j/252521*

Olaniyan, DA & Okemakinde, T. (2008). Human Capital Theory: Implications for Educational Development. *European Journal of Scientific Research.*

Olssen, MJ, Codd, A & O' Neill. (2004). *Education policy: Globalization, citizenship and democracy*: London: Sage publications.

Quan-Baffour, KP. (2012). The Liberative Power of Education: Adult Basic Education as Empowerment tool for Rural Women in Taung. *Studies in Tribe and Tribals ,10(2),91-97*

Quarmby, K. (2011). *Scapegoat. Why we are failing disabled people*. London: Portobello Books

Republic of Ghana (1992) Constitution.

Rodd, P. & Sanders, K. (2018). The Imperative of Critical Pedagogy in Times of Cultural Austerity: A Case Study of the Capacity to Reimagine Education as a Tool for Emancipation. *New Zealand Sociology, 33*(3):33-55

Sakamota, A., & Powers, P. A. (1995). Education and the dual labour market for Japanese men. *American Sociological Review, 60(2), 222-246.*

Schultz, T. (1960). Capital Formation by Education. *Journal of Political Economy 68(6),571-583*.

Schultz, T.W. (1971). *Investment in Human Capital*. New York. The Free Press

Shapiro, A. (2014). *Everybody Belongs: Changing Negative Attitudes Toward Classmates with Disabilities*. London. Rutledge.

Tilley, E., Walmsley, J., Earle, S. & Atkinson, D. (2012). The silence is roaring: sterilization, reproductive rights and women with intellectual disabilities. *Disability and Society*, 27 (3), 413–426.

Van Wyk, M. (2015). Writing for Publication: Sharpening your Academic Writing Skills. In Okeke, C & van Wyk, M. (Eds.) *Educational Research; An African Approach*. Cape Town: Oxford University Press.

Winters N, Langer L, Geniets, A. (2017) Physical, psychological, sexual, and systemic abuse of children with disabilities in East Africa: Mapping the evidence. *PLoS ONE* 12(9), e0184541. https://doi.org/10.1371/journal.pone.0184541

Woodgate, R. L., Gonzalez, M., Demczuk, L., Snow, W. M., Barriage, S., & Kirk, S. (2019). How do peers promote social inclusion of children with disabilities A mixed-methods systematic review. Disability and Rehabilitation, 1–27.

World Bank. (2004). Books, Buildings and Learning Outcomes: An impact evaluation of World Bank support to Basic Education in Ghana. Washington, DC: World Bank

INFORMATION AND COMMUNICATION TECHNOLOGY PREPAREDNESS AND SELF-EFFICACY AS PREDICTORS OF UNIVERSITY LECTURERS' ADOPTION OF VIRTUAL LEARNING TECHNOLOGY IN TEACHING

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Abstract
The halt in academic activities due to the COVID-19 pandemic has reinforced the need for learning platforms that transcend physical boundaries. Virtual learning technology (VLT) present a healthy alternative, but for it to be effective, tutors need to be prepared to– and adopt them for teaching. The study sought to determine the power of information and communication technology preparedness and self-efficacy to predict university lecturers' adoption of virtual learning platforms in teaching. The study adopted a correlational research design. A sample of five hundred and thirteen (513) lecturers in the University of Nigeria Nsukka took part in the study. Data were collected with an e-questionnaire, which included demographic data, and three adapted scales (information and communication preparedness scale, information and communication self-efficacy scale, and virtual learning platform adoption scale). Collected data were analysed with Pearson's correlation coefficient and Hayes process macro regression analysis. Findings showed that ICT preparedness and self-efficacy significantly predicted the adoption of VLTs in teaching. Gender significantly moderated the power of ICT preparedness to predict VLTs. The study -concluded that ICT preparedness and self-efficacy are key to university lecturers adopting VLTs in teaching and recommended that lecturers' preparedness to use ICT be improved through ICT workshops and training, as it will positively impact their ICT self-efficacy, and improve their adoption of VLTs in teaching.
Keywords: Information and communication technology, preparedness, self-efficacy, virtual learning platforms, and adoption.

INTRODUCTION

Globalization and advancement of Information and Communication Technology (ICT) has precipitated immeasurable changes in all facets of society. This development of ICT offers an alternative avenue to improve the quality of societies, including education. Education is a process that is crucial and continuous in the life of man. Hence the United Nations General Assembly in formulating the sustainable development goals, stipulated its 4th goal to ensure inclusive, equitable quality education, and promote lifelong learning opportunities for all (United Nations Development Programme, 2020). Similarly, Nigeria as a country recognizes that education is a public good, a fundamental human right that should be inclusive and equitable (FGN, 2014). However, like most African countries, Nigeria is still facing the problem of access to quality education. This problem cuts across all levels of education but is more prevalent in higher education. Despite this, tertiary institutions in Nigeria are designed to advance Nigeria's economic growth and global competitiveness through the provision of accessible, relevant, quality education (Federal Ministry of Education, 2017).

In an effort to increase access to higher education in Nigeria, Open and Distance Learning (ODL) is gradually gaining ground and has become an important driver of modern education (Makoe, 2018). The goals of ODL in Nigeria are: to provide more access to quality education and equity in educational opportunities; to encourage internationalization especially of tertiary education curricula; to encourage lifelong learning opportunities (FGN, 2014). The Nigeria National Policy on Education states that for the achievement of these goals, the Federal Government should strengthen the existing coordinating agencies on ODL by encouraging tertiary institutions' participation in ODL. It is in pursuit of these goals that the National Open University of Nigeria (NOUN) was established in 1983 to provide functional, flexible, accessible, and cost-effective education (Ajadi, Salawu, & Adeoye, 2008). In Nigeria, the National Open University of Nigeria (NOUN) is the only university that provides exclusive distant learning programmes; hence it is described as a single-mode university. NOUN has the mandate to deliver university education to the doorstep of every interested Nigerian. The commitment of NOUN is to widen access to educational opportunities through open distance learning (ODL).

The processes of teaching and learning in most Nigerian universities are based on conventional face-to-face methods, which take place in the classroom. However, the outbreak of the Coronavirus (COVID-19) has altered the methods of doing things all over the world. This situation challenged the education system across the world and forced educators to shift to an online mode of teaching, supported by ODL. The halt in academic activities due to COVID-19 reinforced the need for learning platforms that transcend physical boundaries. Many academic institutions that were earlier reluctant to change their traditional pedagogical approach, had no option but to shift entirely to online teaching/learning. As social distancing measures were imposed, some secondary schools in Nigeria resorted to using radio, Telegram, Skype, WhatsApp, and Zoom to keep their students educated. These virtual learning platforms provided the needed alternative for the transmission of knowledge from teachers to students.

One of the ways of adopting ODL procedures is through the integration of virtual learning technologies (VLT) in teaching. Virtual learning Technology (VLT) is a set of teaching and learning tools intended to develop a student's learning capability via computers and the Internet(Rouse, 2011). Virtual learning supports learning through face-to-face and virtual lessons. Virtual learning is characterised by an environment based on computers, use of the internet, the interaction between users, exchange of views, and access to users to obtain various useful materials (Hamid, Peng, Shaharom, Ter, & Raman, 2018). Moreover, users could be in the same room but do not experience any physical contact, or be far apart from each other, but connected over the internet (Rheighold, 2004). Thus, virtual learning enables collaborations, as well as learning activities through internet-enabled devices like computers and the likes (Korićanin, Saračević, Biševac, & Kamberović, 2014). Virtual learning also supports the management of education and teaching by using the internet (Trafford & Shirota, 2011).

The key to constructing a successful virtual learning module and a fruitful teaching implementation is to detect its advantages and disadvantages. Virtual learning has a lot of advantages over classical teaching methods. For instance, teachers can track if learners are engaging with the internet-based communication and related materials by joining the online classes, submitting evaluations online, and providing quick feedback. The message services in such app as Zoom during live lessons can inspire teamwork and communication both between instructor and learner and among learners themselves. Teachers and learners can

also be involved more enthusiastically in a course at a time and place that is suitable for both (Becta, 2005). Moreover, virtual learning allows the teacher to teach a large class of students at a go, something that would have been difficult to do in physical conditions. With virtual learning, teachers can save the time that would have been used in managing the physical classroom to ensure decorum as the lesson is going on (Becta, 2005).

The main benefit of virtual learning lies in its ability to appeal to the individual differences in students by presenting information in a variety of scales and presenting images from a variety of perspectives at once (for example aerial views, cross-sectional views, animated rotating block diagrams, etc.). The major demerit of VLT is that it creates passivity in the learners, unlike is obtainable in physical classrooms. The consequence of this is that students' interest in the lesson wanes easily, with implications on other learning outcomes like achievement and self-efficacy. Although virtual learning can be designed to be interactive, there is limited give-and-take interaction with a computer, in contrast to the interaction in physical classrooms (Hamid, Peng, Shaharom, Ter, & Raman, 2018). Overall, the benefits of virtual learning revolve around its flexibility, accessibility, and affordability, whereas its demerits come from the limitations of activities that can be done in a virtual setting.

Some virtual learning platforms have been designed and used to facilitate learning beyond physical spaces. Dalton and Turner (2020) and Pius (2020) outline these platforms to include WhatsApp, Telegram, Google Meet, Moodle, Skype, Zoom, Google Classroom, Docebo, WizIQ, Adobe Captivate, Elucidat, Articulate, Shift, Blackboard Learn, among others. The functions afforded by these facilities vary, allowing teachers to use one for a purpose, and another for something else. Teachers must thus understand how each of these technologies functions, and make informed choices to get the best out of whichever virtual learning platforms they choose. Wells, Fieger and Lange (2005) conducted a study to determine students' use and perception of the usefulness of virtual learning. Results from the study showed high levels of student satisfaction with the availability of and learning support provided by a virtual learning environment VLE and suggest that this should be made available in other courses. However, the unwillingness of students to participate in two-way online activities does prevent educators from realising the full potential of online learning technology. Demian and Morrice (2012) also investigated the relationship between the virtual leaning environment and the academic performance of students, with findings from that study revealing a moderate relationship between the two variables.

As important as virtual learning is to teaching, teachers need to be prepared to adopt it in teaching. There are necessary skills required for academics to effectively use virtual learning in teaching. These skills can be acquired through training programs that can prepare academics to adopt VLT. Preparedness among other things involves awareness of the technologies, possession of the relevant skills to adopt the technologies, willingness to adopt the technologies, knowledge of the anticipated challenges, and possible solutions to those challenges. Integrating ICT into teaching and learning is a complex process that requires a preparedness to make the learning more meaningful and fruitful. Ramirez-Montoya, Mena, and Rodriguez-Arroyo (2017) pointed out that teachers' preparedness to use ICT in education effectively, together with their digital competence, becomes central and recognized as being a key element for the construction of useful pedagogical knowledge for practice, thus improving students' learning.

Irrespective of preparedness to use VLT, teachers' ICT self-efficacy is key to their actually using VLT in teaching. Bandura (1997) referred to self-efficacy as an individual's confidence

in his/her ability to undertake a given task. Bandura's concept of self-efficacy refers to a belief in one's capabilities to organize and execute the courses of action required to produce given attainments (p. 3). For the adoption of VLT in teaching, a teacher's efficacy belief is a judgment of his other capabilities to utilise VLT in the classroom for teaching purposes (Tschannen-Moran & Hoy, 2001). A teacher's IT self-efficacy is the teachers' beliefs that they are capable of tapping into their IT skills, to carry out the teaching and learning activities in the classroom (Christophersen et al., 2016). Bandura stated that self-efficacy in a specific area affects individuals' thought processes, levels of persistence, degrees of motivation and affective states regarding tasks within the same area, thereby influencing individuals' performances. Enhancing individuals' self-efficacy beliefs in a specific set of tasks increases their performance levels on those tasks; however, those same individuals may fail in tasks that exceed their perceived coping capabilities (Bandura, 1997). This is an indication that IT self-efficacy has the potential to predict lecturers' adoption of VLT. There is a likelihood that an academic who has the required ICT preparedness, may still not adopt VLT in teaching, should that academic's self-efficacy below. Hence the need to determine the relationship between information and communications technology self-efficacy, preparedness, and adoption of VLT.

Purpose of the Study

The study ascertained the: (i) Predictive power of ICT preparedness on university lecturers' adoption of VLT, (ii) Predictive power of ICT self-efficacy on university lecturers' adoption of VLT, (iii) Moderating influence of gender on the power of ICT preparedness to predict university lecturers' adoption of VLT, and (iv) Moderating influence of gender on the power of ICT self-efficacy to predict university lecturers' adoption of VLT.

Research Questions

The following questions are posed for the study:

(1) What is the predictive power of ICT preparedness on university lecturers' adoption of VLT?

(2) What is the predictive power of ICT self-efficacy on university lecturers' adoption of VLT?

(3) What is the moderating influence of gender on the power of ICT preparedness to predict university lecturers' adoption of VLT?

(4) What is the moderating influence of gender on the power of ICT self-efficacy to predict university lecturers' adoption of VLT?

Hypotheses

The following null hypotheses will be tested at 0.05 level of significance, to guide the study.

(1) The predictive power of ICT preparedness on university lecturers' adoption of VLT is not significant.

(2) The predictive power of ICT self-efficacy on university lecturers' adoption of VLT is not significant.

(3) The moderating influence of gender on the power of ICT preparedness to predict university lecturers' adoption of VLT is not significant.

(4) The moderating influence of gender on the power of ICT self-efficacy to predict university lecturers' adoption of VLT is not significant.

The study's framework is presented in the Figure below:

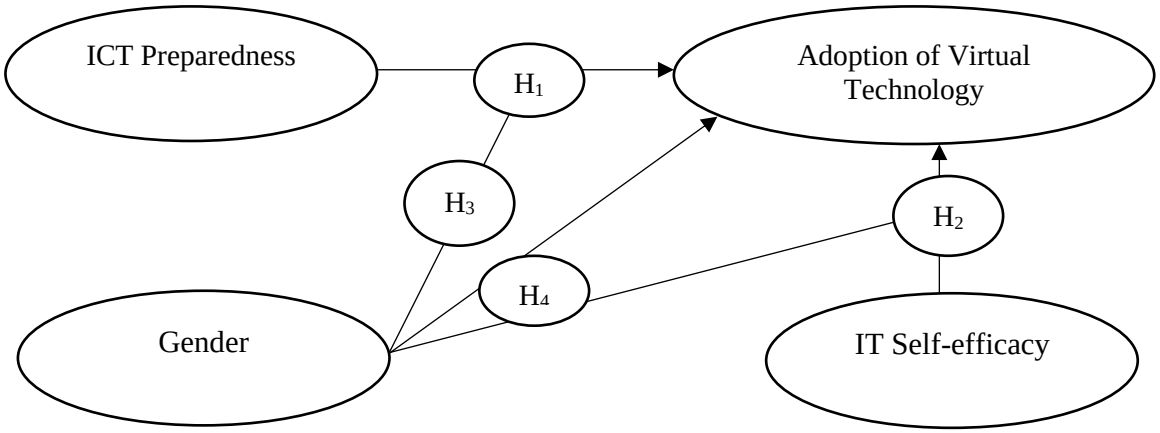

Figure 1. The framework of the study

The study is modelling predictors of VLT adoption. ICT preparedness and ICT self-efficacy are the primary predictors, and gender is treated as a moderator of the prediction. The study is thus seeking to determine how ICT preparedness and self-efficacy predict the adoption of VLT in teaching, as well as how gender independently moderates these predictive powers.

METHOD

The study was conducted at the University of Nigeria, Nsukka, and adopted the correlational research design. Data was collected through an online survey. Participants included five hundred and thirteen (513) lecturers in the University of Nigeria, Nsukka. The participants included 196 males and 317 females. A proportion of 30.8% (158) of the respondents are Professors, 16% (82) are Senior Lecturers, 12.7% (65) are Lecturer I, 26.1% (134) are Lecturer II, 14.4% (74) are Assistant Lecturers.

The instruments for collecting data included ICT preparedness scale (adapted from Forster, Dawson, Reid, 2005; $\alpha = 0.79$), internet self-efficacy scale (adapted from Slutsky, 2016; $\alpha = 0.81$), virtual learning adoption scale (adapted from Christensen & Knezek, 2006; $\alpha = 0.72$). All the instruments were designed to have an increasing 5-point rating scales, ranging from 1 – 5. A link to the electronic instrument, designed on google forms, was sent to the lecturers, who provided responses to the instrument as applicable to them. Instructions were also provided to guide response to the instrument. Collected data were analysed using Pearson's correlation coefficient, and Hayes Process Macro (Model 1) regression analysis. All hypotheses were interpreted at 0.05 level of significance.

RESULTS

Findings from the study are presented in Tables and Figures.

Table 1. Regression analysis of the relationship between IT preparedness and adoption of information technology as moderated by gender.

Variable	β	SE	t	P	Lower CI	Upper CI	R	R^2
IT Prep	.34	.08	4.23	.00	.18	.49	.58	.34
Gender	-2.53	1.12	-2.25	.03	-4.74	-.32		
IT Prep. X Gender	.03	.05	.54	.59	-.07	.12		

Note: IT Prep = Information technology preparedness

Regression analysis (Table 1) shows that IT preparedness (β= .34, p = .00) significantly predicted the adoption of information technology. Also, gender (β= -2.53, p = .03) did significantly predict VLT adoption by university lecturers. The R^2 value (0.34) indicates that 34% of lecturers' adoption of IT in teaching is predicted by the IT preparedness of the lecturers. This predictive power was also significant (p = 0.00) at 0.05 level of significance. It is important to note that while IT preparedness was positively associated with VLT adoption, gender was negatively associated with VLT adoption. The moderation analysis showed that gender moderated the power of IT preparedness to predict VLT adoption, with a p-value of 0.59, which was greater than 0.05 level of significance. This shows that IT preparedness can predict VLT adoption, irrespective of gender. The plot of simple slopes generated from the analyses shows the conditional relationship between IT preparedness and VLT adoption.

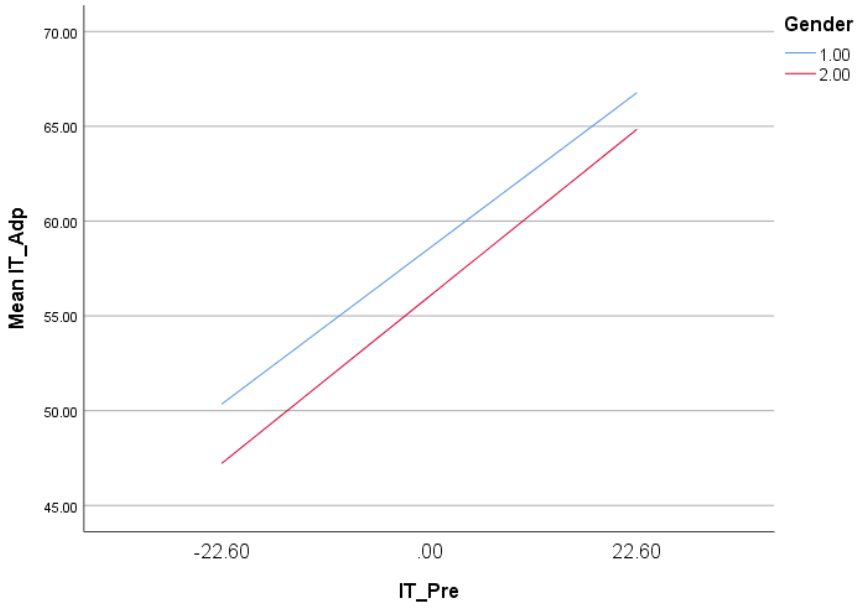

Figure 2. Relationship between IT preparedness and VLT adoption

Table 2. Regression analysis of the relationship between IT self-efficacy and adoption of information technology as moderated by gender.

Variable	β	SE	t	P	Lower CI	Upper CI	R	R^2
IT SE	.32	.07	4.51	.00	.18	.46	.68	.46
Gender	-1.46	1.03	-1.42	.16	-3.48	.56		
IT SE X Gender	.07	.04	1.55	.12	-.02	.15		

Note: IT SE = Information technology self-efficacy

Regression analysis shows that IT self-efficacy (β= .32, p = .00) significantly predicted the adoption of information technology. Also, gender (β= -1.46, p = .16) did not significantly predict VLT adoption by university lecturers. The R^2 value (0.46) indicates that 46% of lecturers' adoption of IT in teaching is predicted by the IT self-efficacy of those lecturers. This predictive power was also significant (p = 0.00) at 0.05 level of significance. It is important to note that while IT self-efficacy was positively associated with VLT adoption, gender was negatively associated with VLT adoption. The moderation analysis showed that gender moderated the power of IT preparedness to predict VLT adoption, with a p-value of 0.12, which was greater than 0.05 level of significance. This shows that IT self-efficacy can predict VLT adoption, irrespective of gender. The plot of simple slopes generated from the analyses shows the conditional relationship between IT preparedness and VLT adoption (Figure 3).

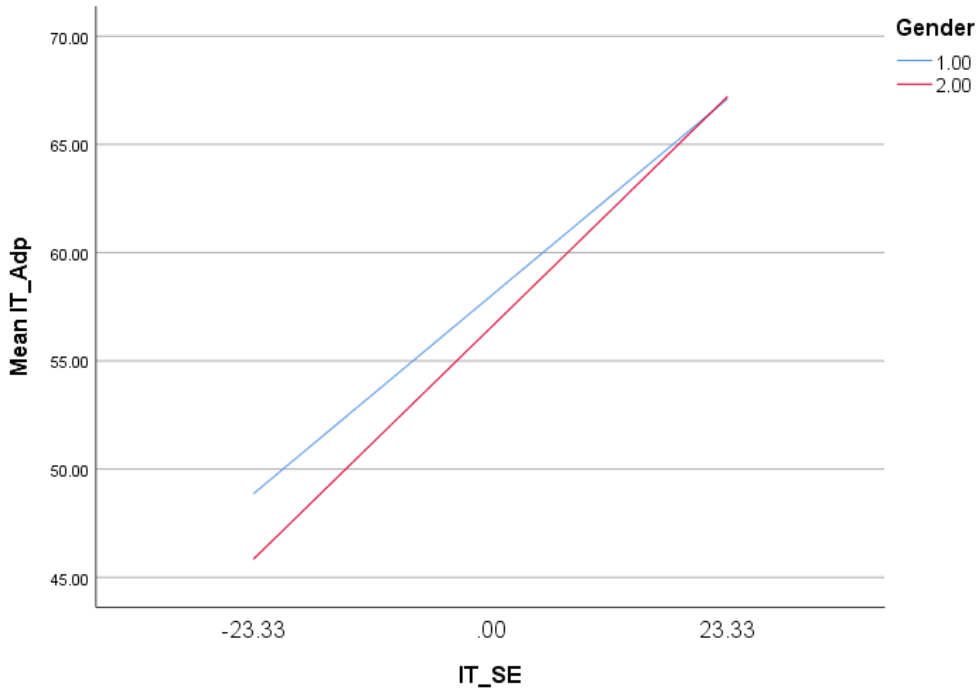

Figure 3. Relationship between IT Self-efficacy and VLT adoption.

DISCUSSION OF FINDINGS

The findings show that 34% of lecturers' adoption of VLT is predicted by the lecturers' IT preparedness, whereas 46% is predicted by IT self-efficacy. Gender however did not significantly moderate the power of IT preparedness and self-efficacy to predict lecturers' adoption of VLT in teaching. This finding is a glaring indication that lecturers' adoption of VLT in teaching cannot solely be attributed to IT preparedness and IT self-efficacy. IT self-

efficacy predicted more IT adoption than did IT preparedness. This shows that IT self-efficacy is a stronger predictor of VLT adoption in teaching, than is IT preparedness. The role of gender in these predictions was not significant; an indication that the power of IT preparedness and self-efficacy to predict VLT adoption in teaching will remain slightly the same in male lecturers, as it is in female lecturers. Granted that self-efficacy has the potential to predict lecturers' uptake of VLT platforms in teaching, other factors such as IT preparedness (Summak, Baglibel, & Samancioglu, 2010), attitude towards IT (Instefjord & Munthe, 2017), level of experience in general use of ICT (Cheal, Geer, & White, 2012), among other factors, can affect the actual use of VLT in teaching. The findings of this study are in line with a fundamental premise in Bandura's self-efficacy about the importance of distinguishing between domain-specific self-efficacy (ICT self-efficacy) beliefs. The results show the importance of associating ICT preparedness and self-efficacy with the adoption of VLT for instructional purposes. It is important therefore to track the factors empirically revealed as potential bottlenecks to the adoption of VLT by teachers, and design measures to stem them.

CONCLUSION

As society evolves, the need for education that transcends physical boundaries is becoming increasingly important. As a result, the adoption of virtual learning technology in teaching is key to modern education. ICT preparedness and ICT self-efficacy contribute to lecturers' adoption of VLT and must be taken seriously if virtual learning will be meaningful in our institutions of learning. Other factors which impact or predict this adoption needs to be investigated and measures are taken to set them to ideally help teachers positively adopt virtual learning in teaching.

Recommendations

From the findings of the study, it is recommended that strategies be adopted to equip lecturers with the skills necessary to be ready to use VLT in the classroom. This could be achieved through organising seminars, workshops, or retainer courses for the academic deficient in the use of VLT. Lecturers' ICT self-efficacy is important in the eventual adoption of VLT for teaching. It is therefore imperative that measures be put in place to improve lecturers' ICT self-efficacy.

REFERENCES

Ajadi, T. O., Salawu, I. O., & Adeoye, F. A. (2008). E-learning and distance education in Nigeria. *The Turkish Online Journal of Educational Technology, 7* (4), 1 – 10.

Bandura, A. (1997). Self-efficacy: The exercise of control. W H Freeman/Times Books/ Henry Holt & Co.

Becta. (2005). Virtual learning environments. Retrieved from http://www.iadt.ie/vle/whatisvle/section2.htm

Cheal, J., Geer, R. & White, B. (2012). The preparedness of pre-service teachers to use ICT in the classroom. *Australian Teacher Education Association (ATEA) Annual conference*, 1–4 July

Christophersen, K. A., Elstad, E. Turmo, A. & Solhaug, T. (2015). Teacher Education Programmes and Their Contribution to Student Teacher Efficacy in Classroom Management and Pupil Engagement. *Scandinavian Journal of Educational Research, 60*(2), 1 – 15.

Dalton, W. & Turner, B, (2020). Best online learning platforms of 2020: LMS and VLE for education. Retrieved from https://www.techradar.com/best/best-online-learning-platforms

Demian, P. & Morrice, J. (2012). The use of virtual learning environments and their impact on academic performance. *Engineering Education, 7*(1), 11-19, DOI: 10.11120/ened.2012.07010011

Federal Government of Nigeria, FGN, (2014). *National policy on education*. Lagos, Nigeria: Nigerian Educational Research Development Council.

Hamid, Z., Peng, C. F., Shaharom, M. S. N., Ter, T. C., & Raman, K. (2018). The concept and use of the virtual learning environment in teaching: A literature review. *International Journal of Academic Research in Business and Social Sciences, 8*(6), 1293–1301.

Instefjord, E.J., & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education, 67*, 37-45.

Korićanin, E., Saračević, M., Biševac, E., & Kamberović, H. (2014). Concept and types of virtual environment: Research about positive impact on teaching and learning. Unite Journal of Information Technology and Economics, 1(1), 51–57.

Korićanin, E., Saračević, M., Biševac, E., &Kamberović, H. (2014). Concept and types of virtual environment: Research about positive impact on teaching and learning. *Unite Journal of Information Technology and Economics, 1*(1), 51–57.

Makoe, M. (2018). Using future research methods in analysing policies relating to open distance education in Africa. *Open Praxis, 10*(1), 5-15.

Pius, G. (2020). 31 Best e-learning platforms in Nigeria for remote learning. Retrieved from https://gopius.com/best-e-learning-platforms-for-remote-learning/

Ramírez-Montoya, M.S. Mena, J.J. & Rodríguez-Arroyo, J.A. (2017). In-service teachers' self-perceptions of digital competence and OER use as determined by a xMOOC training course. *Computers in Human Behavior, 77*, 356-364

Rheighold. C. (2004). The concept and use of the virtual learning environment in teaching: a literature review. *International Journal of Academic Research in Business and Social Sciences, 8*(6), 1293-1301.

Rouse, M. (2011). Virtual learning environment (VLE) or managed learning environment (MLE). Retrieved from http://whatis.techtarget.com/definition/virtual-learning-environment-VLE-or-managed-learning-environment-MLE.

Summak, M., Baglibel, M., & Samancioglu. (2010). Technology readiness of primary school teachers: A case study in Turkey. *Procedia Social and Behavioral Sciences, 2*, 2671–2675.

Trafford, P., & Shirota, Y. (2011). An introduction to virtual learning environments. *Gakushuin Economic Paper, 48*(10), 143–151.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783–805.

United Nations Development Programme. (2020). Sustainable Development Goal 4. Retrieved from https://sdgs.un.org/goals/goal4

Wells P., Fieger, P., & de Lange, P. (2005). Integrating a virtual learning environment into a second year accounting course: Determinants of overall student perception. Proceedings of the AAA Annual Meeting, San Francisco.

EXPLORING CREATIVE PRACTICES OF TRANSFORMATIONAL LEADERSHIP IN SENIOR SECONDARY SCHOOLS IN EASTERN CAPE, SOUTH AFRICA

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Abstract
This paper is part of the main study that investigated the perceptions of senior secondary school principals on transformational leadership in the Queenstown District, South Africa Transformational leadership theory was used to ground the paper. A qualitative approach and case study design were used. Eight secondary schools were conveniently selected and from each school, a principal was purposefully sampled. Data were collected using semi-structured interviews. The data collected were analysed using content analysis and were presented in themes. The following are the main findings: Leadership should perceive guidance as the providence offered by the team. The team provides directions, development and monitoring towards goal attainment/plans/objectives; Principals/structures should inspire, lead, guide and engage subordinates and stakeholders with the vision; and ensure adherence to the building, sharing of school vision and leadership. These are the recommendations: for advocacy for principals to establish leadership teams who perceive guidance as a strategy of accomplishing their school missions; Principals and their leadership teams should ensure school effectiveness by instilling positive culture, exemplary leadership, honesty, truthfulness, and motivation to all; To sustain a consistent culture of their school, principals and leadership teams should collaborate and build capacity through pastoral guidance.
Keywords Leadership, Transformational leadership, Professional practices, school effectiveness

INTRODUCTION

The researchers define leadership from the findings as the counsel given by a group of people in an organization as they construct critical strategies and deliverables for the organization's growth. By setting goals and sharing the vision, leadership purposefully achieves the organization's objectives. A leader, according to Nonyashe (2018), should take the initiative, be an initiator, and assume a level of responsibility aimed at achieving and inspiring others to work toward common goals. According to Leithwood, Harris, and Hopkins (2019), focusing on people's development through offering intellectual stimulation, providing individualized support, and modelling professional habits increases organizational performance. In light of the foregoing, the principal should develop individuals as a leader by offering intellectual stimulation, individualized support, and professional practices in order to improve performance and greatness in his school. By preparing together and sharing the vision for fulfilling their leadership's mission, principals should put procedures in place to provide guidance and set targets to achieve specific goals that leverage high performance and excellence in the classroom. Principals should see the study of inspiring others and sharing of personal experiences as a psychological construct in schools. In light of the foregoing, the principal should develop individuals as a leader by offering intellectual stimulation, individualized support, and professional practices in order to improve performance and greatness in his school.

By preparing together and sharing the vision for fulfilling their leadership's mission, principals should put procedures in place to provide guidance and set targets to achieve specific goals that leverage high performance and excellence in the classroom. School leaders should see their duty of leadership as second to classroom teaching in terms of involving and encouraging all essential stakeholders while also providing a positive working environment. School administrators' opinions about their leadership, according to Sibanda (2017), are that effective leadership styles lead to good learner performance. Pretons and Barnes (2018) assert that knowing what great principals do and then using that information to capitalize on those constructive leadership actions and behaviours is one of the techniques for increasing learner accomplishment and wellbeing. Several sources of endogeneity, according to Willies (2016), influence the impact of leadership shift on learning. It's possible that it'll have an impact on both the school's performance and the principal. Willies (2016) opines that attempts to harness principal leadership as a means to better levels of accountability and school performance are likely to have a negative impact like teacher unions exerting a significant amount of authority.

Leadership is defined as a person's ability to persuade people to do extraordinary things, allowing them to become the focal point of transformation, value creation, transfer, and realization of shared goals. School leaders are expected to deliver results, promptly resolve "people issues," and manage a system spanning numerous disciplines of knowledge (Bush, 2016). Internalizing the vision through effective communication and shared expectations, and therefore focusing energy that guides and affirms each individual's function and position in decision-making. The shared vision has the power to energise people by connecting them to the organization's mission. Transformational leadership, according to Moolenaar, Daly, and Sleegers (2010), is associated with a positive school innovation climate, and it motivates followers to go above and beyond in terms of extra effort and productivity, as well as improving teacher practices and organizational learning. In order to change teacher education processes, two factors must be considered: preparedness and acceptability. Secondary school principals should use this approach to motivate and identify activities that will stimulate their subordinates' interest in needed change (Hero, 2020). In light of the foregoing, school leaders should internalize transformational leadership and adapt teaching techniques and beliefs in order to establish an organizational learning community and increase change effort. Kouzes and Posser (2018) define transformational leadership as "great leadership" when it influences the desired outcomes and interpersonal relationships, as well as the reliance on effective ways.

Under transformational leadership, the school becomes less bureaucratic and more transformative. Rather than empowering individual students, the entire school is empowered. Under transformational leadership, the school becomes less bureaucratic and more transformative. Rather than empowering individual students, the school as a whole is empowered, and it is vital to foster and preserve this collective empowerment. In an age when tremendous heterogeneity has become the norm, leaders who regard leadership as a process of interaction between leaders and subordinates should recognize that cultural intelligence can help them to be more effective. This contributes significantly to the development of cultural intelligence and leadership comprehension (Solomon and Steyn, 2017). According to the study, secondary school principals may be transmitting the perception of cultural transformation for effective schools by guiding transformational leadership style with cultural intelligence.The objectives of this paper is to investigate the perceptions of senior secondary school principals on transformational leadership.

Statement of the Problem

The effectiveness of an organization's management can critically impact its viability and its sophistication in conceptualizing leadership as a prerequisite for an effective and efficient way of bringing about school improvement. As a result, it is mostly in the Eastern Cape Province where many secondary schools have not been functioning properly. It has been the lowest in terms of grade 12 results. Poor leadership is one of the factors that contribute to low learner academic results (Mrali, 2012). Norviewu-Mortty (2012) adds that ineffective leadership of school principals leads to unstable and difficult staffing, students' negative attitudes to academic work and discipline, an unhealthy school system and climate, and non-cooperation of parents and community. It can be advocated that ineffective school leadership is caused by a lack of vision and being unable to influence behaviours of teachers and learners by the school principal. The researchers are of the view that due consideration needs to be considered for school principals' capacity for leadership improvement in relation to enhanced learner outcomes. This is supposed to be the focus if not long-term goal for any school to succeed. It is the responsibility of secondary school principals to develop clear school visions and communicate them with the staff and learners to motivate them to strive in the same direction. Knowledge and skills in transformational leadership are needed during these times of change because this assists in the shift from traditionally rigid schools to the more democratic schools as well as to situational leadership.

Theoretical Framework

This study is based on the philosophy of transformational leadership(Leithwood, Harris & Hopkins., 2019) . This theory was chosen by the researchers because it is a paradigm for transformative leadership in education that focuses on a single area. The category on which the paper is based is direction setting, which includes creating a school vision, setting precise goals, prioritizing, and maintaining high expectations. Principals should design a "school for life" approach that transforms the objective of schooling away from achieving standardized academic outcomes and toward a beneficial impact on students' and communities' economic and social well-being (Marc, Epstein &Yuthus, 2014). As a result, student-centered learning methods should be adopted, which require students to work in groups to solve complex problems and manage their projects. This will aid in their development as they learn from one another cooperatively. As a result, administrators and their staff should put conceptual knowledge into practice at school through activities that allow students to apply what they've learned (Marc, Epstein & Yuthus, 2014). As leaders, principals always instruct their people to solve problems logically rather than recklessly. The principal inspires his subordinates to make smart decisions by encouraging them to be innovative, critical, and rational in their reasoning (Ahmed, Abbas & Rasheed, 2016). Leaders praised more innovative followers, but they were not chastised if they did not act in accordance with the leader's wishes.

METHOD

This study is based on a qualitative research approach, which tries to fulfill the stated research purpose by studying and analysing phenomena from the perspective of the participants (Leedy & Ormrod, 2016), in this case, senior secondary school perceptions on transformational leadership. According to White (2020), qualitative research deals with primarily verbal data, whereas quantitative methods deal with numerical data, and both are conducted through the researcher's participation in the daily activities of those involved in the research. People are studied qualitatively by getting to know them and experiencing what they have to offer. people go through in society on a regular basis (White, 2020). Individual and collective social acts of people were reported and analyzed using a qualitative research

approach, which was suited for the topic under investigation. In this study, a case study research design was used. It was acceptable for this study since it could lead to a deeper knowledge of the phenomenon being investigated, to deliver useful results. It's also a versatile design to work with because it refers to how well a hypothesis can be created and tested using both inductive and deductive data collection methods. The goal of this survey was to find out how senior secondary schools felt about In the Queenstown District, transformational leadership is being demonstrated. A total of eight (08) schools were conveniently chosen, and purposive sampling was employed to select a principal from each. The data was collected from the principals of the eight senior secondary schools using a semi-structured interview schedule. The goal was to collect detailed descriptive data that would aid researchers in understanding the participants' understanding of transformational leadership and their social reality. Instead of focusing on the statistical importance of text or content occurrence, content analysis was employed to focus on unique themes that demonstrate the range and meanings of the phenomenon. After the data has been collected, transcribed, they have used content analysis, data coding, search for patterns, and then data was categorized, and themes were formed.

Trustworthiness

The term "trustworthiness" describes how qualitative data is steady, predictable, dependable, consistent, and reliable, resulting in the same conclusions or outcomes as before. The study followed Creswell's (2012 four factors of credibility, confirmability, dependability, and transferability, which refer to findings that are worth paying attention to.

Credibility

In qualitative research, credibility means that the findings of a study are plausible and trustworthy from the standpoint of a participant in the study. Qualitative research aims to describe or explain an event, group, or phenomenon from the perspective of the people who are the study's subjects. As a result, participants are in the best position to assess the validity of a qualitative study's findings (Shenton, 2004). Individual interviews, recording of the interviews, and confirming evidence with participants by allowing them to access the transcripts were used to achieve credibility in this study.

Conformability

According to Trochim (2006), conformability refers to the extent to which results can be confirmed or corroborated by others. Throughout the investigation, the researchers documented the procedures for reviewing and rechecking the data. Any bad examples that contradicted previous observations were aggressively sought for and described by the researchers. Following the study, a data audit was carried out, which looked at the data collection and processing techniques and made judgements on the possibility of bias or distortion. This study addressed data conformability by establishing methods for reviewing and rechecking data throughout the study, as well as completing a data audit once the data had been collected. To uncover any possible biases or distortions, the data was analysed, and the findings were determined. This was accomplished by comparing the results to the transcripts.

Dependability

The reliability of the study findings assures that they are consistent and repeatable. The standard at which the research is conducted, analysed, and presented is used to determine this. Each step of the study should be described in detail so that an outside researcher can duplicate it and get similar results. Researchers can grasp the approaches and their

effectiveness because of this regularity. Bickman and Debra (2008). Participants' dependability was accomplished in this study by engaging in a research debriefing with my supervisor and included a summary of the research steps performed from the commencement of the research to the reporting of findings in the study.

Transferability

The extension of a study's findings to different circumstances and contexts is known as transferability. The context in which qualitative data gathering takes place shapes the data and aids in its interpretation. Transferability can be improved by providing enough information for readers to determine whether the results are applicable to their own situations. Details of viewpoint were presented, which necessitated a description that included the players' interpretations as well as other social and/or cultural data (Davis, 2015). This study's transferability was achieved by providing thorough contextual background information and selecting participants who would enrich the information.

Ethical Procedures

Before and throughout the trial, the researchers followed all ethical procedures. The researchers' institution provided ethical clearance. The Eastern Cape Education Department gave the researchers permission to visit schools and interview students. The researchers were granted access to the research venues and participants by the principals of chosen schools. The participants were told that the information they provided would only be used for research reasons. Informed consent and confidentiality were both respected.

RESULTS

Theme 1 Leadership: the categories that emerged were guidance and Mission attainment.

Guidance

P1 said that *"It is about finding someone to go to for giving directions*" P3 believed *"Guiding the team consisting of parents, teachers and learners to a certain direction*". P5 was of the view that it is the *"guidance the leader provides upon the key plan, deliveries according to a particular plan"*. P1 said that "*establishment of goals and sharing vision".*

.This clearly emphasizes that it is the responsibility of each individual to set goals so that the product is achieved at the end of the day. As a result, the process of implementing change in the organization must be guided.

Mission attainment

P1 stated that "Leadership's purpose is vision and mission attainment". P2 said *that "Leadership is about sharing a vision and indicating how to attain it". P3 said that "Leadership is guiding a vision and mission attainment"*. P4 said that "By *establishing goals and sharing vision we are bringing our mission into completion".*

This proposed that administrators utilize certain approaches to justify leadership that will help their schools achieve their goals. This can be accomplished by sticking to the structure and embracing a same school vision, as well as leadership.

FINDINGS

The findings demonstrated that the principal's perceptions of transformational leadership must aid in the elimination of ineffective practices that contribute to school closure and non-viability.

The leadership should persuade people to do extraordinary things by allowing them to become the focal point of transformation. By valuing creation and innovation, transferring

knowledge and realise shared goals, they are developing the organisation. The motivation and support offered to subordinates assist in redesigning the organization to its heights. In an effort to create productive community relationships principals should develop a collaborative culture as well as strengthened participation in school decision making.

Leadership teams should reorient its members in a new direction that is consistent with changes in leadership practices and correlates with various levels of school success to raise the standard of living.

The principal's inspiration and encouragement to his subordinates to make smart decisions, to be innovative, critical, and rational in their reasoning enhances levels of success in the school. The leadership teams should be active and look ahead to the future and scan the environment for external forces of change impacting their school. In order to give shape in the school, the unity of leadership should join hands with followers around a clear, collective vision, and commonly understood and accepted mission and purpose.

CONCLUSIONS

The researchers concluded that it is vital to foster and preserve principal's perceptions of transformational leadership through collective empowerment on one hand and provide support to individual students on the other. In an age when tremendous heterogeneity has become the norm, leaders who regard leadership as a process of interaction between leaders and subordinates should recognize that cultural intelligence can help them to be more effective. By guiding the development of cultural intelligence and leadership comprehension secondary school principals are transmitting the perception of cultural transformation for effective schools.

Recommendations

This paper recommends advocacy for principals to establish leadership teams who perceive guidance as a strategy of accomplishing their school missions; Principals and their leadership teams should ensure school effectiveness by instilling positive culture, exemplary leadership, honesty, truthfulness, and motivation to all; To sustain a consistent culture of their school, principals and leadership teams should collaborate and build capacity through pastoral guidance.

REFERENCES

Ahmed, F., Abba, T. & Rasheed, A. (2016). Impact of Transformational Leadership on Employee Motivation in Telecommunication sector. *Journal of Management and Practices, 2*(2), 11-25. http://mppnet.com.

Bickman, L. & Debra, J.R. (2008). *The SAGE Handbook of Applied Social Research Methods* (2nd Ed.). Canada: Sage Publications

Bush, T. (2016). A Preparation for School Leadership: International Perspective. *Journal Educational Management and Administration*. 30(1), 417-429.https://files.eric.ed.gov.

Creswell, J.W. (2012). *Qualitative Inquiry and Research design: choosing among five approaches* (4th Ed.). Canada: SagePublications.

Davis, K.A. (2016). Qualitative Theory and Methods in Applied Linguistics Research. *Tesol Quarterly Journal*, *29*(3), 427-453. https://www.researchgate.net.

Hero, J.L. (2020). Teachers' preparedness and acceptance of information and communication technology (ICT) integration and its effect on their ICT integration practices. *Puissant-*

A Multidisciplinary Journal, 1(4),5976. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5473036.

Kouzes, J.M. & Posner, B. (2018). P*ractices of exemplary leadership*. London.Businessballs.

Leedy, P.D., & Ormrod, J.E. (2020). *Practical Research: Planning and Design* (9th Ed.). New Jersey: Pearson.

Leithwood, K., Harris A., & Hopkins., (2019). Seven strong claims about successful school leadership revisited. *School Leadership and Management,* 40(1), 5-22, DOI: 10.1080/13632434.2019.1596077

Marc, J.E. & Yuthus, K. (2014). *Measuring and Improving Social Impacts: A Guide for Non-profits, Companies, and Impact Investors*. Oakland: CA. Berrett-Koehler Publishers.

Molenaar, N.M., Daly, A.J., & Sleegers, P. (2010). Transformational leadership, Social Network Position and Schools Innovative Climate. *Education Administration Quarterly,* 46(5),623-670. https://doi.org/10.1177%2F0013161X10378689.

Mrali, A.M. (2012). Educator perceptions of the impact of the departmental matric intervention strategies on selected under-performing schools in the Queenstown District. Master of Education: University of Fort Hare.

Nonyashe, M. (2018). leadership styles used by school principals to improve learners' academic performance: a case study of eight rural secondary schools of Mthatha: Walter Sisulu University.

Norviewu-Mortty, E.K. (2012). Principals' strategies for improving the academic achievement of students of disadvantaged rural junior high schools in Ghana. https://ro.ecu.edu.au/theses/493.

Preston, J. & Barnes, K. (2018). Successful Leadership in Rural Schools: Cultivating Collaboration. The Rural Educator, 38(1),6-15. https://files.eric.ed.gov.

Trochim, W.M.K. (2006). The Qualitative Debate. Research Methods Knowledge Base. http://www.socialresearchmethods.net/kb/qualmeth.php

Sibanda, L. (2017). *Understanding distributed leadership in South African schools: Challenges and prospects.* South Africa.Universty of Free State.

Shenton, A.K. (2004). Strategies for Ensuring Trustworthiness in Qualitative Research Projects. Education for Information. *Journal of Psychology,* 22(2), pp.63-75.https:www.scrip.org.

Solomon A., & Stein, R., (2017). Leadership style and leadership effectiveness: Does cultural intelligence moderate the relationship? *Acta Commercia - Independent Research Journal in the Management Sciences*, *1*7(1), a453. https://doi.org/10.4102/ac.v17i1.453.

White, C.J. (2020). *Research: A Practical Guide*. Pretoria: Ithuthuko Investment.

Willies, J. (2016). *Redesigning Schools, Redefining Education*. New York: Springer.