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Preface

The African Academic Research Forum, through the South Africa International Conference on Education provides an opportunity for researchers, academics in education and all other relevant stakeholders to gather and share ideas related to learning and teaching issues in the 21st century.

Since its inaugural conference in 2014, the African Academic Research Forum has provided an opportunity for researchers from throughout Africa, the diaspora and other parts of the world to share findings from different research studies they have conducted. This has resulted in vibrant discussions and the sharing of best practice from different research perspectives.

This Book of proceedings contains papers that have gone through a rigorous, blind peer-review process. The reviewers are experts in the field of education who would approve only work that reflects international standards. We received a total of 73 full papers for possible presentation and publication from participants in seven countries. The final number of papers accepted was 39.

I am particularly proud of the fact that the founding ideology of the African Academic Research Forum, which is (i) to stimulate debate, (ii) sharing research ideas and (iii) enabling collaborative research with others, still prevails.

The entire organising committee of this 6th edition of the South Africa International Conference on Education welcomes you all to Pretoria and Manhattan Hotel in particular. We certainly hope that you will find all presentations and scholarly debates extremely worthwhile. A special word of welcome goes to all participants gracing the conference for the very first time.

Appreciation also goes to the keynote speaker, the debate panellists, and all reviewers who, through their expertise have assisted in improving manuscripts to appear in the Conference Proceedings. Finally, our appreciation goes to the editors of the Conference Proceedings who ensured that this output was prepared and ready in time for the conference.

To each and every one of you, please enjoy the conference and make sure you make acquaintances with other academics.

We look forward to welcoming you once more in the 7th edition of the South Africa International Conference on Education in 2020.

Prof A. Mji
Conference Chair

List of Reviewers

The organising committee of SAICEd 2019 would like to greatly thank the following reviewers who took the pains to review the conference papers.

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Review Process

In total, 144 manuscripts in different areas within the field of Education were received. Of these manuscripts, 73 were intended to be full papers while the rest were to be short papers. All the full manuscripts were subjected to a double blind review. The reviews were carried out by experts from different countries. Their brief was to base their reviews on 22 criteria they were supplied with. They were also requested to look at the manuscripts with the aim of assisting authors to produce good quality presentations.

Following the review process, the editorial committee considered the reviewers' comments and 22 manuscripts were found to be unsuitable for publication. Reports were forwarded to the remaining 51 authors with suggestions of what needed to be addressed. After receiving the re-worked manuscripts, the editorial committee finally accepted 38 for inclusion in the proceedings.

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CLASSROOM INFORMATION AND COMMUNICATIONS TECHNOLOGY INTEGRATION BY PRE-SERVICE AND IN-SERVICE TEACHERS IN RURAL ECOLOGIES

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Abstract

With information and communication technologies (ICTs) having been introduced in many classrooms as an aid in teaching, the focus is now on how in-service and pre-service teachers make use of the learning technologies in their teaching. Most universities offer classroom-ICT-integration courses both to pre-service and in-service teachers. However, classroom-ICT-integration practices largely remain the prerogative of each individual teacher. This study explored the ICT-integration practices of 98 fourth year Bachelor of Education foundation phase pre-service teachers (Grades R-3) and 14 in-service teachers (enrolled in a post-graduate diploma programme) after completing a course on classroom ICT usage. Both groups of teachers practised in rural ecologies. Qualitative data were collected by means of reflective journals, lesson plans and video recordings of lessons. Conventional content analysis was used to analyse the data collected. Findings indicate that both groups of teachers possessed significant technological knowledge (TK) after completing the course. However, better technological pedagogical knowledge (TPK) was displayed in simulated teaching conditions than real classrooms in rural ecologies. The findings suggest that TPK is activated when the nature of learning technologies available match teacher TK. Recommendations are made for schools to provide educational resources that reflect the technological advancements matching teachers' developed technological, pedagogical, and content knowledge (TPACK) after participating trainings or professional development.

Keywords: classroom ICT usage, learning technologies, ICTs, rural ecologies, TPACK

Introduction

In the wake of the classroom-ICT-usage advent, it is important to understand how both pre-service and in-service teachers implement the use of ICTs in the classroom. The quest to understand classroom ICT usage is very significant in schools from developing countries, where schools face some of the barriers to successful implementation. According to Tezci (2011), most developing countries are in the early stages of implementing the use of ICTs in classrooms. Barriers to successful classroom ICT usage include lack of resources such as educational software, absence of technical support, poor teacher ICT skills, lack of teacher confidence, incompatible pedagogical approaches and restrictive curricula, among others (Gebremedhin & Fenta, 2015; Buabeng-Andoh, 2012; Demiraslan & Usluel, 2008). Despite these barriers, ICTs are fast transforming and having an impact on everyday life, including teaching and learning (Gebremedhin & Fenta, 2015). Teachers need knowledge bases such as technological, pedagogical, and content knowledge (TPACK) in order to successfully integrate ICTs in the classroom (Chai, Koh & Tsai, 2010). As teachers strive to use ICTs in the classroom, So and Kim (2009) observe that there are two types of TPACK that are manifest: the espoused TPACK for different subjects that teachers can talk about and the TPACK that teachers can use to implement the integration of ICTs in the classroom. The

above observation points to the existence of gaps between how policies and courses on ICTs dictate that the integration should occur and the actual implementation in the classroom.

The integration of ICTs in the classroom comes with great promises to enhance education and improve teacher effectiveness (Vitanova, Atanasova-Pachemska, Iliev & Pachemska, 2015; Fu, 2013). Among the advantages of classroom ICT usage are that learner-centredness can be improved, learners have access to more information through the internet and flexibility of time and space is allowed (Trepule, Tereseviciene & Rutkiene, 2015; Fu, 2013). This study was motivated by the possible disjuncture between what is mandated and actual classroom practices. Furthermore, most of the reviewed literature for this paper used quantitative surveys to determine or predict teachers' perceptions, skills, competences, beliefs and knowledge on the integration of ICTs in the classroom (Kimmons & Hall, 2018; Admiraal et al., 2017; Reyes Jr, Reading, Doyle & Gregory, 2017; Yurdakul, 2017; Prestridge, 2012; Tezci, 2011). In the South African context, Msila (2015) propounds that teacher competence and positive attitudes are important for successful classroom ICT integration. Similarly, Padayachee (2017) points out that lack of infrastructure and skills hinders teachers from integrating ICTs in the classroom. However, Hart and Laher (2015) caution that access to ICTs and teacher competence may not guarantee successful implementation. The authors believe that teacher perceptions of the usage of educational technologies also influence their decisions to make use of them or not. This study followed a qualitative approach to explore how pre-service and in-service teachers in rural ecologies integrate ICTs in teaching and learning situations after a course on classroom ICT usage at one South African University. Dalal, Archambault and Shelton (2017) mention that even though it can be established through quantitative studies that teachers appreciate the potential of ICT integration in the classroom, there are other factors that influence their choices to use technology for instruction. These factors can also be established through qualitative methods.

ICTs are meant to be integrated at all levels of education (Capuk, 2015). Accordingly, we ask the question, *How do pre-service and in-service teachers integrate ICTs in the learning and teaching situations of rural ecologies after completing an ICT-integration course?* The qualitative method allows the study to contribute to context-based perspectives of classroom ICT usage. The study findings may provide data that can be used to improve the classroom-ICT-integration course at universities.

Literature review

Although universities offer courses on classroom ICT usage, it has been observed that in-service and pre-service teachers may struggle to integrate learning technologies in teaching and learning processes (Buabeng-Andoh, 2012; Tezci, 2011). Additionally, both in-service and pre-service teachers do not experience classroom-ICT-usage training in the same way because university lecturers' competences on ICTs are varied. Reyes Jr et al. (2017) point out that university lecturers can be placed in three categories according to classroom ICT usage. The first category can use and teach concerning ICTs, while the second can only use ICTs and the third is ambivalent towards the use and teaching of ICTs. These varied lecturer competences contribute to creating a varied influence on the in-service and pre-service teachers attending classroom-ICT-integration courses. As So and Kim (2009) point out, it is important that pre-service teachers are not merely exposed to ICT tools during training but are also guided to develop skills to successfully design and facilitate technology-integrated lessons.

Teachers need TPACK in order to successfully incorporate ICTs in teaching and learning situations (Capuk, 2015; Chai et al., 2010; So & Kim, 2009). The TPACK framework is one of the knowledges-based models for technology integration in the classroom (Koehler & Mishra, 2009). TPACK comprises good teaching with technologies and the ability to mediate the representations of concepts through technologies (Capuk, 2015). TPACK is a mesh of teacher knowledges that are a result of the intersection of content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK), as shown in Figure 1 below.

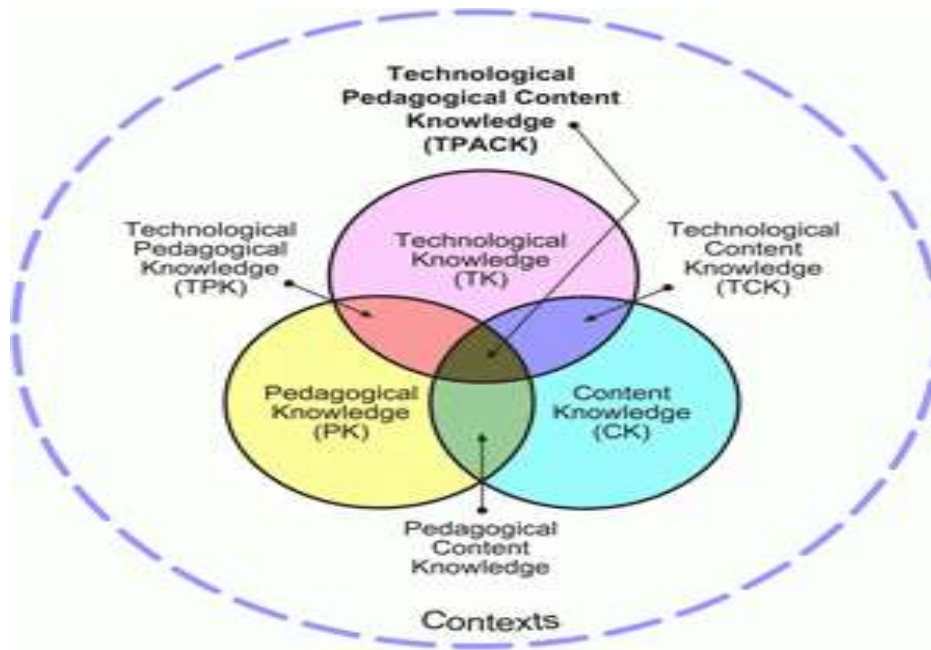


Figure 1: The TPACK framework (Adopted from Koehler & Mishra, 2009, p. 63)

CK refers to the teachers' knowledge about the subject matter that they teach, whilst PK refers to the teachers' knowledge of methods to present concepts in ways that ensure effective learning (Koehler & Mishra, 2009). Koehler and Mishra (2009) stress that TK is a continually evolving construct of how teachers interact with technology and cannot be adequately defined at any point in time. TPACK is used in this study as a conceptual framework to guide our understanding of how pre-service and in-service teachers integrate ICTs in rural classrooms spread throughout the Free State and KwaZulu-Natal provinces of South Africa (the in-service- and pre-service-teacher participants had their experiences of teaching in these two provinces at the time of data collection).

Methodology

We used a qualitative case study to explore how 98 fourth year BEd pre-service teachers (Grades R-3) and 14 in-service teachers (drawn from four primary schools, six secondary schools and four TVET colleges) in a post-graduate diploma programme integrate ICTs in the classroom. Data were collected by means of reflective journals, lesson plans and video recordings of lessons. In the reflective journals, the pre-service-teacher participants reflected on their experiences with teaching and learning technologies during teaching practice in the rural ecologies of the Free State and KwaZulu-Natal provinces. Similarly, the participants also kept reflective journals on their experiences with ICT integration in the classroom in the same areas. According to McNair and Galanouli (2002), data from reflective journals can be used by teachers to improve classroom practice. The lesson plans were collaboratively

planned by ten groups of 8-10 pre-service-teacher participants. Each lesson was delivered by one of the group members and other group members played the role of learners in simulated teaching conditions. The lessons were video-recorded and transcribed. The in-service-teacher participants initially formed two groups of seven members each to discuss how they can plan lessons to achieve classroom ICT integration. However, because only seven of the participants managed to get permission from the schools and parents using our ethical clearance certificate to record and submit the videos to the researchers, the lessons were planned individually by the seven participants and delivered in front of real learners at the schools the participants worked at. These lessons were also video-recorded and transcribed.

Data analysis

In order to keep participants' identities safe, codes are used as references. The in-service-teacher participants were coded as T1-T7 (teachers 1-7). The ten groups formed by the pre-service-teacher participants were coded as G1-G10 (groups 1-10). The codes PST1, PST2 and so on are used for pre-service-teacher participants whose journal reflections were used in this paper. Not all the contributions of the participating teachers could be included in this paper as evidence, but all contributions were considered in the building of the themes. The one-page reflective journals, lesson plans and transcripts of video-recordings were analysed through conventional content analysis, whereby codes and categories were derived directly from the text data (Hsieh & Shannon, 2005). During data immersion, the researchers read the textual data and reflected in order to identify data texts that were grouped from codes to categories and finally themes (Finfgeld-Connett, 2014). The quality measures of rigour and trustworthiness were addressed through triangulation of data collection instruments (reflective journals, lesson plans and video-recorded lessons). Comparisons were also made between the data from the pre-service- and in-service-teacher participants.

Findings of the study

The data analysis process yielded three themes: (1) the teachers' technological knowledge, (2) the pre-service and in-service teachers' TPACK and (3) in-service teachers' classroom ICT integration practices in rural ecologies.

Theme 1: The teachers' technological knowledge

The in-service- and pre-service-teacher participants mentioned the learning technologies that they used as well as those that they are able to use if these technologies are available. On the list of learning technologies that was compiled from the content analysis were computers, laptops, cell phones, tablets, interactive white boards, radio, TV, internet, digital microphones and speakers. Also on the list were Microsoft Word, PowerPoint and Excel as the software that the participants could use in the classroom. Media such as videos, digital stories, digital songs and digital pictures were also mentioned. Social media platforms such as blogs were mentioned by some pre-service-teacher participants.

Although the participants mentioned all these learning technologies, most of these were not available at the schools where participants taught at and the infrastructure underdevelopment hampered the use of some technologies such as cell phones and tablets. Participant T1, who taught at a farm primary school, complained about poor network coverage. We determined that the lack of internet facilities was one of the barriers to the use of learning technologies at her school. In her reflective journal, she said:

Sadly, in our case we were using cell phones, tablet and laptop to try and google some info. We could not as we are at the farms and we have poor network coverage. Nonetheless we managed to improvise and did the dance moves.

The participant was referring to what transpired in the video of the lesson that was submitted. We observed that in a Grade 6 class the participant was teaching about dance (Gumboots and Pantsula). Participant T1 asked the learners to search for information on the two types of dance using their tablets and cell phones. However, the internet connection was a problem, hence the teacher and learners abandoned that exercise and ended up using printed material to continue with the lesson. We observed that the participant did not use a computer or a projector. These were probably not available. We made this observation because every participant (pre-service and in-service) mentioned that they used a computer and a projector or that they are able to use them if they are available.

A pre-service-teacher participant, PST1, also shared his experiences of the limited integration of ICTs in the classroom in the schools situated in the rural ecologies when he said the following in his reflective journal:

Four years of my teaching experience have been very informative and skill enhancing, not using much of technology with the learners however. The reason is simple, some schools are situated in the rural areas of the homelands of QwaQwa when some schools consider computer as subject to be taught in one period rather than a teaching and learning tool.

Another pre-service-teacher participant, PST2, corroborated what was expressed by PST1 by mentioning the teaching technologies that she would have used during teaching practice if they were available. She said:

In my final year of teaching practice learners were very eager to learn new things and could relate it to their existing knowledge that they even shared stories from their experiences. To keep the class enthused and open-minded to the new world of technology, I would have used the following tools for my lessons, laptop, projector, videos, slides and digital pictures.

Theme 2: The pre-service and in-service teachers' TPACK

The in-service- and pre-service-teacher participants' demonstrations of their TPACK are presented separately so that comparisons could be drawn at the end.

The in-service teachers' TPACK

We noticed that five of the seven in-service-teacher participants used PowerPoint presentations during their lessons in a teacher-centred fashion whilst the learners were listening quietly. Figure 2 presents two slides from participant T2's class, who was teaching Grade 1 mathematics.



Figure 2: Extract of participant T2's PowerPoint presentation

Participant T2, however, justified that she used the PowerPoint presentation to enhance the Grade 1 learners' understanding of the topic. She said:

The problem I identified for my lesson is that I notice that my learners needed activation as they could not understand the topic of tens and ones. I then decided to introduce PowerPoint presentation to expose my learners to technology and to arouse curiosity and interest. I noticed that my grade ones were struggling as they're from rural areas they are hardly surrounded by technology.

It seems the use of the learners' mother tongue was also one way of helping the Grade 1 learners to understand the topic. Another participant, T3, taught about Tuberculosis in a Grade 6 class. The lesson was conducted in a computer laboratory which was equipped with a computer and projector. The teacher used PowerPoint to present the lesson and showed video clips of healthy and affected lungs at the end. The learners were listening quietly and were not given other activities.

The pre-service teachers' TPACK

The pre-service-teacher participants had more ICT resources to use during the 10 group lessons that were video-recorded. They could use the facilities at the university, which included lecture rooms equipped with computers, Wi-Fi, projectors, speakers and

microphones. Four of the groups planned a Grade 2 lesson on seasons of the year. Two groups planned a Grade 2 lesson on modes of transport, one planned a Grade 1 lesson on parts of a human body, one planned a Grade 1 lesson on emotions, whilst another group planned a Grade 1 lesson on animal sounds and the last group planned a Grade 1 lesson on shared reading, using the theme of animal sounds. We noticed that the presenters of the lessons did not use teacher-centred PowerPoint presentations. Instead, they used questioning techniques to introduce the lessons, making sure that the ‘learners’ (their peers) were actively participating. The availability of the internet enabled the groups to download educational videos with cartoon characters that would identify well with Grade 1-2 learners for which the lessons were planned. They were also able to download digital pictures, stories and songs.

For example, in G1’s Grade 1 lesson on animal sounds, the presenter introduced the lesson by projecting pictures of the animals on the screen, which the learners were then instructed to identify. In the activities that followed, the participant played the sounds of the animals and the learners were asked to give names of the animals. In addition, pictures of animals were displayed, and the learners mimicked the corresponding sounds. In another activity, a video was played showing the animals making the sounds. Ultimately, a video with a sing-along song was played for the learners to participate by identifying the different animals and mimicking the sounds. Therefore, the group integrated a number of technologies in the classroom, namely, the computer, the projector, speakers, the internet, educational videos and digital songs.

Another group, G2, demonstrated more ways in which the learning technologies could be used in the classroom. They presented a Grade 1 lesson on parts of a human body. The technologies used included a computer, projector, speakers, digital songs with videos, e-books, Microsoft Word to complete worksheets to match a picture and the name of the body part, the mouse to move pictures of body parts to their correct locations and a virtual learning platform (BlackBoard) for learners to submit their classwork. The use of ICTs was extended to the informal assessment and homework. What we say was reflected in the video of the lesson and a section of a Grade 1 lesson plan.

Table 1: Section of Group 2’s lesson plan

Teacher activities	Learner activities
The educator will play the record and let learners listen the functions of different body parts [a digital song with a video]	Learners will listen the functions of body parts from the record played by the educator
The educator will ask learners to come in front and type on the computer the other functions they know except mentioned ones	Learners will go in front and type on the computer the other functions of body parts they know
After the lesson (post-activities) the educator will ask learners to go to their e-books using their tablets or smartphones then they will find a worksheet there	Learners will use their laptops and match block A with block B on their blackboards [a virtual learning platform]
To check further the learners’ understanding, the educator will put on a projector separated body parts and ask the learners to use the mouse to put body parts where they belong	Learners will use a mouse to put the different body parts where they belong on the projector

The third row in the table shows that the participants in G2 intended for their learners to find activities in e-books instead of ordinary books. In addition, the learners were not to use ordinary exercise books but laptops and had to submit their activities on a virtual learning platform. The availability of more ICT resources at the university enabled the pre-service-teacher participants to explore more ways to use learning technologies than what the in-service-teacher participants could do in real rural-ecology settings.

Theme 3: In-service teachers' classroom ICT integration practices in rural ecologies

We realised that as far as classroom ICT integration is concerned, there is what the in-service-teacher participants say they can do versus their actual practices in the classroom.

The actual classroom ICT integration practices

Under Theme 1 we mentioned that in-service-teacher participants had TK that was not supported by the available resources and infrastructures in the schools. The unavailability of the internet prevented the participants from using educational media such as YouTube videos. Participant T5 indicated that he might use videos to motivate his learners if these were available:

The problem with teaching General Journal using textbook and chalkboard is that learners don't pay much attention and they lose interest in the subject and the concept discussed in class. So YouTube videos will help me arouse learner's interest, improve their attitude towards learning the content, to inspire and motivate students, also increase learners understanding, and it also helps learners create memorable visual images about the content.

Participant T6, an in-service teacher from a TVET college, conceded that she found it difficult to facilitate learner-centred lessons by making use of the technologies in the classroom. She said:

Mostly obstacles I encountered is to make the integration of technology success into Hospitality Services include organizational support, attitudes and expectations, and technology itself. I use technology mostly to present information rather than giving students a chance to be hands-on. I am not even certain about policies governing the use of technology. The location of the projector is in the computer laboratory and is meant for IT students. Sometimes I felt uncomfortable because I have to deal with the possible equipment failures or slow internet access during their contact time.

What teachers say they can do

Participant T4, a computer skills in-service teacher at a TVET college, facilitated a practical session on how to use Excel to perform mathematical calculations. The learners were working hands-on on the computers whilst the teacher guided them as they went through a worksheet. The learners were working individually and followed the teachers' instructions, such as "Now highlight the heading and make it bold." However, in her reflective journal, the participant claimed that she was using questioning techniques and facilitating discussions among the learners:

I chose student-centred teaching methods as examples [of teaching strategies] that can be used in a classroom. I negotiate with students, asking questions to elicit thinking about the viability of knowledge representations, arranging students together so that they can argue toward consensus, and pointing the way to additional learning resources. I become a mediator, guide, friend and co-learner to them.

The participants can talk about what can be done with learning technologies to facilitate learner-centred classrooms, motivate the learners and improve understanding and critical

thinking. However, the actual classroom practices as influenced by lack of resources and teacher identity traits, such as lack of confidence, stood in the way of effective implementation.

Discussion and conclusion

In this study we set out to explore how pre-service and in-service teachers integrated ICTs in rural classroom ecologies after completing a course on classroom ICT usage. The study findings partly give information on the contribution made by the course to the preparation of the teachers. The study findings also provide contextual insights on how in-service and pre-service teachers integrate ICTs in the classroom. The first significant finding of the study is that both pre-service- and in-service-teacher participants possessed TK after completing the course, with participants listing the learning technologies they were familiar with. These technologies included computers, laptops, cell phones, tablets, interactive white boards, radio, TV, internet, digital microphones and speakers. Media such as educational videos, digital pictures and stories were also mentioned as well as software such as Microsoft Word, PowerPoint and Excel. It emerged, however, that most of these learning technologies were not available in the schools where the in-service-teacher participants worked and those where the pre-service-teacher participants went for teaching practices. Tezci (2011) confirms that many developing countries are still in the early stages of implementing the integration of ICTs in the classroom. The use of the learning technologies was limited in the participating schools situated in the rural ecologies, with participating teachers not having the opportunity to use some of the learning technologies in the classroom. The lack of resources stands as one of the major barriers to classroom ICT usage (Gebremedhin & Fenta, 2015; Buabeng-Andoh, 2012; Demiraslan & Usluel, 2008).

The second significant finding is that the nature of learning technologies available influenced how the participants integrated ICTs in the classrooms. The pre-service-teacher participants displayed a better command of TPACK in the lessons they presented at the university, where there were more and better ICT resources, such as an uninterrupted internet connection. They were able to achieve some of the pedagogical objectives in their lesson plans through the use of ICTs. These objectives included facilitating learner-centred lessons that were exciting and motivating for the learners. These objectives could not always be achieved in the schools, however, because of the scarcity of resources. Fu (2013) confirms that an abundance of learning technologies creates learner-centred classrooms.

The third significant finding is that the in-service-teacher participants in the rural ecologies had TPACK that they could talk about but not necessarily implement in the classroom. This is similar to a finding made by So and Kim (2009), who show that teachers would fail to implement the TPACK they talked about. The availability of learning technologies coupled with a considerable TK contribute to bridging the gap between theory and practice during the implementation of classroom ICT usage. The pre-service-teacher participants, who planned their lessons at the university (with better ICT facilities), displayed better TPACK than the in-service teachers who lacked resources in real classrooms. We therefore recommend that teachers' TPK should be supported by a variety of learning technologies and according to the teachers' developed TK. The Department of Education should consider supplying educational resources that support classroom ICT usage by being at par with advancements in technology and the enhanced TPACK of teachers after professional development and trainings. In conclusion, the findings seem to suggest that teachers develop TPK that corresponds to the TK they possess. If the ICT availability conditions in schools do not match their TK, teachers find it difficult to develop effective TPK. It is important for the classroom-ICT-usage course

developers at universities to find ways of developing TPK for teachers who teach in classrooms that have minimal technological resources.

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THE CONTRIBUTION OF A CROSS-AGE TUTORING SYSTEM VIA A SOCIAL NETWORK TO THE IDENTITY DEVELOPMENT OF ADOLESCENT TUTORS AND YOUNG TUTEES

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Abstract

The study is introduced, and background provided, including the problem statement and the aim/objective of the study. Next, theoretical/conceptual frameworks related to identity development are investigated. This section provides brief coverage of identity and identity development, with a specific focus on social identity. Current research pertaining to the role that educational systems play in developing countries in identity development is also explored. A review of literature investigates social networks, their use in education and the impact thereof on youth development. This is followed by an investigation into educational uses of social networks, as well as studies pertaining to the impact of the use of social network sites on the youth. The methods section provides relevant background information, to contextualise, describe and motivate what influenced and contributed to the research design used for this study. This section also proposes the identity and identity development measurement instrument, based on the known elements identified in previous sections, as well as new elements. This section describes the data collection instrument and data analysis of the case study. The paper is concluded after discussing the results, suggesting that the significance of the study relates to the contribution of a cross-age tutoring system via a social network to the identity development of the adolescent tutor and young tutee.

1. Introduction

In the corporate environment, enterprises are progressively moving towards digitisation, enabled through unified communication and collaboration technologies (Bolton, Goosen, & Kritzinger, 2016). In our homes, the youth are among the most prolific users of social network sites and it is increasingly harder to separate out their everyday practices from their technological tools (Goosen, 2016). Emerging studies like Goosen and Mukasa-Lwanga (2017b) found that the youth spend a considerable percentage of their daily life interacting through social media. Subsequently, questions and debates arise about the effects that social network sites could have on these user's identity development (Le Roux & Loock, 2015).

Moreover, as educators and managers at schools in South Africa (Goosen & Van der Merwe, 2015) observe the impact of Information and Communication Technologies (ICTs) in fields other than education, they are now rethinking how teaching and learning in the 21st century (Goosen & Ngugi, 2018) can be facilitated by using educational technologies for the 21st century (Goosen, 2015a) that students already have (Greenhow & Robelia, 2009; Libbrecht & Goosen, 2015). Also, there is clear evidence that social network sites provide educational potential to deliver environments for learning to supplement school-based experiences (Huijser, 2008). More recently, Goosen (2019) showed how information systems and technologies are opening new worlds for learning to children, who are using their technologies for education in the cyber world (Goosen & Naidoo, 2014).

Situated in this context, this qualitative study seeks to examine the social identity development of the participants in a cross-age tutoring system via a social network, where adolescent tutors tutor disadvantaged primary school children in South Africa. In this system,

the adolescent tutors provided after-school, non-formal learning support to lower grade students (tutees), who do not usually have access (Goosen, 2018) to such one-on-one homework support, focusing on numeracy and literacy.

There are serious problems with literacy and numeracy in developing countries, like South Africa (Gould, 2014; Nag, Chiat, Torgerson, & Snowling, 2014). Based on their report on the Annual National Assessment, the national Department of Basic Education (2011) in South Africa indicated that the quality of foundation learning in these areas is still well beneath what it should be.

The problem stated could be tackled through the improvement of numeracy and literacy results for economically and educationally disadvantaged students without placing an additional load on teaching resources, which, in the formal learning environment, are already overburdened (Masters, 2009).

Regarding key principles, driving perspectives and major challenges, expanded learning time and opportunities can be described as those student programmes and activities, which occur outside of traditional school hours (Blyth & LaCroix-Dalluhn, 2011). This solution attempts to provide an expanded learning opportunity for primary school children with support in terms of numeracy and literacy.

The contribution of a cross-age tutoring system to the tutors' and tutees' identity development is well researched. Even though this field is still in its infancy, the use of social networks as a tutoring medium is also an accepted and researched topic. Limited literature is, however, available on using a social network as a vehicle for cross-age tutoring, as well as what the contribution thereof is to the role players' identity development.

This research explores identity development in a social network context. High school students act as tutors for disadvantage primary school children in an informal after school learning programme. The tutees were coached in both numeracy and literacy.

The research reported on in this paper forms part of a project, which entails criteria and guidelines for the selection, design, implementation and use of a tutoring system (Goosen, 2004). An important aspect of the study is the proposal of an instrument to evaluate the identity development of youth, who takes part in a mobile learning (m-learning) system via a social network site: this is important, since using mobile tools for creating learning aides and materials have become an important part of non-formal and informal learning (Udanor & Nwodoh, 2010). There is, however, no focus on specific m-learning strategies. The intention of this study is not to become involved in pedagogical theories of learning. The underlying importance of these theories is recognised, and they are used where applicable.

The research is not about the design and development of a cross-age tutoring system in question. It was assumed that the system is fully functional. Only one specific implementation of the system in a controlled environment is investigated.

1.1 Aim/Objective

The aim of the research is to determine the contribution of a cross-age tutoring system via a social network to the identity development of the adolescent tutor and young tutee. The cross-age tutoring system entails adolescent tutors providing learning support to younger children, whose access to learning support is hampered by unfavourable socio-economic circumstances. This led to the identification of the following objective: to understand the identity development of the adolescent tutor and young tutee.

1.2 Research Questions

The primary research question addressed by this research study is: How does involvement in a cross-age tutoring system via a social network contribute to the identity development of the adolescent tutor and young tutee?

In an attempt to investigate and identify the identity development issues that occur when the adolescent tutor and young tutee are involved in a cross-age tutoring system via a social network, the following secondary questions are set out, which this research intends to answer:

1. How does the involvement of the adolescent tutor and young tutee via a social network contribute to identity development?
2. What role does a cross-age tutoring system play in identity development?

2. Theoretical/Conceptual Framework

The role that the following theoretical and conceptual framework identified plays in this article is to systematically answer the stated questions, as the research approach was initiated with an in-depth study of existing literature on theory and concepts pertaining to social networks, identity development and the educational potential of these.

Numerous theoretical and technological issues need to be addressed when the contribution of a cross-age tutoring system via a social network to the identity development of the adolescent tutor and young tutee is determined.

To understand the behaviour and functioning of the youth, the *concept* of **identity** is defined. In so doing, the fields of psychology and social psychology are investigated, with just as much attention as is necessary to understand the consequences of the impact on an individual's social identity development.

A framework is contextualised as an “abstract, logical structure of meaning that guide the development of a study” (Grove, Burns, & Gray, 2014, p. 42). When a framework is derived from related concepts, a conceptual framework is created. According to Miles, Huberman, Huberman and Huberman (1994, p. 18), a “conceptual framework explains, either graphically or in narrative form [both are much preferred], the main things to be studied – the key factors, constructs or variables – and the presumed relationships among them”.

Numeracy is defined as the ability to reason and to apply simple numerical concepts (Brooks & Pui, 2010). In this regard, the latter authors took a closer look at a common measure of numeracy and asked whether individual differences in numeracy were unique from general mental ability.

All individuals have a personal **identity**, which is defined by an individual's characteristics; the “personality attributes that are not shared with other people” (Hogg, 2006, p. 115). Furthermore, all individuals have a social identity. According to Tajfel (1982, p. 24), social identity stems from that part of the individual, “which derives from their knowledge of their membership of a social group (or groups) together with the value and emotional significance of that membership”. In the case of social network sites, both personal and social identity indications are evidenced.

2.1 A Social Network for Identity Development

According Greenhow and Robeliato (2009), the development of online profiles within social networks has a direct influence on the reinforcement of an individual's identity. For today's adolescents, it is just another step on the path towards figuring out who they are. And figuring out who they are requires being social (Rosen, Carrier, & Cheever, 2010).

Individuals gain a social identity and group identity by their affiliation: membership in various groups. These groups include, among various categories, family, ethnic, education, friendship, dating, sex roles and religion. The term collective identity refers to a sense of belonging to a group (the collective). Relationship development is encouraged as an individual's disclosure promotes familiarity with online community members. Adolescents, in particular, may experience a sense of disinhibition and safety online that leads to increased self-disclosure and enhanced bonding (Rosen, et al., 2010).

Pempek, Yermolayeva, and Calvert (2009) suggested that due to the pervasive presence of social networks in the lives of adolescents and children, these online interactions may influence identity development through peer feedback.

2.2 Educational Potential of a Social Network

In terms of learning, media and technology, Selwyn and Grant (2009) provided an introduction with regard to researching the realities of social software use.

There seems to be an increase in the use social network sites for informal educational activities (Madge, Meek, Wellens, & Hooley, 2009). Lang (2012) pointed to evidence that social network sites could sustain learning, but only some kinds of learning, and only under certain conditions.

Research conducted by Wang, Jackson, Zhang and Su (2012, p. 2313) explored “the relationships between the Big Five Personality factors,” self-esteem, narcissism and sensation-seeking and individual Chinese University students’ uses of specific features of Social Networking Sites (SNSs).

Gentile, Twenge, Freeman and Campbell (2012) conducted an experimental investigation into the effect of social networking websites on positive self-views. Two experiments were conducted employing the Narcissistic Personality Inventory (NPI).

To test the effects of exposure to Facebook on self-esteem, Gonzales and Hancock (2011, p. 79) posed contrasting hypotheses. “Objective Self-Awareness (OSA) from social psychology and the Hyperpersonal Model” from computer-mediated communication was “used to argue that Facebook would either diminish or enhance self-esteem respectively.”

Ellison, Vitak, Gray and Lampe (2014) measured self-esteem in their study to explore the cultivation of social resources on a social network, as well as specific Facebook enabled communication and relationship maintenance behaviours, and their role in perceived bridging social capital processes, using “seven items from the Rosenberg Self-Esteem Scale” (Ellison, et al., 2014, p. 862). In a similar milieu, Whitman and Gottdiener (2016) explored the relationship between Facebook and users’ self-esteem, identity perceptions and cognitive function.

3. Literature Review

This section explores **distributed cognition** and **social computing** as underlying understanding of the social interaction between the people and resource elements.

3.1 Distributed Cognition

Distributed cognition enhances the understanding of interactions between people, resources and environments and emphasizes the social aspects of cognition. Distributed Cognition, which often makes use of ethnographically collected data, is useful for analysing situations that involve problem-solving as it helps provide an understanding of the role and function of representational media. Distributed cognition as a theory of learning, applied in the field of distance learning.

Distributed cognition illustrates the process of interaction between people and technologies. The theory was developed using insights from sociology, cognitive science and the psychology of Vygotsky (1978) and was defined by Hutchins (1995, p. 13) as “the emphasis on finding and describing ‘knowledge structures’ that are somehow ‘inside’ the individual encourages us to overlook the fact that human cognition is always situated in a complex sociocultural world and cannot be unaffected by it”. It is a descriptive framework that describes the coordination between individuals, artefacts and the environment.

Distributed cognition is a useful approach for (re)designing social aspects of cognition by putting emphasis on the individual and his/her environment. Distributed cognition views a system as a set of representations and models the interchange of information between these representations. These representations can be either in the mental space of the participants or external representations available in the environment.

According to Hollan and Hutchins (2010), when these principles are applied to the observation of human activity, at least three interesting kinds of distribution of cognitive processes become apparent:

1. Cognitive processes may be distributed across the members of a social group. Tracking these processes produces insights about the dynamics of the social processes.
2. Cognitive processes may be distributed in the sense that the operation of the cognitive system involves coordination between internal and external (material or environmental) structure. Tracking these processes produces insights about the dynamics of agent/environment relations and is particularly relevant for understanding and designing augmented environments.
3. Processes may be distributed through time in such a way that the products of earlier events can transform the nature of later events. Tracking these processes produces insights about the dynamics of social and cultural systems on longer timescales. The effects of these distributions of process are extremely important to an understanding of human cognitive accomplishments as products of human social dynamics.

3.2 Social Computing

Social computing is the collaborative and interactive aspect of online behaviour, which is mediated by technology and includes humans in a social role. It is defined by Quinn and Bederson (2011, p. 1405) as facilitating “relatively natural human behaviour that happens to be mediated by technology”.

The term can be understood in contrast to personal computing, which describes the behaviour of isolated users. Social computing is closely related to the concept of Web 2.0, which serves as a framework for applications supporting the processes of social computing. Social computing shifts computing to the edges of the network, and empower individual users with relatively low technological sophistication in using the Web to manifest their creativity, engage in social interaction, **contribute** their expertise, share content, collectively build new tools, disseminate information, etc.

Social computing begins with the observation that humans and their behaviour are social. These observations lead to the gathering information. The task of organizing this information is a technical challenge; the task of making meaning of this information is a social and cultural one.

4. Methods/Techniques

Following Gelderblom and Kotzé (2008), on what can be learnt from a brief look at the history of choosing the ‘best’ (Goosen, 2008; Goosen, Mentz, & Nieuwoudt, 2007) theories

of cognitive development when designing technology for young tutees, the methods and techniques used in the empirical phase of the study included the elements of the sample, instruments and data analysis techniques.

4.1 Research Design

Durrheim and Terreblanche (1999) described a research design as the framework or plan that guides research in a way that ensures that it is properly done. Since the aim of the research is to determine the contribution of a cross-age tutoring system via a social network to the identity development of the adolescent tutor and young tutee, this study sought to understand the phenomenon of identity development of youth in a specific environment, with a case study design deemed suitable.

Yin (2014) distinguished between four basic designs for case studies: single, holistic, multiple and embedded case studies. The embedded case study consists of sub-units, which must be examined; hence, multiple units of analysis. This study adopts an embedded case study, since the case consists of subunits (tutor and tutee), which must be examined. The embedded case study provides for multiple units of analysis. Furthermore, the main logic behind choosing the embedded case study and working qualitatively in this study was its nature of exploratory discovery and inductive logic (Creswell, 2014). It is a pertinent design to provide detail and insights into participants' experiences of the contexts, and thus create meaningful accounts of their experiences of using social network sites for upliftment.

Furthermore, according to Durrheim and Terreblanche (1999), in practice, research can be:

1. applied or basic,
2. descriptive, explanatory or exploratory, and
3. quantitative or qualitative.

This research can be classified as applied, descriptive and both quantitative and qualitative. It is applied research, since the results of research provided insight into the contribution of a social network site on the young tutees' identity development. It is descriptive in the sense that the research intends to provide a narrative-like description of a phenomenon, namely the identity development that occur when adolescent tutors taught young tutees via a social network site. The research used description as a tool to organise data into patterns that emerge during analysis. The subjects were observed in a completely natural and unchanged environment. Descriptive research does not fit neatly into the definition of either quantitative or qualitative research methodologies, and this research utilised elements of both. This research is quantitative, as the idea was to gather data that described events and then organize, tabulate, depict and describe the data (identity measurement results), and qualitative, in terms of the depth of research for especially the narrative perspectives on the educational technologies in education involved (Goosen & Mukasa-Lwanga, 2017a).

4.2 Data Collection Instruments

Data collection methods are influenced by the research paradigm - positivists prefer objective, quantitative and experimental techniques, while interpretivists and constructivists use qualitative methods such as observation and interviews. This research anticipates the following a mixed method approach of data collection at this stage: quantitative data through identity measurement instruments, and qualitative data through interviews, observation, and blogs.

Identity measuring instruments were employed to identify if there were any changes in the entity characteristics of the role players using the system. This entailed the formulation, for each child participating in the study, a rich description of his/her identity characteristics before (s)he started using the system, as well as after using the system. The following two identity measuring instruments were used in this study:

- The Psychosocial Inventory of Ego Strengths (PIES) was developed as a self-report measure of Erikson's eight ego strengths. The measure can be administered to individuals or groups. Respondents are instructed to answer each question on a five-point scale ranging from 1 “does not describe me well” to 5 “describes me very well.”
- The Objective Measure of Ego-Identity Status was developed to assess identity status in adolescence and young adults. Administration of the Objective Measure of Ego-Identity Status Revision 2010 can be given individually, in groups, or on the internet. The directions request that the participant read each item carefully and decide if they disagree or agree with it. Then they are instructed to select the level of disagreement or agreement (slightly, moderately, or strongly). The items are scored on a 1-6 rating continuum with six indicating strongly agree.

Interviews, observations and blogs further resulted in descriptions, quotations, excerpts and social data, developing into narrative descriptions. These narratives helped to tell ‘the story’.

Each method was evaluated via its own well-established evaluation methods, since evaluation is a crucial component of the research process.

4.3 Sample/Sampling Technique

As the system that this research employs augments the literacy skills of economically and educationally disadvantaged children in South Africa via social network sites, the sample consists of tutors and tutees. Five tutors, working with ten to twenty tutees, participated in the study. The tutors were 15 to 16-year-old youths. The youths had sound academic backgrounds, as well as technological skills. An important prerequisite is that they must have the same mother tongue as the tutees. The tutees were underprivileged grade two to three children, who live in care centres, where after-school support is not possible, or nominal. All participation is voluntary.

4.4 Validity/Reliability of Instruments

One limitation of the study by Ellison, et al. (2014, p. 867) was the fact that their “measure of social capital may not have” had “adequate construct validity; future research in this area should develop new measures of social capital and validate existing measures”.

“The Rosenberg Self-Esteem Scale was used to measure participants’ self-esteem” (Wang, et al., 2012, p. 2316), as this instrument had “well-demonstrated internal consistency, test-retest reliability and convergent and discriminant validity”.

4.5 Data Analysis

Data analysis is the process whereby data is transformed into answers to the research questions (Durrheim & Terreblanche, 1999) and is to a large extent determined by the research paradigm, but also by the nature of the data collected.

Although quantitative and qualitative data are often presented as mutually exclusive alternatives, a mixed method approach was used to provide the most comprehensive set of data for this study.

Qualitative data analysis provides data that is used to describe meaning. The analytic framework followed is systemic in nature.

Thematic analysis is a systematic interpretation of the data. Data is to be read and reread actively attending to what is being said. Interesting features of the data were noted and labelled with words/phrases that capture their meaning. Constant comparative analysis was employed. This is a cyclical process in which data are collected, read and reread, categorised, coded, and then analysed and compared (Richardson, Goodwin, & Vine, 2011).

Quantitative data analysis provides quantifiable and easy to understand results. The level of measurement associated with the quantitative data is interval data. Interval data is continuous and has a logical order; data has standardized differences between values, but no natural zero.

The results were tabulated for the different variables in the data set. This process gave a comprehensive picture of what the data looked like and assisted in identifying patterns. Frequency and percentage distributions were constructed. A frequency distribution is an organized tabulation of the number of individuals or scores located in each category. A percentage distribution displays the proportion of participants who are represented within each category.

A descriptive refers to calculations that are used to 'describe' the data set. The descriptives used included means, minimum and maximum values, median and mode.

After tabulating the data, the data were explored by disaggregating it across different variables and subcategories of variables. Crosstabs allowed for the disaggregation of data across multiple categories. Data were also disaggregated by subcategories within a variable. This allowed for a deeper look into the units that make up a category.

In addition to the basic methods described above, more complicated procedures with regard to data analysis were carefully thought about. These included correlations, analysis of variance and regression.

Since it was necessary to enrich the data, one solution was the creation of a collaborative community engagement project with capabilities for growing innovative schools in the 21st century that create alignment between academic activities and enriching infrastructure to support learning outside of school time (Goosen, 2015b; Stylianakis, Moumoutzis, Arapi, Mylonakis, & Christodoulakis, 2014).

5. Results & Discussion

Data were captured at a children's home over a period of around two weeks. During the first meeting, the tutees were familiarised with the technology and software application by the tutors. An interactive session via tablets was then established. Although physically not distributed, the tutoring session took place via the internet, to familiarise all role players. A tutoring session was then conducted. Three tutoring sessions were then planned for the next week. The tutees were assisted during these tutoring sessions by caretakers. A final session was conducted onsite at the end of the second week.

Data were captured by having the tutors complete a questionnaire before embarking on the tutoring process, as well as by them keeping a journal throughout the process. Interviews were also conducted.

As indicated by Le Roux and Looock (2015), in terms of the impact and opportunities of using e-tutoring to teach in a challenged socio-economic environment (Van Heerden & Goosen, 2012), quantitative data reported included an example of the pre- and post-test scores on the Rosenberg Self-Esteem Scale (RES) for a specific adolescent tutor. The latter indicated that even though the adolescent had high self-esteem before, this increased even further. Looking

at these scores for all the tutors, as well as the mean scores, all but one of them showed increases for self-esteem.

Qualitatively, post study interviews conducted with the young tutees showed them finding the reading lessons particularly helpful and having very positive overall experiences. Although an extract from one of the experience journals of one of the adolescent tutors described mostly positive feelings, it also directed attention to a situation, which could point to the reason why some of the tutors might not have shown an increase in self-esteem.

This first set of results showed the contribution of being involved in a cross-age tutoring system via a social network to increased self-esteem for the adolescent tutors. Based on these results, it is envisaged that this could be repeated in the context of quasi-experimental research with a control group. Finally, benefits also resulted from the positive experiences of the economically and socially challenged young tutees.

6. Conclusion

In this research, identity development was evaluated when a cross-age tutoring system via a social network occurs as a benevolent activity. As a result, this research makes a contribution to the field in terms of a significant theoretical insight into the contribution of a cross-age tutoring system via a social network to the identity development of the adolescent tutor and young tutee. In terms of originality, a gap in the literature has been identified - studies to this effect refer to the contribution of a cross-age tutoring system on identity development in face-to-face and/or online learning environments. No literature could be identified that contribute to the body of knowledge of identity development if social networks are used as specified. Furthermore, studies that directly inform the debates and controversies attended with the use of social networks by the youth have tremendous promise to improve youth access and utilization of social media, towards influencing the numeracy and literacy rates of tutees at the applicable institutions (Goosen & Van Heerden, 2013).

Finally, with the current forecast that broadband internet will be available to 100% of the SA population in 2020, this research enables the deployment of mechanisms to support education.

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SECONDARY SCHOOL STUDENTS' INVOLVEMENT IN CYBERCRIMES AND ITS EFFECT ON THEIR ACADEMIC ACHIEVEMENT

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Abstract

The Internet provides innumerable social and educational prospects for schoolchildren in Nigeria. However, despite the innumerable benefits of the Internet to children, this fourth revolution in education known as the 'internet' which enables teeming male and female schoolchildren to interact in the cyberspace can be a perilous community for them. The risks associated with interactions with other schoolchildren and unknown persons in the cyberspace could expose them to cyber daredevils, affect their academic performance, facilitate their involvement in online crimes, or download online programmes that could give cybercriminals admittance to personal sensitive information. Consequent on the information provided by different researchers on the opportunities and risks opened to schoolchildren in the cyberspace, this article examined the involvement of secondary school students in cybercrimes otherwise called 'Yahoo Yahoo' among school-age children in Nigeria, and its effect on their academic achievement. The study was a descriptive type while a field-based approach was adopted to collect quantitative data using a questionnaire tagged 'Schoolchildren Questionnaire on Cybercrimes' (SQC) from nine hundred and thirty students selected from intact classes in twenty secondary schools in Nigeria. The data was subjected to T-test and Pearson Product Moment Correlation, and results indicated that male secondary school students engaged more in online criminal activities than their female colleagues, the involvement of secondary school students in cybercrimes has no significant relationship with their parents' occupation. Also, the academic achievement of secondary school students that engaged in cybercrimes was not different from that of their colleagues who did not perpetrate cybercrimes. The study has inferences for the development of cyber security education programmes in secondary schools in developing countries to mitigate the incidences of cybercrimes involving schoolchildren.

Keywords: Secondary School Students, Cybercrimes, Academic Achievement.

Introduction

The activities of school children were confined to the physical spaces during the analog era. But at the dawn of the digital era, the activities of schoolchildren shifted from physical space to the cyberspace consequent on the Internet revolution. The Internet revolution led to the evolution of virtual communities which Rheingold (2000) described as: social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with enough human feeling, to form webs of personal relationships in cyberspace (p. 20). Most children belong to social networking groups which are the most prominent of the virtual communities. Some of these social networking websites such as Twitter, Facebook, 2go, and Whatsapp basically help schoolchildren to create and sustain relationships.

Ige (2018, p.152) state that the celebrations that attended the transformations brought by Internet to education became short lived when the anonymity offered by the Internet became a new locus of criminal activities. Consequently, this threatened the well-being of many schoolchildren across the globe. At present, the cyberspace is the second home of

schoolchildren where friends are made and met. Leiner, Cerf, Clark, Kahn, Kleinrock, Lynch, Roberts, and Wolff (2003) description that Internet represents one of the most successful models of the rewards of sustained investment, commitment to research, and development of information infrastructure is evident in the trillions of transactions that are carried out on the Internet each day.

Despite the benefits of this promising technology, a small group of persons known as ‘Yahoo Boys’ have been ruthlessly exploiting unsuspecting schoolchildren on the Internet. It is consequent to this development that this study examines the perceptions of secondary school students on crimes committed by their colleagues involved in this new locus of criminal activities in the cyberspace.

Problem of the Study

Each day, more than half a billion people around the world log on to the internet to buy and sell goods, to exchange ideas and to communicate promising opportunities and innovative solutions. While billions of dollars move across the internet each day, a small group of predators have chosen to make cyberspace a place for crime and fraud. At present, there are reports of internet fraud cases involving young people in which NGN277, 931, 341 millions were recovered (IT News Africa, 16 August 2017). These young cyber scammers dealt in fraudulent online marketing, online dating scams, automated teller machine frauds, and other related cybercrimes (IT News Africa, 16 August 2017).

The cybercrime reports of years 2001 to 2010 prepared by the National White Collar Crime Center and Federal Bureau of Investigation (FBI) in the United States of America showed the extent to which cybercrime is deeply rooted into the economic and social fabric of the Nigerian nation. Table 1 provides information on the top ten countries in the world whose citizens are enmeshed in cybercrimes from years 2001 to 2010.

Table 1 shows that Nigeria was second in year 2001 among the top ten countries perpetrators of cybercrimes with 2.7%. In year 2002, Nigeria retained the second position with 5.1%, while in 2003 Nigeria was positioned third with 2.9%. In year 2004, Nigeria still maintained the third position with 2.87%, even though the country recorded the lowest perpetration of cybercrimes. In year 2005, Nigeria moved to second position with 7.9%, while in year 2006, Nigeria occupied the third position with 5.9% and third position with 5.7% in year 2007 respectively. In 2008, 2009, and 2010 Nigeria retained the third position among the cyber lawless countries in the world with 7.5%, 8.0%, and 5.6%.

Previous studies such as Amosun and Ige (2009) reported the involvement of school-age children in crimes committed in the cyberspace, and identified cybercrimes such as Nigerian letter fraud, credit card fraud, identity fraud, business fraud, and scam as crimes orchestrated by school-age children. In another study, Adu and Ige (2016) identified the use of another person’s name and social security number i.e. identity theft, and scam were the most committed crimes in the cyberspace by school-age children in Nigeria. It is consequent on the surging incidences of cybercrimes that this study investigated the perceptions of the level of involvement of school-age children which include Secondary School Students in cybercrimes in Southwest, Nigeria. In this paper, a brief exposition is given on the nature of crimes in the cyberspace. Furthermore, an explanation of the occurrences of crimes in the cyberspace using the space transition theory was carried out.

Table 1: Showing the Countries Perpetrator of Cybercrimes from years 2001 to 2010

Countries	2001	Ran k	2002	Ran k	2003	Ran k	2004	Ran k	2005	Ran k	2006	Ran k	2007	Ran k	2008	Ran k	2009	Ran k	2010	Ran k
United States	87.6%	1st	76.7%	1st	76.7%	1st	78.75%	1st	71.2%	1st	60.9%	1st	63.2%	1st	66.1%	1st	65.4%	1st	65.9%	1st
*Nigeria	2.7%	2nd	5.1%	2nd	2.9%	3rd	2.87%	3rd	7.9%	2nd	5.9%	2nd	5.7%	3rd	7.5%	3rd	8.0%	3rd	5.8%	3rd
Canada	2.5%	3 rd	3.5%	3 rd	3.3%	2 nd	3.03%	2 nd	2.5%	4 th	5.6%	3 rd	5.6%	4 th	3.1%	4 th	2.6%	4 th	2.4%	5 th
Romania	0.9%	4 th	1.7%	4 th	1.5%	7 th	0.92%	7 th	0.7%	8 th	1.6%	5 th	1.5%	5 th	0.5%	9 th	-	-	-	-
United Kingdom	0.9%	4 th	-	-	1.3%	8 th	2.32%	4 th	4.2%	3 rd	1.9%	4 th	15.3%	2 nd	10.5%	2 nd	9.9%	2 nd	10.4%	2 nd
South Africa	0.5%	6 th	-	-	1.1%	9 th	-	-	1.0%	7 th	0.6%	10 th	0.9%	7 th	0.7%	6 th	0.7%	5 th	-	-
Australia	0.4%	7 th	0.9%	6 th	-	-	-	-	-	-	-	-	-	-	-	-	0.5%	10 th	0.5%	10 th
Indonesia	0.3%	8 th	0.5%	10 th	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Togo	0.3%	9 th	0.7%	7 th	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	0.2%	10 th	1.3%	5 th	-	-	-	-	0.7%	8 th	1.1%	8 th	0.8%	9 th	-	-	-	-	-	-
Spain	-	-	0.6%	8 th	2.4%	5 th	0.6%	9 th	-	-	-	-	0.9%	7 th	0.6%	7 th	0.7%	5 th	0.8%	6 th
Netherlands	-	-	0.6%	8 th	0.9%	10 th	-	-	-	-	1.2%	6 th	-	-	-	-	-	-	-	-
Italy	-	-	-	-	2.5%	6 th	2.01%	5 th	1.7%	5 th	1.2%	6 th	1.3%	6 th	0.5%	9 th	-	-	-	-
Germany	-	-	-	-	1.3%	8 th	-	-	-	-	0.7%	9 th	-	-	-	-	-	-	-	-
Greece	-	-	-	-	-	-	1.04%	6 th	0.8%	10 th	-	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	0.86%	8 th	-	-	-	-	-	-	-	-	-	-	-	-
China	-	-	-	-	-	-	0.58%	10 th	1.1%	6 th	-	-	-	-	1.6%	5 th	-	-	3.1%	4 th
*Ghana	-	-	-	-	-	-	-	-	-	-	-	-	0.7%	10 th	0.6%	8 th	0.7%	5 th	0.7	8 th
Malaysia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7%	5 th	0.8%	6 th
Cameroon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6%	9 th	0.6%	9 th

Source: IC3 2001 - 2010 Internet Fraud Reports/Internet Crime Reports (January 1, 2001 to December 31, 2010) prepared by the National White Collar Crime Center (NW3C) and the Federal Bureau of Investigation (FBI). From 2011 to 2019, the NW3C and FBI did not make public the data on top countries perpetrators.

* The annual ranking of Nigeria in percentage (%).

Finally, the gender dimensions of crimes committed in the cyberspace, relationship between parental occupation and students' involvement in cybercrimes, and the impact that crimes committed in the cyberspace have on the academic pursuit of secondary school students were presented.

Literature Review

Criminal Activities in the Cyberspace

The Internet is used in several countries of the world. According to Leiner et al. (2003) the Internet started with early research in packet switching, thereafter, different stakeholders in government, industry, and academia partnered in the evolution, and deployment of this fourth revolution in education (Ige, 2018; Ige, 2012). The ubiquitous influence of the Internet has led to its use by all and sundry especially in schools, governmental, and non-governmental organizations. These have made the Internet a global repository of information that is relevant to virtually all human discourse. Death (2017) opined that the valuable information that is available in the cyberspace would make such a hub a target for criminals. In addition, Death (2017) states that unlike the conventional robberies that are committed by breaking into a building, and sifting through valuable items, cyber criminals can attack their victims from afar due to the nature of the Internet. This phenomenon is called 'anonymity', it enables an individual to put up a status that in the cyberspace would prevent other users from recognizing such a person (Ige, 2018; Ige, 2013; Ige, 2012; Jaishankar, 2008).

Amosun and Ige (2009) defined crimes committed in the cyberspace as illegal conduct of using computers, electronic, and other ancillary devices to gain unauthorized access, interfere with systems, incept data, distribute malware, and sabotage networks. The evolution of the cyberspace as a new locus of criminal activities might relate to Marshall and Clarkson's (2008) position on the rapid growth of Internet in capacity and unhindered access to it at different points across the globe. A study, Ige (2008) found that the use of another's person's name and social security number to purchase goods and services was the most perpetrated crime by schoolchildren in the cyberspace. Several studies have also reported that lawless activities such as identity theft, phishing, confidence fraud, espionage, kidnapping children via Internet chat rooms, terrorism, creation and distribution of viruses, auction fraud, child pornography, and business fraud are carried out in the cyberspace (Adepoju, 2009; Adu & Ige, 2016; Amosun & Ige, 2009; Amosun, Ige, & Choo, 2015; Ige, 2012; Ige, 2018).

For instance, Adepoju (2009) found that credit card fraud was the most committed crime in the cyberspace among university students. Ige (2013) inferred from the findings of Adepoju (2009) that those defrauded by the selected university students in the cyberspace were nationals of the first world since the credit card facility was relatively new to the Nigerian financial landscape at the time. This inference by Ige (2013) confirmed the assertion of Hidayah Ab Rahman and Choo (2015) that the endemic connectivity of systems used in global societies are vectors that can be used by people with ill-natured intent which ranged from cyber criminals to organized groups of financially-and ideologically-motivated crime groups to state sponsored actors.

Theoretical Framework

Space Transition Theory

The Space Transition Theory (STT) was propounded by Karuppanan Jaishankar in 2008. Jaishankar (2008) highlighted the need to evolve a distinct theory that explains the phenomenon of cybercrimes, and consequently the emergence of STT. However, in this study, the perceptions of crimes committed in the cyberspace would be explained from the

third and fifth standpoints of STT because the second and fifth standpoints of STT have been found to effectively explain the incidences of cybercrimes among schoolchildren in Nigeria (Ige, 2018). The third postulate of STT posits that ‘criminal behaviour of offenders in the cyberspace is likely to be imported to physical space which might be exported to cyberspace as well. The fifth standpoint of the STT advances that ‘strangers are likely to unite in cyberspace to commit crime in the physical space’ and ‘associates of physical space are likely to unite to commit crime in cyberspace’.

The second standpoint states that schoolchildren could be bring their repressed behavioural deviations to bear on their interactions with other users in the cyberspace. These behavioural deviation are suppressed by school rules and regulations and moderated by presence of teachers during school time who act in loco parentis. The formation of association of cyber-scammers by some school children in developing countries validates Jaishankar (2008)’s claim. The implication of Jaishankar (2008)’s fifth standpoint is that schoolchildren that are new to each other could collaborate to commit a crime in the cyberspace they cannot commit on school premises. Schoolchildren that are also friends could come together to perpetrate acts that are sacrilegious in the cyberspace because there are no law enforcement agents to prevent such an occurrence. A good instance is Todd Loik (15-year-old), whom Ige (2019) reported he committed suicide in Canada on 8 September 2013 because previous playground bullies were transferred into the cyberspace (The Canadian Press, January 25, 2015). The STT is relevant to this discourse because it gives an outline of the involvement of school children in a pragmatic way and described how students could import their non-conforming behaviours in the physical space to online communities especially in the developing nations. The implication of STT for the current study is that children could perpetrate acts that are punishable in their schools in the cyberspace because their school rules and regulation are not operational in such a space, and capable guardians such as teachers are absence.

Hypotheses

1. There is no significant difference in the academic performance of secondary school students that engaged in crimes committed in the cyberspace and those students that do not.
2. There is no significant difference in male and female secondary school students’ involvement in crimes committed in the cyberspace.
3. There is no significant relationship between students’ parents’ occupation and their involvement in crimes committed in the cyberspace.

Method

The design employed in the study was a descriptive survey research design. The participants of this study comprised all the in-school age students in Ondo and Oyo states. These in-school age children are schooling in secondary schools in Ondo and Oyo states. It was from these in-school age children that the researcher purposefully selected 470 male and 460 female senior secondary school students in Ondo and Oyo states in Nigeria. The sample was taken from four local government areas in Ondo and five local governments in Oyo states. Ondo state has eighteen local governments while Oyo state has thirty-three local governments. The metropolitan schools in the nine local governments in Ondo and Oyo State were purposely selected because of the availability of Internet services in these metropolises. The in-school age children were purposefully selected for the study because their schools were willing to participate in the study, and in urban areas where the incidences of cybercrimes were rife.

A Students' Questionnaire on Cybercrimes (SQC), was used to elicit responses on all known cybercrimes outlined in the cybercrime reports published by the Federal Bureau of Investigation and National White Collar Crime Center from 2001 to 2018. The total reliability coefficient of the scale was $r=0.70$, the 'SQCC' had 69 items. The second instrument used was a 40-item achievement test selected from the questions developed by the Ministry of Education in Ondo State for the Junior Secondary Examinations in Social Studies. The 40-item selected by the researcher were vetted by academics at the then Department of Teacher Education (Now Department of Arts and Social Science Education) at University of Ibadan in Nigeria before it was administered to evaluate the academic performance of the students.

Research Results

The study explored the secondary school students' involvement in cybercrimes and its effect on their academic achievement. The study further elicited responses on male and female in-school age children of the gender most involved in cybercrimes and evaluated whether parents' occupation have a relationship with the involvement of in-school aged children in cybercrimes.

Hypothesis 1: There is no significant difference in the academic performance of secondary school students that engaged in crimes committed in the cyberspace and those students that do not.

Table 2: Influence of Crimes Committed in the Cyberspace on Students' Academic Achievement

	N	Mean	Standard Deviation	T	Df	Sig (p)	Remark
Students not involved in Cybercrimes (No)	148	8.49	3.55	-0.651	924	.515	Not Significant
Students not involved in Cybercrimes (Yes)	778	8.71	3.82				

* $t = -0.651$ Df = 924 ** $P > .5$

Table 2 shows that there is no significant difference in the academic performance of students that engage in cybercrimes and those students that do not ($t = -0.651$; $df = 924$, $P > .5$). The results show that school-age children now perpetrate cybercrimes as against the general views that only post-secondary school students engage in cybercrime (The Saturday Punch, 2005).

Hypothesis 2: There is no significant difference in male and female secondary school students' involvement in crimes committed in the cyberspace.

Table 3: T-test difference of students' perceptions of Male and Female involvement in cybercrimes

Gender	N	Mean	Standard Deviation	T	Df	Sig (p)	Remark
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Male	470	48.90	6.86				
Female	460	43.64	7.07	-4.609	928	.008	Significant

* $t = -4.609$ * $df = 928$, * $P < .05$

Table 3 shows that there is a significant difference between male and female involvement in cybercrimes ($t = -4.609$, $df = 928$, $P > .05$). The male students engaged more in cybercrimes ($X_M = 48.90$) than the female students ($X_F = 43.64$).

Hypothesis 3: There is no significant relationship between students' parents' occupation and their involvement in crimes committed in the cyberspace.

Table 4: Parents' Occupations and Senior Secondary School Students Involvement in Cybercrimes

Parents' Occupation	N	Mean	Standard Deviation	R	Sig (P)	Remark
High income occupations	930	43.27	6.97	0.037	.260	Not significant
Low income occupations		4.40	1.14			

* $r = 0.037$ ** $P > 0.05$

Table 4 shows the correlation between parents' occupation and Senior Secondary School Students involvement in cybercrimes. The result shows that there is no significant relationship between students' parents' occupation and their involvement in cybercrimes ($r = 0.037$; $P > .05$).

Discussion

The results of this study showed that there is no significant difference in the academic achievement of senior secondary school students that engaged in cybercrime and those that do not ($t = -0.651$, $df = 924$, $P > .5$). The use of internet chat websites to scam individuals that have no personal relationship with the scammers requires a high level of cognition, therefore, the students that engage in cybercrime will always use their higher intellectual scamming ability to be at par with their colleagues who put up regular attendance in classes. Also, some of the students used in the study claimed that some of their colleagues used their scamming skills to hack into protected academic resources on the internet, and order current textbooks without paying on the internet. The results of the T-test showed that male involvement in cybercrime is higher than the female involvement from the sample selected for this study. The emerging results might not be unconnected in the unreasonable freedom that males enjoyed more than females in the Nigerian society. Despite the anonymity afforded by the internet to users, the internet crime reports of years 2001 to 2010 showed that males involved more in cybercrimes than females at global level. Also, males lost more money than females due to cybercrimes (IC3, 2011).

The results showed that there is no significant relationship between parents' occupation and senior secondary school students' involvement in cybercrime ($r = 0.037$, $P > .05$). The students claimed that poor students whose parents cannot afford to pay the private internet service providers usually make use of the commercial cybercafes at a cheap rate, thus bridging the

advantage that students from wealthy parental background might have on the students from poor socio-economic backgrounds. As good as these results are, it is difficult to corroborate the results obtained in this study with previous research works on cybercrime because of the technical nature of research published on cybercrimes and cybersecurity. Most research on cybercrimes are in the field of Computer Science, Informatics, or Information Science, the closest research to the foci of this study is the impact of social of students' learning outcomes which does have the same meaning as cybercrimes. For instance, Rithika and Selvaraj (2013) researched on the impact of social media on students' academic performance to ascertain if the use of social networking websites such as Facebook, Twitter, and Orkut diverted students from their academic pursuit. Unfortunately, Rithika and Selvaraj (2013)'s study is not related to the current study and as such it could not be used to compare the results obtained in this study.

Conclusion and Recommendation

The findings of this research show sign of future success for cybercrime prevention in school ecologies experiencing cybercrimes. It is evident from this research that non-formal cybercrime prevention programmes in countries vulnerable to cybercrimes should target male students consequent on their involvement in cybercrimes than female school-age children. The outcome of this research has shown that school-age children from both poor and rich families could commit crimes in the cyberspace. It is recommended from the findings of this research that teachers in secondary schools in developing countries should inculcate appropriate cyber citizenship skills through school-based counselling services in school-age children. These counselling supports would enable school-age children to realise that non-conforming behaviours in the cyberspace are criminal in any nation of the world. This research also has implications for school-based cybercrime prevention as it has projected identity theft and scamming as cybercrimes that teachers should tackle in the school ecologies.

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IMPACT OF FRIENDSHIP SKILLS ON ACADEMIC PERFORMANCE OF STUDENTS WITH INTELLECTUAL DISABILITIES IN ILORIN METROPOLIS

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Abstract

This study investigated the impact of friendship skills on academic performance of students with intellectual disabilities in Ilorin metropolis, Kwara State. Descriptive survey research design was used. Four special education needs schools within Ilorin metropolis were purposively selected for this study. A total number of 60 students identified with intellectual disabilities participated in the study. A ten item questionnaire tagged “ “Questionnaire on Friendship Skills of Students with Intellectual Disability (QFSID)” was developed by the researcher to elicit responses from the students on their friendship skills. The QFSID was pilot-tested and reliability coefficient of 0.81 was obtained. An Academic Performance Tests (APT) designed by the researcher was also used to assess participants’ academic performance in both literacy and numeracy skills. The data gathered was analyzed using regression analysis, t-test, percentages, frequency, mean and standard deviation. Findings revealed that the level of friendship skills among students with intellectual disabilities was moderate. However, friendship skill had significant influence on academic performance of students with intellectual disability. This means that, friendship skills had impact on academic performance of students with intellectual disabilities in Ilorin metropolis. The study recommended that, special needs schools should incorporate friendship skills training into routine teaching of students with intellectual disabilities in order to maintain and improve on their current level of friendship skills for improved academic performance.

Keywords: Intellectual Disabilities, Friendship skills, Academic Performance.

Introduction

School is a social institution with the responsibility of developing children or learners in all aspects of life. As a social setting, the school consists of various interpersonal relationships such as students to teachers, teachers to teachers, students to students and so on. In the school systems, academic skills are acquired as well as social skills. One factor that school systems often fail to take into account is the impact of friendship skills on academic performance of students with intellectual disabilities. Intellectual disability is a condition described by significant limits in both intellectual functioning and in adaptive behaviour, which covers many everyday social and practical adaptive skills. Generally, intellectual disability varies in degrees and severity. The condition varies along a continuum from mild to profound (Ugbo, 2017). These include mild, moderate, severe and profound (American Psychiatric Association [APA], 2013). These categories are based on the functioning level or the intelligent quotient (IQ) of an individual.

Friendship on the other hand is a state of being emotionally attached to another person, resulting from feeling of affection. Larry (2015) defined friendship as two or more people who enjoy each other’s company. However, friendship skill refers to a set of social skills which enable individuals to initiate and maintain good interpersonal relationship with one another. Students with intellectual disability have difficult time making friends because they cannot interact effectively through conversations as typically developing students do. Students with friendship skills deficits such as students with intellectual disability might be at a disadvantage to benefit from sharing educational information among their counterparts.

This shows that the presence or absence of friendship skills might have positive or negative impact on the academic performance of students with intellectual disability. According to Kristy (2004), friendship has significant benefits for academic environment. This means that, poor friendship skills could lead to poor academic performance of students with intellectual disabilities. Students with intellectual disabilities need to acquire friendship skills to enhance their academic performance. Friendships skills therefore, become an important focus of this study as a predictor of change in academic performance of students with intellectual disabilities in special education needs schools. Thus, this study investigated the impact of friendship skills on academic performance of students with intellectual disabilities in Ilorin metropolis, Kwara State, Nigeria.

Research findings tend to suggest that gender variations exist in friendship skills between male and female students generally. For instance, Andrew (2011) also noted that male students reported lower-quality friendship than females. Mjaavatn, Frostad, & Pijl, (2016) averred that there are significant gender differences in friendship skills of students with disabilities. This gender gap raises serious questions because there is no agreement in the literature as to which gender is more affected with friendship skill deficits among students with intellectual disability. It is against this background information that this study is based.

Many students with intellectual disabilities experience problems related to their friendship skills deficits and are at risk for academic underachievement, social exclusion, school drop-out, peer rejection, social ostracism, vulnerability, friendlessness, bullying, sexual exploitation and depression among others especially in Ilorin metropolis, Kwara State, Nigeria. In spite of the various social skills interventions, most students with intellectual disabilities in Ilorin metropolis perform woefully in academic performance tests. This is an indication that occasional efforts made so far by NGOs might not be enough to improve friendship skills acquisition of students with intellectual disabilities in Ilorin metropolis. This is because social skills training and interventions are not incorporated into routine teaching as an integral part of school curriculum for students with intellectual disabilities. This tends to be the case because the school authorities might not be aware of the influence of friendship skills acquisition on academic performance of students with intellectual disabilities in Ilorin metropolis.

Numerous studies have been conducted on social skills and academic performance but none of these studies specifically investigated the impact of friendship skills on academic performance of students with intellectual disabilities in Ilorin metropolis. In light of this problem, this research study was designed to investigate this.

Research Question

1. What is the level of friendship skills of students with intellectual disability in Ilorin Metropolis?

Hypotheses

The following null hypotheses were tested:

H₀₁: Friendship skills have no significant influence on academic performance of students with intellectual disability in Ilorin metropolis.

H₀₂: There is no significant difference between friendship skills of male and female students with intellectual disabilities in Ilorin metropolis.

Concept of Intellectual Disabilities

According to Dada (2015), AAIDD had earlier defined Intellectual disabilities as a condition characterized by significantly sub-average general intellectual functioning existing concurrently with related limitations in two or more of the following applicable adaptive skills areas: communication, self-care, home living, social skills, self-direction, health and safety, functional academics, leisure and work. Adaptive functioning refers to the skills needed to live in an independent and responsible manner, including communication, social skills such as friendship skills, and self-help skills such as getting dressed, feeding, money management, and shopping. Intellectual disability significantly reduce the ability to understand new or complex information, learn new skills and to cope independently including social functioning (Australian Disability Clearinghouse on Education and Training [ADCET], 2017).

Generally, intellectual disability varies in degrees and severity. The condition varies along a continuum from mild to profound (Ugbo, 2017). These include mild, moderate, severe and profound (APA, 2013). These categories are based on the functioning level or the intelligent quotient (IQ) of an individual. They may master very basic self-care skills and some friendship skills. Dada (2015) elucidated that individuals with moderate intellectual disabilities may lack self-help skills but is capable of acquiring survival skills that will enhance their independence within the environment. Such survival skills according to her include feeding, toilet training, dressing, personal hygiene and functional academics. Persons with severe and profound intellectual disabilities may lack basic self-help and survival skills. They will remain dependent on others for every day needs and they are not capable of learning functional academics.

Dada (2015) averred that persons with intellectual disabilities are prone to a variety of social problems. They often have problems in making and keeping friends for at least two reasons: first, many do not seem to know how to strike up social interactions with others and this difference is noticeable before they enter school. Secondly, even when they do make attempt to interact with others, they may exhibit behaviours that put off their peers. For instance, they may be eating and drooling at the same time. This type of behaviour according to her can put off other children. Students with intellectual disability have difficult time making friends because they cannot interact effectively through conversations as typically developing students do. They are also at risk for social problems in other areas (Greenwood, Walker & Utley, 2002).

Concept of Friendship Skills

Friendship is a state of being emotionally attached to another person, resulting from feeling of affection. According to Action Health Incorporated [AHI] (2003), friendship is a warm and intimate relationship with someone you like and trust. Steven (2011) defined friendship as a dyadic relationship with certain properties such as mutual attachment, commitment, and special concern for one another's welfare. Larry (2015) defined friendship as two or more people who enjoy each other's company. Friendship Skills therefore refers to a set of behaviours which enable individuals to initiate and maintain good interpersonal relationship with his or her counterparts within a social context. Friendship skills include establishing good interpersonal relationship with others through good communication skills, finding friends, maintaining good friendship, cooperating with others and being active in social activities. These skills are low in students with intellectual disability (Hashemian & Mohammadi, 2015).

According to Action Health Incorporated (2003), friendship skills include initiation skills such as manner of approach, appearance, communication; sustenance skills such as honesty, patience, interest, warmth, understanding, trust, and tolerance and termination skills such as negotiation and clarification. These skills are essential to everyone and must be applied as the state of relationship demands.

The Importance of Friendship Skills to Students with Intellectual Disabilities

The importance of friendship skills to students with intellectual disabilities cannot be overemphasized. In addition to improved academic performance of students with intellectual disabilities, Larry (2015) averred that actively maintaining social ties to the community can lead to enhanced job opportunities, expanded networks, community protection, and social skill development. Friendships are important for social, communicative, and affective development in students (Goldstein & Morgan, 2002). Friendship skills form the backbone of personal and professional or academic success. It helps to navigate such everyday interactions such as exchanging greetings and holding conversations, starting friendships and maintaining them, and asking for help and instructing others (Steadly, Schwartz, Michael & Stephen, 2008). Friends help each other to solve problems (Goldstein & Morgan, 2002). According to Krata (2012), friendship also promotes confidence, gives a sense of identity, teaches loyalty, stability, boosts happiness, reduces stress and increases excitement.

According to Kristy (2004), friendship has significant benefits for academic environment. Previous research also supports the hypothesis that friends' academic achievement plays a positive role in the context of middle school students' academic achievement. For instance, students may learn effective study skills by observing and imitating the study habits of their high-achieving friends; they may also have privileged access to valuable academic support. Also, the learning processes that take place when a student is collaborating with a high-achieving friend on an academic task may be particularly efficient if their interactions are more engaging and stimulating than they would be with average-achieving peers.

Conversely, persons with intellectual disability continue to live in a distinct social space (Clement & Bigby, 2009) with a critical boundary operating between themselves and others (Amado, 2014). Their social networks are small and often restricted to families and peers with disabilities (Christine & Diane, 2017). However, Futterman (2016) averred that having a good friends have effects on a student's school performance. He explained further that students tend to have better attitudes about school and learning when they have their good friends around. Greenwood, Walker & Utley (2002) asserted that the school environment, characterized by interactions with peers and teachers, and social development of the students have a strong influence on their academic achievement.

Students with friendship skills deficits such as students with intellectual disability might be at disadvantage to benefit from sharing educational information among their counterparts. This shows that the presence or absence of friendship skills might have positive or negative influence on the academic performance of students with intellectual disability. Hence, poor friendship skills could lead to poor academic performance of students with intellectual disability. Friendships skills therefore become an important focus of this study as a predictor of change in academic performance of students with intellectual disabilities in school.

Methodology

Research Design

Descriptive survey approach was used for this study. A descriptive survey is a study aimed at collecting data, analyze them and describe in a systematic manner the characteristics, features or facts about a given population (National Open University Nigeria [NOUN], 2012). This method was used as it is found to be applicable to this study.

Sample and Sampling Procedure

Sample consisted of sixty (60) students with intellectual disabilities in four schools for special needs students in Ilorin metropolis, Kwara State, Nigeria. Purposive sampling technique was used to select 60 students with intellectual disability from special schools within Ilorin metropolis. According to NOUN (2012), purposive sampling is a sampling technique necessitated when the researcher is interested in certain specified characteristics. It ensures that only those that meet such required purpose, attributes or characteristics are selected. This sampling technique was used because only those students identified with intellectual disability participated in the study.

Instruments

A questionnaire tagged “Questionnaire on Friendship Skills of Students with Intellectual Disability (QFSID)” which was designed by the researcher to elicit the required information from the respondents on the levels of friendship skills among Students with Intellectual Disability in Ilorin metropolis. The instrument was divided into two sections – A and B. Section ‘A’ focuses on demographic data of respondents while section ‘B’ contains items on friendship skills of students with intellectual disabilities. The items were designed on a 4 point Likert rating scale, ranging from 4 to 1 as follows: High level (HL) is 4 points, moderate level (ML) is 3 points, low level (LL) is 2 points and very low level (VLL) is 1 point. The QFSID was pilot-tested and reliability coefficient of 0.81 was obtained. The researcher also designed Academic Performance Tests (APT) to gather information on literacy and numeracy skills of students with intellectual disability so as to assess their academic performance. Content validity of the instrument was achieved using the judgment of experts in test and measurement, English language and Mathematics and in special education (Intellectual and Developmental Disabilities) in the department of Special Education, Kwara State University, Malete, respectively.

Procedure for Data Collection and Ethical Consideration

A letter of introduction was submitted to the schools seeking permission to conduct the research. After getting the permission, the researcher explained the importance of the study to the teachers and later administered the questionnaire to students with intellectual disabilities in conjunction with their teachers who were trained as research assistance on how to administer the questionnaire. The researcher made friends and played with the respondents to establish good rapport with the students and ensure self-disclosure. Packets of shortcakes with pure water sachets were also distributed to the respondents with the permission of the school authorities so as to gain their full cooperation and participation.

Method of Data Analysis

The data gathered were analyzed using percentage, frequency, t-test, mean, standard deviation and regression analysis. The decision rule for the interpretation of the results of the data analysed was a mean score of 2.5 and above which was considered as a positive response (moderate level), and less than 2.5 was considered as a negative response (low level). The calculated probability (p-value) that was greater than the significance level of 0.05

was not rejected while the p-value that was less than the significance level of 0.05 was rejected. However, all null hypotheses were tested at 0.05 level of significance.

Result of findings

Research Question 1: What is the level of friendship skills of students with intellectual disabilities in Ilorin metropolis?

Table 1: Analysis of level of friendship skill of students with intellectual disabilities.

S/N	Item	HL	ML	LL	VLL	MEAN
2	I feel left out of activities	22(36.7%)	30(50%)	5(18.3%)	3(5%)	3.2
3	There is nobody I can go to when I need help	8(13.3%)	48(80%)	4(6.7%)	-	3.1
4	I do not get along with other students	3(5%)	48(80%)	7(11.7%)	2(3.3%)	2.9
5	I cooperate with other students	18(30%)	38(63.3%)	4(6.7%)	-	3.2
6	I am liked by students in my class	39(65%)	17(28.3%)	4(6.7%)	-	3.6
7	It is easy for me to make new friends at school	17(28.3%)	19(31.7%)	16(26.7%)	4(6.7%)	2.8
8	I am good at working with other students	32(53.3%)	18(30%)	9(15%)	1(1.7%)	3.4
9	I have nobody to talk to	5(8.3%)	18(30%)	27(45%)	10(16.7%)	3.3
10	It is hard for me to make friends	6(10%)	21(35%)	18(30%)	15(25%)	2.8
11	I have lots of friends	19(31.7%)	23(38.3%)	10(16.7%)	8(13.3%)	3.6
	Weighted Average					3.1

Table 1 revealed that students with intellectual disabilities agreed that they felt left out of activities (3.2). They also agreed that there is nobody they can go to when they need help (3.1). They agreed that they do not get along with other students (2.9). Furthermore, they agreed that they cooperate with other students (3.2). They also agreed that they are liked by other students in their classes (3.6). They agreed that it is easy for them to make new friends at school (2.8). They also agreed that they are good at working with other students (3.4). More so, they agreed that they have nobody to talk to (3.3). They also agreed that it is hard for them to make friends (2.8). They agreed that they have lots of friends. The overall weighted average mean was 3.1 which indicated that the calculated mean (3.1) is greater than the fixed mean (2.5). This shows that the level of friendship skills of students with intellectual disabilities in Ilorin metropolis was moderate, that is, they make friend very well with their peers and non-disabled peers.

H₀₁: Friendship skills have no significant impact on academic performance of students with intellectual disability in Ilorin metropolis.

Table 2: Analysis of the impact of friendship skill on academic performance of students with intellectual disabilities.

Variables	n	Mean	Std. Deviation	R_{cal}	R^2	Adjusted R Square	f	Sig	Decision
Friendship skills	60	23.20	3.32	0.46	0.21	0.20	15.40	0.01	Sig
Academic performance	60	13.92	3.52						

Table 2 showed the analysis of the significant impact of friendship skill on academic performance of students with intellectual disabilities. It was revealed that friendship skill had mean score of 23.20 and standard deviation of 3.32 while academic performance of students with intellectual disability had mean score of 13.92 and standard deviation of 3.52, r_{cal} was 0.46, R^2 was 0.21, adjusted $R = 0.20$, F was 15.40 and significant 0.01 ($r_{cal} = 0.46$, $R^2 = 0.21$, adjusted $R = 0.20$, $F = 15.40$, $P < 0.05$). The p-value of 0.01 is less than the 0.05 level of significance. This implied that friendship skill had significant influence on academic performance of students with intellectual disability. Therefore, the null hypothesis which stated that friendship skill has no significant influence on the academic performance of students with intellectual disability was rejected.

H_{02} : There is no significant difference between friendship skills of male and female students with intellectual disabilities in Ilorin metropolis.

Table 3: Analysis of the significant difference between friendship of male and female students with intellectual disabilities

Variable	Gender	N	Mean	Std. Deviation	T cal	Df	Sig	Decision
	Male	30	22.93	3.33				
Friendship skills	Female	30	23.47	3.34	0.62	58	0.54	Not Sig

Table 3 showed the analysis of the significant difference between friendship skills of male and female students with intellectual disabilities. It was revealed that male students had mean score 22.93 and standard deviation 3.33 while female students had mean 23.47 and standard deviation 3.34. The t-cal was 0.62, degree of freedom was 58 with significant level of 0.54 ($P > 0.05$). The p-value of 0.54 is greater than 0.05 level of significance. This implied that there was no significant difference between friendship skills of male and female of students with intellectual disabilities. This implied that attitude of male and female of students with intellectual disabilities do not differ. Therefore, the null hypothesis that stated that there is no significant difference between friendship skills of male and female students with intellectual disability in Ilorin metropolis was not rejected.

Discussion of Findings

The study revealed that the level of friendship skills of students with intellectual disabilities in Ilorin metropolis was moderate, that is, they make friend very well with their peers and non-disabled peers. This contradicts the findings of Tipton, Christensen, and Blacher (2013)

who discovered that adolescents with intellectual disability (ID) had friendships characterized by significantly lower levels of warmth/closeness and positive reciprocity than their typically developing peers. Students with intellectual disability make friends very well with their peers and non-disabled peers in Ilorin metropolis. However, the types and characteristics of the friendships should be considered because the types of friendship kept by students may have positive or negative influence on their academic performance. Véronneau and Dishion (2011) stated that students with academically engaged friends achieved to levels higher than expected. Futterman (2016) also stressed that having a good friend would have effects on a student's school performance.

The study showed that friendship skills had significant impact on the academic performance of students with intellectual disability in Ilorin metropolis. This agreed with the findings of Véronneau and Dishion (2011) who discovered that students with academically engaged friends achieved to levels higher than expected. It also corroborate with Futterman (2016) who stressed that having a good friend have effects on a student's school performance. The finding also complemented the finding of Kristy (2004) which stated that friendship had significant benefits for academic environment.

Study also revealed that there was no significant difference between friendship skills of male and female students with intellectual disability in Ilorin metropolis. This finding did not corroborate with Andrew (2011) who noted that male students in his study reported a lower-quality friendship than female. The finding also did not agree with Mjaavatn, Frostad, and Pijl, (2016) who found significant gender differences in friendship skills of students with disabilities. Friendship skill deficits affect male and female students with intellectual disabilities in Ilorin metropolis the same way.

Conclusion

However, it has been observed that the level of friendship skills of students with intellectual disabilities in Ilorin metropolis was moderate and had positive impact on their academic performance. This could be as a result of friendship skills training received from the NGOs occasionally. Therefore, friendship skills training should not be left to NGOs alone as an occasional intervention. Hence, friendship skills should be developed and incorporated into routine teaching of students with intellectual disabilities as an integral part of the school curriculum.

Recommendations

It is therefore recommended that schools should incorporate friendship skills training into routine teaching of students with intellectual disabilities so as to maintain and improve on their current level of friendship skills for improved academic performance. Students with intellectual disability should be encouraged to make and keep good friends who are academically interested and engaged. Advocacy should be put in place to change the attitudes of peers towards their intellectually disabled counterparts with good understanding.

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STUDENT SUPPORT TOWARDS RETHINKING TEACHING AND LEARNING IN THE 21ST CENTURY: A COLLABORATIVE APPROACH INVOLVING E-TUTORS

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Abstract

Institutions offering Open Distance e-Learning (ODeL) are increasing support levels to e-tutors, by providing them with educational technologies and opportunities to select those that they feel most comfortable in using towards facilitating e-learning. Management systems are further empowering e-tutors towards collaborating with students learning at a distance. This paper explored the collaborative learning approach employed in Computer Integration in the Classroom (FDEME3L) offered at an ODeL institution. The Collaborative Learning Environment (CLE) was viewed through the lens of Vygotsky's social constructivist theory. The research approach was qualitative, with a case study design. The target population was seven purposively sampled e-tutors. Data was gathered using unstructured interviews, non-participant observation and document analysis, and analysed using a procedure suggested by Creswell. The research questions were: What are FDEME3L e-tutors' perceptions of the CLE? and How do e-tutors interact with students in such a learning environment? Findings revealed limited interaction between e-tutors and students in the CLE. The participants indicated a need for training in how to motivate and engage students in a CLE. It is recommended that e-tutors receive training, ensuring that they do not focus solely on how to interact with students using a particular platform, but also on developing a scholarly approach towards involving students.

INTRODUCTION

The use of Information and Communication Technologies (ICTs) at institutions offering Open Distance e-Learning (ODeL) to facilitate teaching and learning (Libbrecht & Goosen, 2015) had evolved significantly recently (Wiid, Cant, & Nell, 2013). Such technologies provide innovative opportunities for students towards interacting with their instructors and fellow students to acquire the knowledge and skills with regard to their studies (García-Valcárcel, Basilotta, & López, 2014). Student support through ICTs for courses in ODeL environments (Goosen & Van Heerden, 2019) is needed to motivate them towards focusing on e-learning - they gain considerably from interacting with both their lecturers, as well as fellow students (Thomson, 2014). Such interactions also foster collaboration as important skill, towards sharing information.

Using the internet makes it possible to apply various educational technologies and techniques towards sustainable and inclusive ODeL practices and maximise quality independent learning (Garrison, 2009) informed through research (Goosen, 2018a). Educational technologies drive change in the presentation of collaborative learning experiences in this new transformed education system (García-Valcárcel et al., 2014). Students' perceptions of a collaborative learning approach, social presence and their satisfaction are dependent on relationships as critical factors (So & Brush, 2008), encouraging them towards viewing such a learning environment from a different perspective and providing them with opportunities to practise "characteristics with regard to utilising ICTs to enhance social" presence, collaborative and leadership skills (Goosen & Van der Merwe, 2015, p. 127). Students in a collaborative learning context assume a more active role than in a traditional instruction setting.

Moreover, in the 21st century, students are better informed as a result of their learning experiences, when education is supported by technology (Wiid et al., 2013). García-Valcárcel et al. (2014) pointed out that 21st century presentation of content offers students greater freedom to expand their thinking potentiality. This so-called 'Net Generation' shows "a preference for working collaboratively" (Goosen & Naidoo, 2013, p. 247), and collaborative virtual learning contexts generate learning environments that meet their objectives. Using educational technologies and the internet is offering considerable advantages for presenting a collaborative learning experience.

Collaborative and interactive assistive technology learning environments are evolving as ODeL institutions begin to take advantage of the unique features offered in virtual world spaces that make it possible to record and map the flow of ideas (Goosen, 2019c). Groups of students will potentially benefit from collaborative thinking as they learn to mobilise energy and actions for the achievement of common goals. Specifically, they will rely on an accumulative intelligence that is greater than the sum of their individual talents (García-Valcárcel et al., 2014).

ODeL can be a lonely experience for students, who may feel isolated and unsupported. The use of technology has bridged this gap and makes it possible to extend support to students in the form of collaboration and communication technologies, as well as student tracking and maintenance on their learning environments (Goosen & Van Heerden, 2017). The University of South Africa (UNISA), as an ODeL institution, relies on the collaborative learning context, as students have the opportunity to further their studies in different places and at different times (UNISA Learner Support, 2016). The institution is pursuing a shift from open distance learning to open distance e-learning and has extended student support through the appointment of e-tutors.

According to Goosen and Mukasa-Lwanga (2017a, p. 43) (quoting Van Schoor), the "UNISA definition of open distance education details it as" consisting of multi-dimensional concepts, with the aim of bridging "distances between students and their university, academics, courseware and peers regarding time, geography, economics and communication". Open and distance e-learning is focused on the removal of barriers to accessing "e-learning, flexibility of e-learning provision, student centeredness, supporting students and constructing e-learning programs with the expectation that students can succeed" (Goosen & Mukasa-Lwanga, 2017b, p. 21).

The explanation of e-learning by the South African White Paper on e-Education (Department of Education, 2004) highlighted "tool(s) and communication aspects, by "envisioning ICTs as communication and collaborative tools for" e-learners, teachers and managers "to contribute to development" (Goosen, 2018a, p. 217; Goosen & Van der Merwe, 2015, p. 128).

With the above definitions as basis, in 2013, UNISA therefore implemented an e-tutoring model for the provision of student support (Abdullah & Mtsweni, 2014). The institution uses the *myUNISA* learning management system as a platform for collaboration between lecturers, e-tutors and students by means of a range of educational technologies. The technologies on the platform facilitate communication between students, e-tutors, lecturers and administrative staff. *myUNISA* can be accessed from any location at any time when the need arises.

UNISA also appointed e-tutors to drive the e-learning process. e-Tutors are required to communicate with students exclusively via *myUNISA* and expected to monitor students' self-paced learning (Pitsoane, Mahlo, & Lethole, 2015). They do this by providing clarity regarding difficult concepts and "instructional guidance, encouraging collaborative learning and strengthening students' self-efficacy" (Goosen & Van Heerden, 2018, p. 7) through

student support activities to fit a diversity of contexts, as well as collaborative self-directed learning (Goosen & Van Heerden, 2019), to generally enrich students' experiences (UNISA Learner Support, 2016).

In light of the preceding discussion, the **purpose** of the research reported on in this paper was to explore the collaborative learning approach employed in Computer Integration in the Classroom (FDEME3L) offered at an ODeL institution, with the **research questions** being:

- What are FDEME3L e-tutors' perceptions of the CLE? and
- How do e-tutors interact with students in such a learning environment?

THEORETICAL FRAMEWORK

The social constructivist theory of Vygotsky (1978) was the lens through which the collaborative learning experience of students enrolled for the course Computer Integration in the Classroom (FDEME3L) at UNISA was viewed. Social constructivist theory was considered suitable for the study, because it emphasises the sharing of knowledge and the assistance rendered by knowledge experts. Social constructivism considers the construction of knowledge through learning as a group and being given the chance to reflect on what has been learnt (Educational Broadcasting Corporation, 2004). Vygotsky (1978) favoured having students work as a group to share different ideas, as "such collaborative learning also facilitates clarifying ideas, providing access to peer-feedback" (Goosen, 2019b, p. 133). As proposed by Dewey (1910), any hypothesi/(e)s that they come up with as a result of collaboration could then "be tested through the execution and/or implementation of certain actions" and interventions (Goosen, 2018b, p. 101), after which they can concur and arrive at a much deeper understanding of an activity (Gunter & Gunter, 2015).

Collaborative learning is rooted in the idea from Vygotsky (1978) of the zone of proximal development, which emphasises that knowledge and learning developed through interaction with other people/learners, rather than as an individual (Gunter & Gunter, 2015). As learners interact, they construct knowledge for themselves as learning unfolds. In addition, since learners cannot be expected to master activities on their own, mastery can be realised only with the assistance of a person who is more knowledgeable. This person can be a teacher or an instructor.

Constructivism does not dismiss the responsibility of teachers to assist learners by imparting expert knowledge (Educational Broadcasting Corporation, 2004). A teacher is expected to constantly help learners to construct knowledge, rather than simply to reproduce information. Construction of knowledge assists in transforming students from passive recipients of information to active participants in a learning process. In the context of the study under discussion, the expertise of e-tutors and how they probe interaction was taken into consideration.

Finally, an extension of the technology acceptance model for e-learning by Cheung and Vogel (2013) can be implemented towards predicting user acceptance of such collaborative technologies.

LITERATURE REVIEW

The role of e-tutors

Morillas and Fandos (2014) consider tutoring at Higher Education Institutions (HEIs) to be part of the teaching and learning process, the aim of which is to improve students' academic success and help them attain their professional goals. E-tutors contribute to students' academic success through their interaction with students in a collaborative learning setting in which they guide students and help them understand any parts of the learning content with which they may have difficulties. The presence of an e-tutor encourages students to ask questions and reflect on their online learning (Santana-Mansilla, Costaguta, & Schiaffino, 2016).

Berge (1995) identified the main e-tutor roles as being pedagogical, social, managerial and technical. These are discussed below.

The pedagogical role includes tasks, such as inspiring and sustaining students' interest in online community discussions (Goosen & Gouws, 2016). This role draws on the methods used to create a collaborative learning experience. An e-tutor is expected to respond promptly and to ensure that students participate actively in online discussion. The Educational Broadcasting Corporation (2004) emphasises the following techniques as essential pedagogical practices for a collaborative learning environment:

- prompt students to formulate their own questions (inquiry)
- allow multiple interpretations and expressions of learning (multiple intelligences)
- encourage group work and the use of peers as resources (collaborative learning)

The social role involves the creation of friendly and attractive social environments for students. In essence it promotes human relationships, maintaining a group as a unit and helping participants collaborate. Excellent communication skills on the part of e-tutors are of the utmost importance in this regard.

The managerial role involves organising collaborative learning activities and educational encounters, clarifying procedural rules and decision-making (Goosen & Breedts, 2013). An e-tutor needs to display strong leadership and direction in presenting content to students.

The technical role entails becoming conversant with the “collaborative virtual environment technology for” use in the learning environment (Goosen, 2019a, p. 92). Students must receive technical support online. The technical role is the most important one, because online technologies are used as the platform for teaching, supporting, management and assessment of students.

The Educational Broadcasting Corporation (2004) contends that as the collaborative learning process unfolds, an e-tutor is expected to coach and suggest, while at the same time leaving room for students to conduct their own hands-on experiments, ask questions, engage in trial and error and succeed on their own. Collaborative learning activities must be structured in such a way that students participate fully. Students should also be given the opportunity to reflect on what they have learnt.

The above-mentioned roles are promoted through e-mails and online tutoring digital devices. E-tutors need to exercise patience as they interact with students, and to accommodate diversity. For students, this new educational teaching and learning method promotes collaborative learning in groups, while at the same time allowing e-tutors to prompt students to answer or comment and monitor the pace at which students progress from an educational perspective (Anon, 2015). Interaction in a collaborative learning experience is key to the success of an e-learning environment.

Collaborative learning

According to Goosen and Mentz (2009), collaborative and cooperative learning are often used interchangeably. “Both the cooperative and collaborative approaches involve groups of learners working together to achieve an outcome and assigning specific tasks” (Goosen & Mentz, 2007, p. 255). This could involve approaches “for effectively and collaboratively eliciting and plastically representing” (Goosen & Gouws, 2016, p. 533) knowledge, skills and competencies (Serrano-Camara, Paredes-Velasco, Alcover, & Velazquez-Iturbide, 2014). Khalil and Ebner (2017) and Westbrook (2012) further define collaborative learning as a set of processes which help people to share knowledge or information in order to achieve a specific goal that is usually content specific. Sansivero (2016) offered a slightly different perspective, defining collaborative learning as a methodology that transforms the traditional lecture or teacher-centred approach into a student-centred one. Students work as a group to help one another understand content, solve problems or create projects, with the instructor facilitating or moderating the virtual learning environment.

Interaction in a collaborative learning environment involves students working in pairs or in small groups, deliberating on learning activities or finding solutions to problems. Unlike in individual learning, collaborative learning participants rely on one another's resources and skills to achieve the end results. They shed light on given learning activities, asks questions for clarity, synthesise and share information to arrive at a desired goal.

During collaborative learning, it is expected that a particular form of interaction among the participants will take place that prompts a collective learning mechanism (Serrano-Camara et al., 2014). The sharing of knowledge and skills among two or more people is better than individual learning; many instructors believe that misunderstandings and misconceptions are cleared up through interaction between students. Collaborative learning can take a variety of forms, such as quick online forums, chat rooms, collaborative writing, group projects, joint problem-solving, debates, study teams, and other activities (Mayben, Nichols, & Wright, 2003). All the participants are engaged in a common learning activity and are both dependent on and responsible for the outcomes.

Collaborative learning experiences in education are designed based on the premise that interactivity and sharing of information in small groups produces stronger solutions than would have been arrived at individually (Sansivero, 2016). In addition, García-Valcárcel et al. (2014) attest that collaborative learning encourages students to understand learning from a different perspective: the environment creates a learning experience that allows students to practise social and leadership skills and provides a satisfactory learning experience that significantly reduces anxiety.

Collaborative learning in the 21st century is increasingly finding its way in the virtual world and has given rise to a new educational scenario that merges the notion of group-based learning and the potential offered by new digital technologies (Khalil & Ebner, 2017).

How collaborative learning is implemented

Key to a successful collaborative learning experience is the evaluation and selection of the appropriate digital technology suited to the instructor's pedagogy, students' needs and the specific outcomes of a course. Thomson (2014) emphasises that for collaborative learning to be a success, the appropriate strategies for learning activities need to be put in place, otherwise it is possible that students studying at a distance may experience a sense of isolation and feel neglected or even disengaged. The proper strategies would give rise to easy collaboration, and students would quickly become acclimatised within a new learning environment. This would sustain their interest and improve focus, and they would be able to **contribute** in the best possible way and achieve quality results in turn.

A well-planned collaborative learning experience with broadening technological tools will enable students to learn how to learn, giving them the opportunity to learn not only individually but also from their peers, as they are able to pick up learning strategies and methods from one another (Educational Broadcasting Corporation, 2004).

The facilitator or instructor should constantly think of ways to introduce a collaborative learning experience to the students. Time should be allocated for interaction and navigating digital technologies, and the facilitator needs to think about how to support students and probe as the collaborative learning experience unfolds. A facilitator should demonstrate empathy, putting himself or herself in the students' shoes, as a large number of learning activities are undertaken collaboratively online.

The instructor should consider students' prior knowledge as a connection to new content knowledge (Educational Broadcasting Corporation, 2004). Familiarity with the selected technology is paramount, and so students need to be given the opportunity to navigate or familiarise themselves with the selected digital technology. When students are comfortable with the selected technology, the instructor can proceed to more challenging activities, prompting students as learning flows and asking them to reflect on what they have learnt. The role of a facilitator during this process would entail offering guidance and ensuring that students are on the correct path.

For a collaborative learning experience to be a success, the basic elements identified by Johnson and Johnson (2005) should be borne in mind:

1. positive interdependence
2. individual accountability
3. social skills
4. face-to-face interaction
5. group processing.

Thomson (2014) suggests six online collaboration strategies, which are discussed below:

1. Provide a clear definition of expectations and purpose.
2. Give clear instructions to students in a group.
3. Keep groups small.
4. Provide close monitoring and support.
5. Set etiquette guidelines for proper participation.
6. Devise activities relevant to the topic.

Generally, as collaborative learning experiences unfold, students will ask questions, obtain clarity, respond to questions, navigate, and help one another to reach the desired goal (Khalil & Ebner, 2017).

The advancement of new digital technologies supports collaborative learning experiences in higher education. These tools need to have the right functionality and be user-friendly (Thomson, 2014). They should also allow for stronger and more powerful engaging of collaborative learning environments. Only then can students feel confident and interact to complete their tasks.

Thomson (2014) emphasises the importance of choosing the appropriate digital technology, as this will contribute to the collaborative learning environment. The activities could be done quite fast.

METHODOLOGY

FDEME3L is a course for which roughly 3300 students register per semester. The study involved seven e-tutors tutoring FDEME3L students in the 2017 academic year.

At UNISA, two hundred students are assigned to one e-tutor (Mkhize, 2014). All e-tutors are linked to their respective course sites, as are the students, who are given access to the sites that enable them to interact with lecturers, e-tutors and UNISA teaching and learning materials (Butcher, Baijnath, & Ryan, 2012). UNISA employs Administrative Student Coordinators (ASCs) to monitor e-tutors' group sites, ensuring that e-tutors attend to students' questions and the responses are in line with UNISA's quality standards (Pitsoane et al., 2015). In addition, ASCs are responsible for tracking students' involvement in a collaborative learning environment.

The data used were collected over both semesters in the 2017 academic year.

These e-tutors used the *myUNISA* learning management system and e-mails to collaborate or interact with students. The primary lecturer was able to observe the e-tutors' interaction with students by means of group sites on *myUNISA*.

The study sought to explore how e-tutors supported FDEME3L students by means of the collaborative approach to facilitating the course. The qualitative research approach was considered appropriate for the study because the researcher was able to directly explore the perceptions of e-tutors in a natural setting, in this instance the *myUNISA* learning management system. The foci were the experiences of the e-tutors in terms of collaborative course activities, their roles as e-tutors and how they used different digital technologies to interact with students.

Research design, data collection instruments and sample

A case study research design was used. For data collection, instruments included unstructured interviews, together with non-participant observation and document analysis. The targeted sample comprised the seven e-tutors for the course FDEME3L, who shared their lived experiences of collaborating with students from the beginning of a semester until students sat for their final examination for the 2017 academic year. The intention was to observe various digital technologies available on the *myUNISA* learning management system as a means to support students. Digital tools such as Announcements, Schedule, Additional Resources, Discussion Forums and e-mail were investigated.

The e-tutors shed light on their e-tutoring experiences during unstructured interviews, for which the researcher used a set of open-ended questions to gather data. The *myUNISA* learning management system was used to access e-tutors' group sites for the purposes of non-participant observation, and data were collected from these sites. All e-tutors were linked to *myUNISA*, and each had his or her own site to use as a collaborative learning environment.

Data analysis

The data were analysed using the procedure proposed by Creswell (2012). The data gathered by means of the three data collection strategies were reduced to manageable and

understandable information. Similar patterns were put together and coded, and this resulted in the establishment of themes.

DISCUSSION OF RESULTS

With regard to participants' ages, four were below the age of 50, suggesting that the majority were digital natives. The results revealed most of the participants to be technologically capable and to have the necessary skills to facilitate a collaborative learning experience. The participants' experience in supporting students by means of a collaborative learning environment was also observed. Of the seven participants, five had sound experience and the potential to work as e-tutors as compared to the other two.

All the participants were teachers. According to the findings, the female participants seemed more prepared to face technological challenges than their male counterparts.

UNISA provided all the participants with training in e-tutoring before they were allocated students. In addition to receiving training, all had good qualifications in educational technology, the minimum qualification being a BEd honours in computer-integrated education or computer-based education. Four e-tutors had a BEd honours in computer-integrated education, two had master's degrees in computer-based education and one had a doctoral degree in the field of educational technology. The technology content knowledge and skills they had acquired enhanced their ability to overcome difficulties associated with the collaborative learning environment.

In terms of interacting with students, all the participants used the Discussion Forums tool as a means of student support. Evidence of the support given to students is revealed in the following excerpt:

Participant F: "In the discussion forum, generally I used Gilly Salmons 5 stage model on online learning. I began by setting the scene. The first discussion was to welcome them and have the members introduce themselves. Thereafter, we discussed the learning material that they have to use."

The Discussion Forums site was used mainly for discussions of the learning material and responding to students' questions. Another tool used by all the participants was Announcements. The participants indicated that they used this tool to notify students about the learning activities. The participants were highly skilled in the use of technology. As revealed in the excerpt below, one of them created other platform accounts and used these to interact with students:

Participant A: "As an e-Tutor, I also have an account on quizlet. I created multimedia interactive tutorials and linked them with my students through *myUNISA*."

Limited use was made of e-mail, with only two participants using it to interact with students. Of all the available digital devices on the *myUNISA* platform, the participants indicated a preference for Discussion Forums because this tool enabled them to motivate, guide and actively engage students.

Participants required support in the form of readily available information and a broad choice of user-friendly digital tools. One of the participants indicated a need for training on motivating students to participate actively and use the Site Info tool:

Participant E: "I need support on how to encourage students to actively participate in discussions about the subject content and how to use the Site Info Tool."

The Site Info tool on the *myUNISA* platform provides access to other digital tools that *myUNISA* users can activate and use. Users are therefore not confined to the readily activated

tools on *myUNISA*, but are afforded the opportunity to try other tools, such as blogs, podcasts and wikis.

The participants were unanimous that collaboration as an e-learning method enables students to help one another by sharing information. Students gain knowledge by interacting with other students, lecturers and e-tutors, and are able to achieve goals that they were unable to attain while learning as individuals.

The participants also indicated that most students do not participate actively in collaborative learning experiences and seemed not to favour working in groups. The participants found the poor engagement of students in the collaborative learning experience and how to motivate them to participate actively to be a challenge.

Included in the tutorial letter also to the e-tutors was the timetable setting out all the activities that e-tutors are required to carry out. This was a suggestion from lectures as to what to do; as technology experts, they were expected to be innovative and use their technological expertise to make a collaborative learning experience interesting and beneficial to students. This became evident during the interview sessions, when it was revealed that one of the participants elected to choose a platform that was not included on *myUNISA*.

Each e-tutor's group site includes a Report Activity on *myUNISA*, and this was used to establish how e-tutors collaborated with students. As a non-participant observer, the researcher chose to present the analysed information graphically. The circle graph below presenting information relating to the use of four digital tools illustrates e-tutors' interactions with students.

The results reveal that the Discussion Forums tool was used by all e-tutors to interact with students. This tallies with information provided by participants as they shared their lived collaboration experiences in interviews sessions. They indicated that they used this tool to engage students in discussions about the course.

The second most preferred tool used by e-tutors on their group sites was Additional Resources. Most of the participants uploaded more resources for students for further reference in their interactions. The uploaded materials afford students more opportunity for discussion and to overcome problems. The Statistics tool provides information about how often other tools within a group site are visited and allows an e-tutor to view the most active tool and most active user. All e-tutors were identified as the most active users, and the Discussion Forums tool was identified as the tool that they used most frequently.

Use of the Announcements tool was shown to be limited, with only three e-tutors using it to any significant degree. This implies a lack of knowledge on the part of e-tutors regarding how to use this tool. All in all, the results show less commitment to interaction on the part of students and equipping of e-tutors with the skills required to present a collaborative learning experience using appropriate digital tools.

CONCLUSIONS

In response to the research questions, this paper highlighted the fact that FDEME3L e-tutors' perceptions confirmed that they still have more to learn about the collaborative learning environment.

The main points included that using ICTs significantly impacts on HEIs' presentation of courses, as well as that collaborative learning could not only "contribute to effective learning in" this course (Mentz & Goosen, 2007, p. 329), but according to Goosen (2004, p. 70),

“collaborative processes can also be” used to cleared up any misunderstandings, which might exist, “together with the importance of possibilities for all parties to contribute appropriately to” learning.

New knowledge derived from the research pointed to the collaborative approach as innovative in terms of providing students with the opportunity to explore new ideas about learning as a group.

The principles of collaborative learning are increasingly influencing the way in which learning is conducted online and signal the need for HEIs to transform the presentation of courses such that students are able to learn from one another and to close the gap in distance learning. There is a need to reflect on practice so as to enhance the collaborative learning experience.

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THE REPRESENTATION OF THE NATURE OF SCIENCE IN SOUTH AFRICAN GRADE 12 LIFE SCIENCES TEXTBOOKS

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Abstract

This study examined the representation of the nature of science in South African Grade 12 Life Sciences textbooks using a conceptual framework developed by Chiappetta, Fillman and Sethna (1991). We investigated the extent to which South African Grade 12 Life Sciences textbooks exhibit the themes associated with the nature of science as an essential tenet in science education. The investigation primarily focused on the identification of the differences and commonalities exhibited by Grade 12 Life Sciences textbooks in terms of the coverage of the themes associated with the nature of science. These textbooks were essentially instructional resources that formed an integral part of the enactment of the National Curriculum Statement and the Curriculum and Assessment Policy Statement promulgated by the Department of Basic Education in South Africa. The investigation revealed a dismal depiction of the nature of science themes across the selected Grade 12 Life Sciences textbooks analysed. In particular, “Science as a body of knowledge” was given substantial coverage as compared to other concomitant themes. While considerable emphasis is placed on the significance of inquiry-based learning as a contemporary pedagogic approach, limited coverage was, however, given to “The investigative nature of science” and “Science as a way of thinking” as relevant themes required for meaningful enactment of inquiry-based learning. Science and technology play a pivotal role towards the fulfilment of societal and economic needs. Yet, “The interaction of science, technology and society” was afforded limited coverage across the selected textbooks analysed. Implications for meaningful curriculum reform are discussed.

Keywords: Nature of science, instructional resources, curriculum reform

Background

Majority of teachers and learners hold naïve views about the essential features of nature of science (NOS) and mere teaching of NOS is ineffective to achieve conceptions of NOS (Lederman, 2007). Lederman (2007) postulates that misconceptions regarding NOS are commonly developed in a classroom by teachers and learners. The National Research Council (2000) posits that teachers rely on traditional didactics approach that is aimed at learners’ understanding of disconnected science content knowledge that does not develop cognitive skills such as critical thinking, reasoning, analysing and problem solving. Moreover, teachers need to emphasise fundamental features of NOS to assist learners to recognise and understand the scientific process themselves. However, this cannot occur since teachers have inadequate experience of scientific inquiry and hold naïve conceptions about NOS (Anderson, 2007).

The significance of the role of textbooks in enhancing meaningful science teaching is well-documented. The prominence of science textbooks in particular as instructional resources is captured by Abd-El-Khalick, Waters and Le (2008) who assert that in large classrooms, textbooks are primary indicators of what is learned and the instructional strategy employed. Albach and Kelly (1998) stipulate that textbooks transform the curricular intentions into teachable instructional practices by reflecting the goals of science learning. These reflections include understanding the interrelationship of science, nature of science, environment and society as well as developing cognitive, inquiry and technological skills. The quality of textbooks influences the quality of instruction (Lemmer, Edwards & Rapule, 2008).

Swanepoel (2010) further explains that the accessibility of high quality textbooks is a crucial element in successful implementation of curricular improvements. As observed by Le Grange (2008), Biology curriculum content encourages learners to learn portions of biological evidences that are regurgitated in summative assessments such as tests and examinations. Le Grange (2008) further maintains that Biology curriculum content puts greater emphasis on the study of vegetation and animal life form with no emphasis on fact and value. This emphasis is defined by Mnguni (2013) as the academic ideology that promotes the training of learners by transmitting discipline specific knowledge. This representation of science is not in accord with the basic tenets of NOS.

The role of science textbooks as essential resources required for improving meaningful understanding of the basic tenets of NOS is especially crucial within the broader South African context. Studies on teacher conceptualisation of NOS in South Africa revealed that teachers have an insufficient grasp of NOS itself. A pilot study conducted by Dekkers and Mnisi (2003) in the Limpopo Province of South Africa found that most teachers surveyed held common myths about NOS. In addition, a study conducted by Linneman, Lynch, Kurup and Bantwini (2003) involving teachers in the Eastern Cape of South Africa attained similar findings. Moreover, research on the depiction of NOS in South African science textbooks primarily focused on the analysis of Grade 10 Life Sciences textbooks and Grade 9 Natural Sciences textbooks (e.g., Ramnarain & Padayachee, 2015; Ramnarain & Chanetsa, 2016). Hence, there is a need for research to be carried out on the depiction of NOS in South African Grade 12 Life Sciences textbooks in order to fill this void.

This research study primarily focused on the analysis of South African Grade 12 Life Sciences textbooks for the inclusion of NOS in recognition of the importance of textbooks as key ingredients for science curriculum reforms. In particular, we scrutinised the differences and commonalities in terms of the depiction of NOS between Grade 12 Life Sciences textbooks written by the previous National Assembly Training and Education Department (NATED) for the enactment of the National Curriculum Statement (NCS) (Department of Basic Education, 2002) and the Grade 12 Life Sciences textbooks that are in accord with the Curriculum and Assessment Policy Statement (CAPS) (Department of Basic Education, 2011). Nature of science is largely viewed as an essential tenet in science education. In support of this notion, Driver, Leach, Millar and Scott (1996) contend that NOS is an essential component of scientific literacy. While plausible relevance of NOS has been irresistible within the science education community, there is some disagreement in the literature as to what it entails (Laugksch, 2000). However, Schwartz and Lederman (2002) assert that there is a satisfactory level of agreement on what NOS entails. There is thus a need for intellectual consensus to provide progressive impetus to the raging discourse. Lederman (2007) classifies the basic tenets of the nature of scientific knowledge as follows: It is tentative (subject to change), empirically based (based on and/or derived from observations of the natural world), subjective (involves personal background, biases and/or is theory laden), necessarily involves human inferences, imagination, and creativity (involves the invention of explanations), and is socially and culturally embedded). Two additional important aspects are the distinction between observations and inferences, and the functions of, and relationships between scientific theories and laws.

It is against this background that we investigated the extent to which South African Grade 12 Life Sciences textbooks exhibit the themes associated with the nature of science as an essential tenet in science education. The investigation primarily focused on the identification of the differences and commonalities exhibited by Grade 12 Life Sciences textbooks in terms

of the coverage of the themes associated with the nature of science. Accordingly, the following research questions were formulated:

- To what extent do South African Grade 12 Life Sciences textbooks exhibit themes associated with the nature of science?
- How do South African Grade 12 Life Sciences textbooks compare in the extent to which they cover the themes associated with the nature of science?

This study investigated the extent to which South African Grade 12 Life Sciences textbooks exhibit the themes associated with the nature of science. The research study was underpinned by the following objectives:

- To analyse the depiction of NOS themes in South African Grade 12 Life Sciences NCS and CAPS textbooks using a Conceptual Framework for textbook analysis?
- To identify differences and commonalities in the depiction of NOS themes in South African Grade 12 Life Sciences NCS and CAPS textbooks.
- To provide recommendations on the improvement of NOS depiction in South African Grade 12 Life Sciences textbooks.

Research design and methodology

This study adopted a qualitative content analysis design. Qualitative design provides the researcher with a holistic view of the concern that is being investigated (Hancock, 1998). According to Mayring (2000), qualitative design specifies guidelines to assist the researcher to identify the units to be analysed and eliminates content that does not form part of science literacy (Chiappetta & Fillman, 2005). Krippendorff (2004) defines content analysis as a method used to make valid and reliable scientific conclusions from the text within a specific context. This method comprises of structured technique that guides the procedure of data analysis and is considered to be an appropriate scientific tool that can be used to measure the quality of the text (Krippendorff, 2004).

South African CAPS and NCS Grade 12 Life Sciences textbooks were analysed using a conceptual framework developed by Chiappetta, Fillman and Sethna (1991) underpinned by a scoring rubric textbook analysis developed by Abd-El-Khalick, Waters and Le (2008). The textbooks were identified and chapters and sections selected for analysis of representation of the nature of science. The selection of the textbooks was based on the period during which NCS and CAPS were implemented. The selected textbooks essentially represented instructional resources utilised during the implementation of NCS and CAPS. The first calculated 10% of pages for each textbook were examined to develop competence and familiarity with the use of the underlying conceptual framework. Furthermore, a sliding scale was applied based on the quantity of pages allocated per content area to calculate the content area found in each page (Chiappetta & Fillman, 2007). The pages were chosen randomly from each content area. The strands examined constituted four core content areas: Life at molecular, cellular, and tissue level; Life processes in plants and animals; Diversity, change and continuity; and Environmental studies. The structure of each content area is depicted in Table 1 below.

Table 1: Core content areas in textbooks

Core content area	Topics
Life at molecular, cellular, and tissue level Cell division and mitosis	DNA code of Life RNA and protein synthesis Meiosis

Life processes in plants and animals Food production	Reproduction in vertebrates Human reproduction Nervous system Senses Endocrine system Homeostasis
Diversity, change and continuity	Darwinism and Natural Selection Human evolution
Environmental studies	Human impact on environment

Source: Adapted from CAPS Life Sciences document (Department of Basic Education, 2011)

The content of Life Sciences textbooks consisted of many units in the form of paragraphs, pictures and tables with their captions, questions and laboratory activities. The analytical framework developed by Chiappetta, Fillman and Sethna (1991) addresses the dimensions of NOS within the four themes as illustrated in Table 2 below. Three CAPS Grade 12 Life Sciences textbooks and three NCS Grade 12 Life Sciences textbooks were analysed for depiction of NOS themes. These textbooks are increasingly used as instructional resources in science classrooms throughout South Africa. The three selected CAPS Life Sciences textbooks had the highest number of orders and they collectively constituted close to 75% of all book orders for Grade 12. Similarly, the three selected NCS Life Sciences textbooks are popular curriculum resources. The textbooks were analysed in two phases. In the first phase, representative samples of science textbooks were analysed to provide an outline of the themes covered in the textbooks. In the second phase, textbooks were scrutinised by focusing on units of analysis chosen using the framework validated during the first round of the analysis. Analysis specifically focused on complete paragraphs, questions and statistics, tables with captions, marginal remarks, and comprehensive steps to conduct an activity in a laboratory or inquiry activity. Furthermore, 10% of random sampling of pages were selected for the first round of analysis which represented a valid and reliable quantity of text. The framework was refined for purposes of organizing and collecting units according to classifications. The validity of the classifications formed the basis for the descriptions of essential aspects of NOS, research on NOS in practice, and domain specific knowledge from the research on Life Sciences education. A comprehensive scoring rubric adapted from Abd-El-Khalick, Waters and Le (2008) was used for analysis. The score allocated to specific NOS elements within a textbook was based on an analysis of all materials relevant to that element within the scrutinised textual materials. Scores were determined as follows:

- (a) 3 points = Explicit, informed, and consistent representation of the target NOS aspect: (i) explicit statements that convey an informed representation, (ii) consistency across the selected chapters or sections in addressing the target NOS aspect, and (iii) consistency in addressing other directly related NOS aspects.
- (b) 2 points = Explicit, partially informed representation of the target NOS aspect: (i) explicit statements that convey an informed, but incomplete representation, and (ii) consistency across the selected chapters or sections in representing the target NOS aspect. An incomplete representation derives from the textbook materials remaining silent in terms of addressing other related NOS aspects that ensure a complete informed representation.
- (c) 1 point = Implicit, informed, and consistent representation of the target NOS aspect: (i) an informed representation of the target NOS aspect could be inferred from the textbook materials (e.g., relevant explanations, activities, examples, or historical episodes lacking structured, reflective prompts or explicit statements), and (ii)

absence of other explicit or implicit messages that are inconsistent with the inferred implicit representation.

Table 2: Analytical framework for NOS

NOS Theme	Descriptor: NOS Categories
Science as a body of knowledge	<ul style="list-style-type: none"> a) Knowledge presented as facts, concepts, laws, and principles b) Hypotheses, theories, and models c) Factual recall of information
The investigative nature of science	<ul style="list-style-type: none"> a) Learns through the use of materials b) Learns through the use of tables and charts c) Makes calculations d) Reasons out an answer e) Participates in thought experiments f) Gets information from the internet g) Uses scientific observation and inference h) Analyses and interprets data
Science as a way of thinking	<ul style="list-style-type: none"> a) Description of how a scientist discovered or experimented b) Historical development of an idea c) Empirical basis of science d) Use of assumptions e) Inductive or deductive reasoning f) Cause and effect relationship g) Evidence and/or proof h) Presentation of scientific method(s) or problem solving i) Scepticism and criticism j) Human imagination and creativity k) Characteristics of scientists (subjectivity and bias) l) Various ways of understanding the natural world
Interaction of science, technology and society	<ul style="list-style-type: none"> a) Usefulness of science and technology b) Negative effects of science and technology c) Discussion of social issues related to science and technology d) Careers in science and technology e) Contribution of diversity f) Societal or cultural influences g) Public or peer collaboration h) Limitations of science i) Ethics in science

Source: Adapted from Chiappetta & Fillman (2007)

Life Sciences textbooks selected for analysis are provided in Table 3 below.

Table 3: Life Sciences textbooks selected for analysis

Identification Code	Textbook	Date of Publication
A	Textbook 1 (CAPS)	2013
B	Textbook 2 (CAPS)	2013
C	Textbook 3 (CAPS)	2013
D	Textbook 4 (NCS)	2007
E	Textbook 5 (NCS)	2010
F	Textbook 6 (NCS)	2007

The reliability of the results in this study was measured using Cohen's kappa coefficient (κ) (Cohen, 1990). The coding agreement was established by calculating Cohen's kappa coefficient to reach the level of inter-coder reliability. Cohen's kappa coefficient is a statistic which measures inter-rater agreement for qualitative (categorical) items. It is generally thought to be a more robust measure than simple percent agreement calculation as κ takes into account the possibility of the agreement occurring by chance. The agreement in interpreting coding was analysed as follows: the values of Cohen's kappa larger than .75 imply excellent agreement; the values of Cohen's kappa between .40 and .75 represent reasonable to good agreement; and values of Cohen's kappa smaller than .40 imply fair to poor agreement. The overall kappa for all measurements is depicted in Table 4 below.

Table 4: The overall kappa for all measurements

		Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement	Kappa	.759	.010	100.735	.000
N of Valid Cases		2132			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Findings

Table 5 below provides the depiction of "Science as a body of knowledge" in terms of the concomitant nature of science categories in selected South African Grade 12 Life Sciences textbooks.

Table 5: Depiction of "Science as a body of knowledge"

NOS Theme	NOS Category	Frequencies						Total
		Textbook k 1	Textbook k 2	Textbook k 3	Textbook k 4	Textbook k 5	Textbook k 6	

Science as a body of knowledge	a) Knowledge presented as facts, concepts, laws, and principles	22	16	34	14	22	16	124
	b) Hypotheses, theories, and models	16	2	13	4	8	4	47
	c) Factual recall of information	380	126	224	58	267	341	1396
	d) tentativeness and durability of scientific knowledge	22	18	32	6	54	33	165
	e) distinctness of scientific knowledge	18	16	14	8	11	31	98

Depiction of “Science as a body of knowledge” in selected textbooks reflected a predominant emphasis on factual recall of information although this NOS category was covered to a limited extent in Textbook 4 (NCS). The coverage of hypotheses, theories, and models across the selected textbooks was extremely inadequate as compared to other NOS categories. While knowledge was mainly presented as facts, concepts, laws, and principles, particular emphasis was also put on tentativeness and durability of scientific knowledge as well as distinctness of scientific knowledge. Table 6 below provides a depiction of “Science as a way of investigation”. It is striking to note that getting information from the internet and using scientific observation and inference were completely omitted in some of the selected textbooks. The implication of the omission is that the affected textbooks do not provide opportunities for learners to take advantage of digital transformation thereby stifling meaningful development of practical investigation skills. There is a crucial need for textbooks as instructional resources to develop learners’ capacity to use the internet as a vital tool to access information to empower themselves. This would pave the way for learners to fully embrace the opportunities associated with the advent of the Fourth Industrial revolution.

Table 6: Depiction of “Science as a way of investigation”

NOS Theme	NOS Category	Frequencies						Total
		Textbook k 1 (NCS)	Textbook k 2	Textbook k 3	Textbook k 4	Textbook k 5	Textbook k 6	
Science as a way of investigation	a) Learns through the use of materials	114	28	88	54	32	111	427
	b) Learns through the use of tables and charts	27	4	27	2	14	11	85
	c) Makes calculations	20	8	56	20	12	10	126
	d) Reasons out an answer	83	32	92	52	64	75	398
	e) Participates in thought experiments	43	10	18	6	12	14	103
	f) Gets information from the internet	2	-	2	2	-	-	6
	g) Uses scientific	12	10	8	2	-	12	44

	observation and inference							
	h) Analyses and interprets data	11	10	10	8	7	6	52

Learning through the use of materials as an NOS category was sufficiently covered in Textbook 1 (CAPS), Textbook 3 (CAPS) and Textbook 6 (NCS). This NOS category was, however, inadequately covered in other textbooks. Reasoning out an answer was also sufficiently covered although its coverage in Textbook 2 (CAPS) represented an anomaly. Other NOS categories that were covered to a reasonable extent included learning through the use of tables and charts, making calculations and participation in thought experiments. Table 7 below provides the depiction of “Science as a way of thinking”. The overall coverage of “Science as a way of thinking” across the selected textbooks was largely inadequate. Presentation of scientific method(s) or problem solving was the only NOS category that received some measure of emphasis. NOS categories that were completely omitted in some of the selected textbooks included description of how scientist discover or experiment, historical development of an idea, inductive or deductive reasoning, characteristics of scientists (subjectivity and bias) and various ways of understanding the natural world. This grim reality should serve as a wake-up call for Grade 12 Life Sciences textbooks writers and curriculum practitioners to do justice to the depiction of “Science as a way of thinking”.

Table 7: Depiction of “Science as a way of thinking”

NOS Theme	NOS Category	Frequencies						Total
		Textbook k 1	Textbook k 2	Textbook k 3	Textbook k 4	Textbook k 5	Textbook k 6	
Science as a way of thinking	a) Description of how scientists discover or experiment	2	-	-	6	10	2	20
	b) Historical development of an idea	4	2	2	2	-	2	12
	c) Empirical basis of science	8	4	14	11	8	18	63
	d) Use of assumptions	9	4	14	8	4	2	41
	e) Inductive or deductive reasoning	3	4	-	4	2	-	13
	f) Cause and effect relationship	14	8	14	6	6	5	53
	g) Evidence and/or proof	10	4	4	2	2	2	24
	h) Presentation of scientific method(s) or problem solving	32	30	11	22	15	24	134
	i) Scepticism and criticism	3	14	7	5	10	12	51
	j) Human imagination	2	8	6	2	2	2	22

	and creativity							
	k) Characteristics of scientists (subjectivity and bias)	3	-	2	6	-	-	11
	l) Various ways of understanding the natural world	8	-	6	2	-	5	21

Table 8 provides the depiction of the “Interaction amongst science, technology and society”. The overall coverage of the “Interaction amongst science, technology and society” across the selected textbooks was largely inadequate. This depiction is disconcerting given the significance of scientific and technological innovation in the information age. Lack of emphasis on careers in science and technology is yet another disservice done by the textbooks as scientific and technological expertise is crucially important for the progressive realisation of socio-economic development in society. This grim reality calls for the reconfiguration of Grade 12 Life Sciences textbooks to ensure equitable coverage of NOS categories related to the “Interaction of science, technology and society” as a key NOS theme.

Table 8: Depiction of the “Interaction of science, technology and society”

NOS Theme	NOS Category	Frequencies						Total
		Textbook 1	Textbook 2	Textbook 3	Textbook 4	Textbook 5	Textbook 6	
The interaction amongst Science, Technology and Society	a) Usefulness of science and technology	4	7	6	4	12	2	35
	b) Negative effects of science and technology	-	6	4	1	4	-	15
	c) Discussion of social issues related to science and technology	8	4	-	11	2	-	25
	d) Careers in science and technology	2	-	-	-	-	5	7
	e) Contribution of diversity	4	2	2	2	-	2	12
	f) Societal or cultural influences	2	1	2	-	-	4	9
	g) Public or peer collaboration	10	4	2	8	8	6	38
	h) Limitations of science	7	2	-	-	2	2	13
	i) Ethics in science	12	4	2	8	10	10	46

“Science as a body of knowledge” was sufficiently covered in the selected textbooks as compared to other themes. “Science as a way of thinking” and the “Interaction amongst science, technology and society” received limited coverage across the selected textbooks.

While “Science as a way of investigation” received fair coverage, more should be done to strengthen the coverage of this aspect with a view to provide meaningful opportunities for learners to indulge in inquiry-based learning. The overall picture points to the fact that concerted efforts by Life Sciences textbook writers are required to ensure equitable coverage of key NOS themes as a key curriculum reform imperative. The representation of NOS themes across the Grade 12 Life Sciences CAPS and NCS textbooks provided a consistent pattern with “Science as a body of knowledge” receiving substantial coverage as compared to other themes. This consistent representation pattern is a commonality characterising the depiction of NOS themes in the selected textbooks. The pattern characterising the representation of NOS themes in Grade 12 CAPS Life Sciences textbooks is illustrated in Figure 1 below.

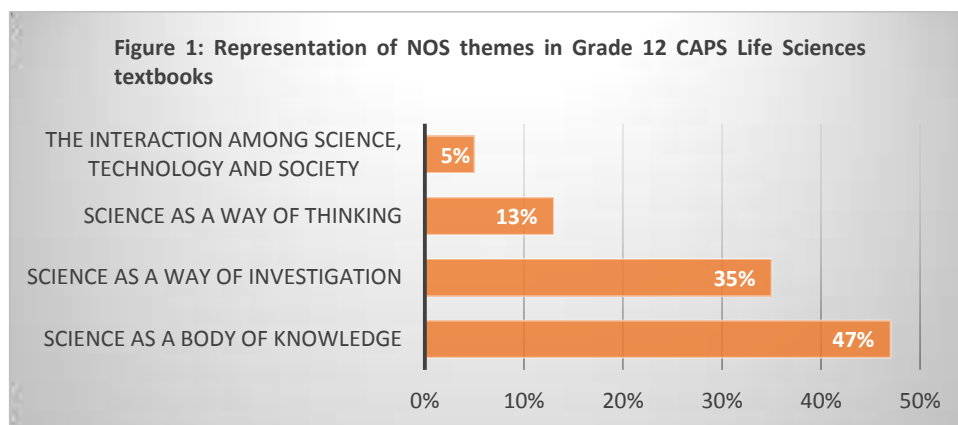
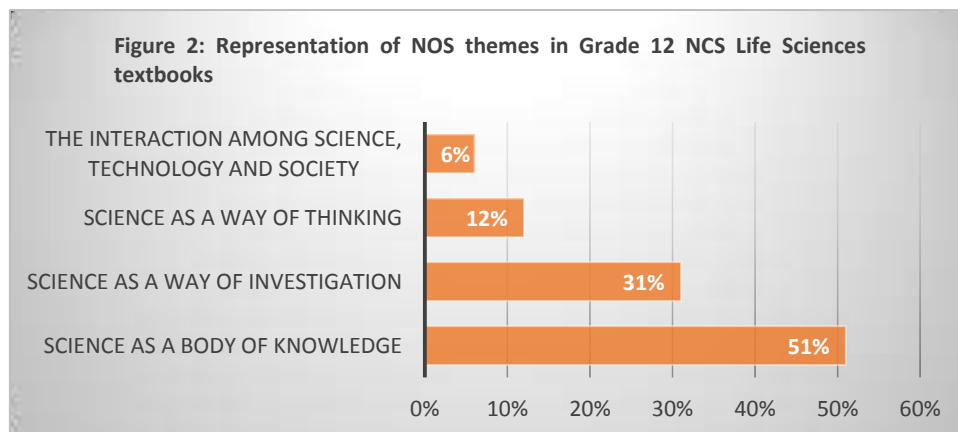


Figure 2 below illustrates the pattern characterising the representation of NOS themes in Grade 12 NCS Life Sciences textbooks.



Discussion

Overall representation of the nature of science in the selected textbooks reflected sufficient coverage of “Science as a body of knowledge” as compared to other themes. In addition, the textbooks put particular emphasis on factual recall of information and this structural emphasis may potentially encourage rote learning on the part of learners. Developing meaningful understanding of hypotheses, theories, and models was largely given scant attention. Yet, meaningful understanding of hypotheses, theories, and models underpin the development of scientific literacy. “Science as a way of investigation” received inadequate coverage in the

selected textbooks and this unpalatable coverage can serve to stifle meaningful enactment of inquiry-based learning as a contemporary pedagogic approach. This finding is consistent with a study conducted by Jiang and McComas (2014) who found that Biology textbooks tend to compromise adequate inclusion of investigative activities. They further posit that these textbooks put emphasis on scientific content knowledge and inquiries without considering societal influence on science and technology within communities.

Inadequate coverage of the nature of science categories in selected textbooks is consistent with an empirical study conducted by McComas (2003) which found that Biology textbooks portray limited coverage of scientific laws and theories. In response to this structural deficiency, McComas (2003) recommends that science textbook authors ought to include more definite examples of laws and theories as they underpin science concepts and facts. In addition, science textbooks should foster the development of knowledge informed by scientific laws and theories to ensure adequate coverage of NOS aspects (McComas, 2003). Jiang and McComas (2004) are of the view that science textbooks should promote collaboration and peer learning while putting particular emphasis on all NOS aspects.

Chiappetta, Fillman and Sethna (1991) found that “Science as a way of thinking” is inadequately represented in Chemistry textbooks as evidenced by omission of scientific discoveries and historical development of ideas. Leite (2002) argues that science textbooks do not provide adequate information on how scientists make discoveries and develop scientific ideas. In my view, this structural deficiency may compromise development of meaningful understanding of NOS aspects as a key curriculum reform imperative particularly within the broader South African educational context. The key findings in this study are consistent with the findings of other studies on the analysis of the representation of the nature of science in Life Sciences and Natural Sciences textbooks conducted in South Africa. A study on the comparative analysis of South African Grade 10 NCS and CAPS Life Sciences textbooks for inclusion of the nature of science conducted by Ramnarain and Padayachee (2015) revealed that “Science as a body of knowledge” received substantial coverage while the depiction of “Science as a way of investigation”, “Science as a way of thinking”, and the “Interaction among science, technology and society” received limited coverage. A study on the analysis of South African Grade 10 Natural Sciences textbooks conducted by Ramnarain and Chanetsa (2016) attained similar findings.

According to Chiappetta, Fillman and Sethna (1991), emphasis on scientific vocabulary and life processes as contained in Life Sciences textbooks serves to promote rote learning and stifles meaningful conceptual understanding. In order to address this structural deficiency, Chiappetta, Fillman and Sethna (1991) recommend that Life Sciences textbooks must provide accurate depiction of NOS aspects that relate to learners’ daily lives. Science textbooks are perceived to be instructional resources providing guiding principles that influence teaching (Idrees, Habib & Hafeez, 2014). This implies that science textbooks should provide adequate information about scientific phenomena that is responsive to NOS tenets.

Recommendations arising from the study

The dismal depiction of the nature of science in South African Grade 12 Life Sciences textbooks calls for immediate review of the textbooks to align them with the key imperatives of meaningful curriculum reform. The reconfiguration of Grade 12 Life Sciences textbooks to ensure equitable representation of the nature of science is imperative. This crucial step will serve to ensure that South Africa as a member of the global community of nations provides a globally competitive curriculum that is responsive to the acceleration of socio-economic development. Dispelling misconceptions by using the conceptual change model would be an

extremely difficult and complex undertaking given the dismal depiction of the nature of science in South African Grade 12 Life Sciences textbooks. There is thus a critical need to create, evaluate, and revise policies and practices to encourage teachers to meaningfully engage in professional science learning. District and school administrators and other relevant key stakeholders ought to work together to establish viable and sustainable communities of practice which provide meaningful opportunities for teachers and learners to critically engage with curriculum content as encapsulated in the Life Sciences textbooks with a view to ensure conceptual and structural coherence.

Conclusion

South African Grade 12 Life Sciences textbooks analysed reflected a dismal depiction of the themes associated with the nature of science as an essential tenet in science education. Consolidation of curriculum reform efforts within the broader South African context should refocus on the equitable representation of the nature of science in science textbooks with a view to enhance meaningful development of scientific literacy.

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TEACHING WITH ICTS: A CASE OF O.R. TAMBO MST ACADEMY AND ITS FEEDER SCHOOLS

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Abstract

This purpose of this paper was to investigate factors that teachers experience as enablers and constraints in OR Tambo Maths, Science and Technology Academy (MSTA) pilot schools in Mpumalanga, South Africa in using Information and Communication Technologies (ICTs) for learning and teaching. We explored learning opportunities created with ICTs and actions expected from learners. The paper draws on survey of 69 teachers and four semi-structured focus groups interviews. The presence of critical mass of innovators and a community of practice enabled teachers to utilise ICTs for learning and teaching. Time constraints, security, accessibility, willingness, infrastructure, access to continuous professional development opportunities and communication were experienced as constraints. Our findings highlight the importance of needs analysis before ICTs are distributed.

Keywords: constraints, digital support, enablers, ICTs, innovators, learning opportunities, MSTA schools

1. BACKGROUND OF THE STUDY

An advancement in ICTs) has seen a considerable growth in digital support for learning and teaching. Many governments in partnership with private sector and parastatals invest in ICT infrastructure. UNESCO (2018) launched a four-year project, called ICT Transforming Education in Africa, with the purpose of enhancing teaching and learning in Mozambique, Rwanda and Zimbabwe. An evaluation of the project in 2017 showed that 50% of teachers apply acquired ICT skills in teaching practice in Rwanda. SchoolNet has been working with South African National and Provincial Departments of Education to ensure integration of ICTs in education. Khanya project in collaboration with Western Cape Department of Education installed computer labs in 1029 schools and 27 000 teachers were trained by 2015 (De Rochie, 2009). However, a survey on the project showed that low psycho-sociological factors such as teacher skills level and contextual factors such as availability of onsite technical support, infrastructure, institutional management, socio-economic status of learners and teachers determine extent of integration of ICTs in education (Chigona, Chigona, Kayongo & Kausa, 2010).

Research shows that ICTs are either not used, underutilised or misused (Christensen & Horn, 2008). Education researchers argue that providing schools with ICTs has no significant effect on learning experiences (Laurillard, 2012), probably because ICTs are provided to “compete against existing teaching and learning practice” (Christensen & Horn, 2008, p18). To enhance learning, use of ICTs requires designing learning opportunities that enable learners to learn (Laurillard, 2012).

The OR Tambo Maths, Science and Technology Academy (MSTA) was established in 2014 in Mpumalanga Department of Education, with the purpose of increasing performance and participation of learners in the Maths, Science and Technology (MST). Interactive white boards, data projectors, cameras, document viewers, document scanners, plasma television

sets and computers were provided in 101 MSTA secondary schools as well as the 492 feeder schools in 2015 and training was provided.

In this research we aim to determine factors that teachers experience as enablers and constraints in using ICTs, in order to explore types of opportunities created with ICTs and actions expected from learners. The paper draws on survey of 69 teachers and four focus groups from MSTA pilot high schools. Our findings indicate that the presence of critical mass of innovators and a community of practice were enablers in using ICTs for teaching and learning. Teachers reported time constraints, security, accessibility, willingness, infrastructure, access to continuous professional development opportunities and communication as enablers and constraints. Our findings highlight the importance of analysis of opportunities created with ICTs and actions expected from learners.

2. LITERATURE REVIEW

There is a substantial increase in access to ICTs in households and schools. An advancement in ICTs may overwhelm teachers and create feelings of anxiety and fear, unless continuous support is provided to function optimally in technological, pedagogical and content knowledge domains (Bath & Bourke, 2010). It is challenging and time-consuming to acquire and develop these knowledge domains (Koehler & Mishra, 2009). Teachers need enough time, training and support to explore, experiment and be able to confidently use ICTs (Laurillard, 2012). Teachers' fear of ICTs and unknown should be expected and acknowledged during the implementation phase (Buabeng-Andoh, 2012).

A considerable amount of literature on use of ICTs for teaching and learning shows that quality of learning opportunities receives critical attention. Mlitwa and Nonyane (2008) found that rural schools lack infrastructure and capacity to integrate ICTs for learning and teaching compared to urban schools. Adomi and Kgangban (2010) too found that the use of ICTs in Nigerian secondary schools does not have much impact on learning experiences due to negative perception towards ICTs, lack of digital literacy skills among teachers and learners. Hodgkinson, Siebörger and Terzoli (2007) affirm that infrastructure, cost of maintenance and connectivity, accessibility of ICTs, availability of ICT dedicated personnel, access of in-service teacher training, existence of policy, willingness of teachers, exemplary leadership of management, presence of teacher champion and pedagogy act as enablers or constraints. Alfaki and Khamis (2018), point out the importance of accessibility ICTs and connectivity to Internet, teacher training and professional development opportunities, willingness and readiness of schools and teachers, but further show that collegial encouragement and support and sharing of good practice can act as enablers or constraints. However, Alfaki and Khamis (2018) are the opinion that the location and types of ICTs also determines the extent of integration. To Hennessy, Harrison and Wamakote (2010) minimal access to training opportunities and poor quality of development opportunities are the main constraints of integration of ICTs in teaching and learning. Provision of infrastructure has little impact on learning experiences, unless there is an attainment of proficiency in literacy and numeracy, underlying use of ICTs with (OECD, 2015, p89).

Studies conducted so far, focus more on enabling and constraining factors on use of ICTs for teaching and learning in developed and developing countries. This study contributes to ongoing conversation on the extent to which teachers in developing countries capitalise on enabling and constraining factors to provide learners with learning opportunities specifically in Maths, Life Sciences and Physical Science in order to determine action required from

learners. Further research is needed to explore the types of opportunities created with ICTs and actions expected from learners.

3. CONCEPTUAL FRAMEWORK

Four stages of pedagogical usage of ICTs were employed as a lens to investigate factors that teachers experience as enablers and constraints in using ICTs for learning and teaching in order to determine whether there are any enablers and constraints that teachers experience in using ICTs available at MSTA pilot schools, to determine the common usage of ICTs available at MSTA schools, to explore learning opportunities created with available ICTs and actions expected from learners.

Pedagogical usage of ICTs involves four stages

- a. Emerging: This is the initial stage where ICTs are used to support daily work performance.
- b. Applying: This is the stage where ICTs are used to enhance traditional classroom practice.
- c. Infusing: This is the stage where ICTs are used to facilitate learning.
- d. Transforming: This is the stage where ICTs are used to create innovative learning environments (Majumadar, 2009, p4-5).

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4. METHOD AND RESEARCH DESIGN

A case study approach is adopted for this study, because the study reports on a single case of grade 10 Maths, Life Sciences and Physical Science teachers who have been trained to use ICTs provided at their schools (Plowright, 2012). Mixed methods were employed to validate results in order to answer the main research question: Which factors do teachers experience as enablers and constraints in using ICTs for learning and teaching in MSTA schools?

4.1 Participants

Grade 10 teachers who have been trained to use ICTs and teach Maths, Life Sciences or Physical Science from 101 MSTA secondary school were invited to participate in the study.

4.2 Profile

Of this sample, 55% (37), 28% (19) and 16% (11) taught Maths, Physical Science and Life Sciences in grade 10 respectively and half (51%) taught these subjects in either grade 11 or 12. Participants were evenly distributed, District A 30% (20), District B and C 23% (15) each and District D 24% (17). Majority of the participants were male, 79% (53), with only 23% (14) female. Of the sample, 68% (45) taught in schools that were in rural areas and 32% (22) in peri-urban areas. In terms of teaching experience, 46% had less than 5 years, 12% (6-10 years), 14% (11-15 years), 8% (16-20 years) and 20% with more than 20 years. In terms of age, 39% were above 41 years, 8% (36-40 years), 19% (31-36), 19% (25-30 years), 15% (18-24).

4.3 Data collection

4.3.1 Questionnaires

Questionnaires were distributed on the first day of the three-day Maths, Physical Science and Life Sciences workshops for participants to complete at own time and collected on the last in June 2018. They were completed by 69 teachers. Questionnaires were piloted with MST teachers from five MST primary schools, but data are not included in this study. Ethics clearance was obtained.

4.3.2 Focus groups

To ensure reliability, four semi-structured focus groups that constituted of six teachers were conducted. Focus group interviews were conducted before dinner on the first and second day of the three-day workshops. Interviews were audio recorded and transcribed verbatim. Interviews were open ended and requested teachers to describe factors that they experienced as enablers and constraints. For example, participants were asked “Tell us about the ICTs that your school have, how often you use them and why”? Sometimes a question was posed differently “Besides ICTs that you received, which other ICTs do you use. Explain how you use them? Here we wanted to determine the common usage of ICTs, which enabled us to determine the action that was expected from learners.

5. DATA ANALYSIS

Iterative and inductive process was used to analyse qualitative data. One researcher read out the transcribed interviews and whenever a segment of text that described factors that teachers experienced as enablers and constraints, what they used ICTs for and the action expected from learners, we coded the text as such. We independently read transcribed interviews and engaged in open coding by generating categories. We met to compare, question and debate the codes. The codes were then clustered into themes. These themes were then used as factors encountered by teachers as enablers and constraints in using ICTs for learning and teaching. Quantitative data were interpreted using SPSS. Triangulation was used as the last step, with the hope that qualitative and quantitative data will converge to support the findings (Bell, 1998, p102).

5.1 ICTS available at MSTA schools

In terms of infrastructure, 61% (41) of teachers indicated that their schools had one Interactive White Board (IWB), while a quarter (25%) had two and 13% had more than two and only 3% (2) had none. Besides IWBs, they reported that have access to desktop computers, laptops, data projector, tablets PC's, document cameras, voice recorder, cellphones, Youtube and Siyavula as shown in Figure 1.

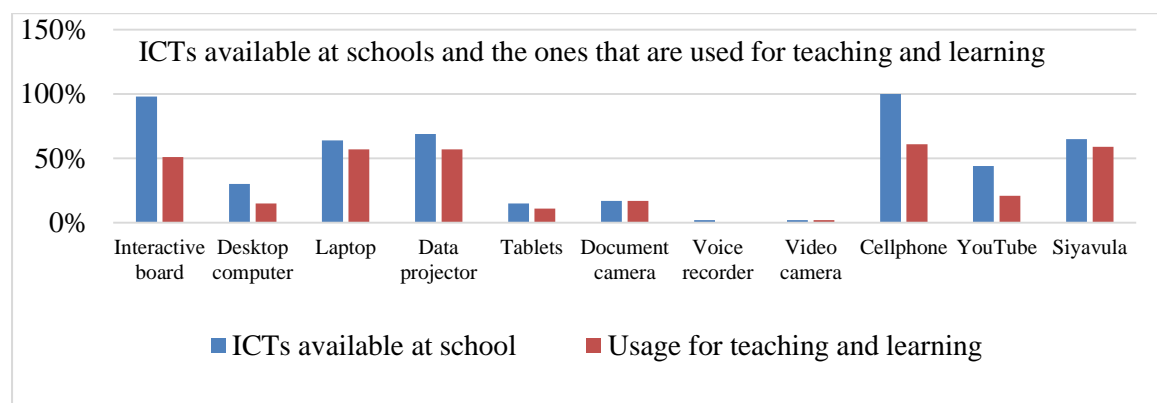


Figure 1: ICTs available at schools and those used for teaching and learning

It can be seen from Figure 1 that all teachers have cellphones (100%) and 98% have IWBs. However, only 61% and 51% used cellphones and IWBs for teaching and learning respectively. It can be seen in Figure 1 that 57% of teachers used laptops, 59% used Siyavula and 57% used data projectors, probably because teachers were at the “Emerging” stage of using data projectors as representational tools. One reason cited was that 45% have not been

trained to use IWBs as shown in Figure 2. Convenience of accessibility of cellphones was cited main reason of more usage of cellphones than IWBs.

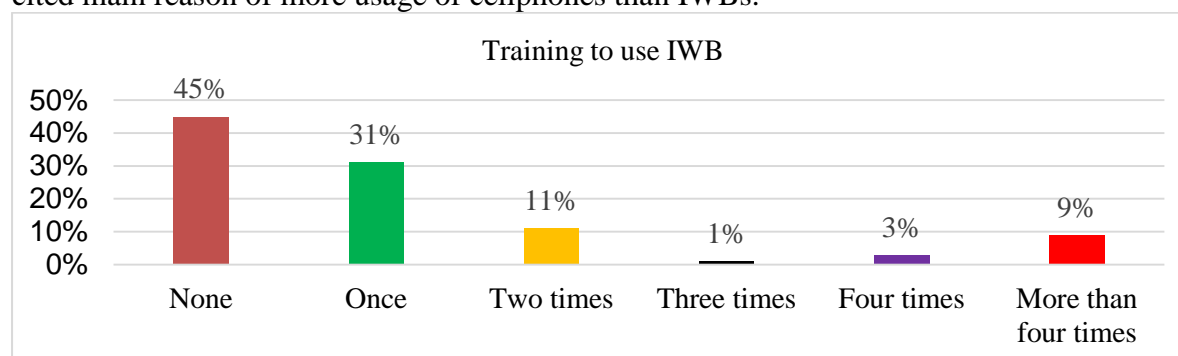


Figure 2: Number of times teachers were trained to use IWB

Two champion teachers indicated that they were trained more than four times to use IWBs. Teachers indicated that the training was inadequate. The inadequacy of training could be attributed to 34% (21 of 62), another 34% (21), 24% (15) and only 8% (5) rated their competency level to be uncomfortable, fair, comfortable and very comfortable respectively. Training did not translate into proficiency, since only one teacher who attended more than four, two who never had any training and one who attended training once were very comfortable as shown in Table 1.

Table 1: Proficiency on use of IWB

Proficiency on use of IWB	No (%)	Number of training						
Level	No (%)	None	Once	2	3	4	More than 4	Tot
		29(45%)	20(31%)	7 (11%)	1(2%)	2 (3%)	6 (9%)	
Very comfortable	5 (8%)	2	1	1			1	5
Comfortable	15 (24%)	2	6	2	1	2	2	15
Fair	21 (34%)	6	10	2			3	21
Not comfortable	21 (34%)	15	4	2				21
No responses	5 (0%)							5
Total		25	21	7	1	2	6	69

5.2 Usage of ICTs available at MSTA schools

Figure 3 shows that IWBs were commonly used as a chalkboard (49%), since 43% indicated that they were trained to use them as a chalkboard and 43% reported that they were proficient in using IWB as a chalkboard, 23% as chalkboard and Icons and 26% as a Chalkboard, Icons, Internet connection and with other learning platforms. IWBs were commonly used for content delivery. The common action expected from learners was listening and watching. The move towards “Applying” stage was affirmed by Teacher 1 saying “*I use it as a chalkboard to present my lessons. It keeps evidence that I have done the lesson. Lessons will be available for my class. Even my Head of Department can see that I have already covered the work*”.

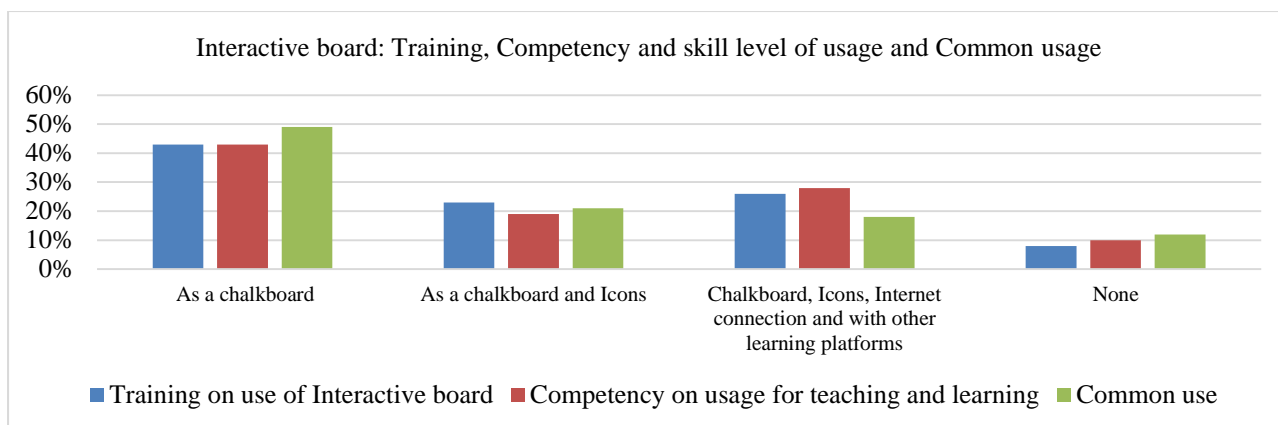


Figure 3: Training on aspects of IWB and common usage of the board.

Teachers cited that use of IWB helped them save time, Teacher 2 saying *“It saves time. It makes reflection much easier. You can save the lesson. You can go back later...”*. When teachers spoke of using IWB to review work done, shows that work covered is digitalised. Teacher 19 affirmed the convenience of using IWB saying *“It has become easy to download short video clips from Youtube that explain specific concepts, especially those that my learners struggle with”*. It is clear from Figure 3 that only 28% of teachers were competent to IWBs with other learning platforms as reported by Teacher 3: *“I use the board with Siyavula. Siyavula is like a textbook. When I find questions in there, I highlight on the board and let learners work on them. I also use the board with Youtube to watch a video online and elaborate...”*.

The use of IWB with other learning platforms implies that content is presented in multiple formats. It is interesting to realise that learners have been actively engaged, in that they were given an opportunity to work on specific questions that the teacher got from Siyavula. The teacher’s comment that learners were also given an opportunity to watch video clips on Youtube shows that styles of learning were accommodated (Eilam & Gurtler, 2010). Clark and Mayer (2016, p35) however point out that ICTs should be used with caution, especially that human cognitive processing is limited. Teacher 14 pointed out that for specific concepts that learners struggle with, she shares video clips via the class Whatsapp group, saying:

I have created a Whatsapp group, but we stick to the ground rules. I use it to communicate important information. I share one or two short video clips on specific concepts a day before I present the lesson on Whatsapp. Although not everybody is on Whatsapp, but I find it helpful. Some learners ask family members about the concepts even before I present in class. We have a policy on cellphones.

When teachers cited how they capitalised on affordances of Whatsapp as one ICT that both teachers and learners have access to, it became clear that teachers have moved towards “Infusing” stage. When Teacher 14 spoke of sharing video clips a day before the lesson, shows that teaching and learning takes place beyond the classroom. Teacher 5 reported that Whatsapp is commonly used for communication, sharing of resources and as a presentational tool saying

I have also created Whatsapp group. In most cases during exam, like now in June, we used Whatsapp to share information. I used audio clips to teach few chapters we could not finish. Audio clips are easily downloaded. We used Whatsapp a lot to interact

towards exam. They would ask questions. I was not the only one answering their questions, but their families were involved.

It was interesting to find out that Whatsapp was not used for communication, but for peer to peer collaboration, which shows that teachers were in “Transforming” satge. Teacher 6 reported that

We do have Whatsapp group for grade 12 learners for instructions, but our school policy does not allow them to bring cellphones to school. What I like about Whatsapp, is that they use their cellphones. We as a school do not worry about security issues. If I want to instruct them on what needs to be done, I just send them the message on Whatsapp. Even if I want to give them homework, like when I am in a workshop, I send it on Whatsapp. And sometimes you find learners use previous question papers to ask Maths questions on Whatsapp. I give them a chance to answer the question first. If they cannot get the steps right, then I will send a voice note and they follow in their study guides. Sometimes, I send a video clip showing all steps how I got the answer.

It was clear that accessibility of cellphones was experienced as an enabler. It can be seen that participants capitalised on affordances of Whatsapp more than other ICTs provided at MSTa schools. The fact that the participants pointed out that the security of cellphones was not the school’s problem, clearly explains why cellphones were the mostly used. Participants cited time constraints, security, accessibility, willingness, infrastructure, access to continuous professional development opportunities and communication as environmental and personal factors that were experienced as enablers and constraints in using ICTs in MSTa schools.

5.3 Time constraints

Teachers reported time as the primary constraint. Seven teachers reported that they learnt to use ICTs at their own time and pace. In their opinion, coverage of content competes against time demands on both teachers and learners. Several teachers reported that they worked under pressure to ensure that prescribed work is finished by mid-year, to have enough time for revision. To them ICTs requires time and effort to learn to use them, preparation time. Their main concern was on the extent to which learning has taken place, as reported by Teacher 8:

My Head of Department, my principal, Curriculum Implementers, our Circuit Manager, Provincial officials, parents, learners and me too want to produce good matric results...What matters most is whether learners have understood the work that we have covered on a specific day. That is why we have morning and afternoon studies. I teach on weekends as well.

This comment shows that the use of ICTs is seen as an add-on, instead of being integral part of teaching and learning. Working under pressure is affirmed by the Secretariat of South African Teachers’ Democratic Union (SADTU, 2019) saying that “an improvement of grade 12 results in 2018 is due to teachers’ sacrifice of family time, teaching seven days a week, early mornings, holiday classes and study camps”. Pressure experienced by teachers is further affirmed by Equal Education (2017) cautioning against unhealthy competition amongst schools on matric results. Participants’ comments on pressure need further research as this was not the focus of the study.

5.4 Security

Security of ICTs was cited as a priority, Teacher 3 saying “*We had laptops, tablets and computers in our school, but they were stolen. That is why the few that we have, are used for*

admin only". The importance of security could be seen by the emphasis made by the Teacher 3 reporting: *"That is why I am saying, let them prioritise security, because they were not the first that were got. The laptops and Tablets were stolen"*.

Seemingly, communities did not take ownership of the ICTs provided at the MSTA schools as reported by Teacher 17.

I think in that case, the first thing that must be done, is to increase security, because before these gadgets are delivered, there is word out there that we will be getting these gadgets.... If they will be stored in the classroom, they (Department of Education) must make sure that the classroom has burglar bars and an alarm. Because before they are delivered, already the word is out there that these gadgets are coming to our school.

Security of ICTs in schools appears to be a general concern. It is however more concerning that participants view community as a threat when they spoke of *"word being out there that gadgets are coming to our schools"*. The comment explains why participants suggested that the Department of Education should provide security. Further research should be conducted why communities are not keen to secure ICTs that are used for their own children. Teachers were more concerned about increasing security measures, than increasing cyber security awareness, Teacher 24 reporting:

I do not think putting those security bars is enough, because they did not work for us.

I think the department should give us personnel, people who will be there and be paid by the department. They should install alarm system, although these people are clever.

At least there will be something to alert community that something is not right.

Although participants viewed increase in security measures as an enabler, these measures were regarded as constraints.

5.5 Accessibility of ICT

Participants reported accessibility of ICTs as a constrain, Teacher 11 saying: *"Due to security reasons, Tablets are kept in one place which is very small. I have to take learners in small groups, which requires time... It would much easy if learners could have Tablets in the classroom in all subjects, than having to waste time going to the venue. I end up using the chalkboard,..."*.

Teachers' comments on less usage of Tablets is attributed to location as a constraint. Teachers were of the opinion that IWBs should be made available and accessible to all teachers. The insufficient number of IWB's is evident from Figure 1. Teacher 10 reported the effect of accessibility saying: *"Using it (IWB) everyday, is training on its own. If they can be installed in every class. You will use it every day.... If it is in your class, it becomes part of your teaching"*.

When teachers spoke of use of IWB as training, shows that accessibility of ICTs could have provided participants with an opportunity to integrate them in teaching and learning as they spoke of ICTs becoming part of everyday teaching. Teacher 13 pointed out the impact of security saying: *"You find that most of these classes with the interactive boards are locked. So, it becomes a difficult to go in there anytime... If it can be available for everyone, not only*

for Maths, Physical Science and Life Sciences teachers. This would make it so easy to get assistance from anyone when I get stuck”. Their comments on learning from peers, is an indication of peer support.

5.6 Presence of onsite support

Participants reported the presence of champion teachers as being helpful. They however indicated that they would have preferred to have critical mass of champion teachers onsite, Teacher 1 reporting: *“For now, every teacher asks our fundi... There are times when I need help and ja, you find that he is busy or not in, I have to call technician who takes time or does not come. I prefer calling or whatsapp one teacher from our neighbouring school. If every class has an Interactive board, every teacher will be able to use it anytime and we will all become fundis”*.

The presence of champion teachers is seen as an enabler as reported by Teacher 11 *“In our circuit, in every cluster meeting, we showcase small things we have tried using the boards, document cameras or Whatsapp. As a result, we have more teachers whom we may ask for help and not rely on one teacher”*. It is evident that teachers’ willingness to showcase innovations has created a community of practice. The critical mass of innovators was however concentrated in three circuits in one district. Several teachers in the three circuits reported that they learnt to use ICTs available at their schools at their own pace and time.

5.7 Willingness to use ICTs

Eight teachers indicated that they learnt to use ICTs on their own. It was found that these participants were less than 30 years and have used some of the ICTs where they studied, one teacher saying *“I didn’t get a formal training. ...when the Board came, I went through it and realised that I could use it. It is like a computer. If you are computer literate,...”*. It was revealed that some of these teachers became critical mass of ICT innovators who provided onsite support via whatsapp.

Lack of willingness to explore available ICTs was evident when teacher reported: *“At our school, we do not use these things.”* Another participant listed all ICTs available at school saying *“In my school, we have Smart board, laptops,... but I have never used them, but I produce good results.... They are used by one teacher who went for training”*.

Participants’ comment on producing good results without use of ICTs affirms the notion that use of ICTs enhances teaching and learning when underpinned by pedagogy (Kalantzi & Cope, 2012). It was clear that teachers did not realise that the availability of ICTs was for them to create learning opportunities with the aid of ICT, think about their teaching practice and ensure that there is an alignment of teaching and learning (Bath & Bourke, 2010).

5.8 Training and Continuous Professional Development Opportunities

Participants were of the opinion that training on using IWB was inadequate. This explains why out of 98% with IWBs, but on 51% used them (Figure 1). One participant pointed out that *“In our schools we were given, what can I say, one or two hour training (laugh)”*. This comment implies that training was a demonstration, but they preferred hands-on training as reported by Teacher 19 saying: *We received all these gadgets but we were not properly trained. We attended a two-hour training... We were shown how to use the board. It was lot of information...I think training should be for all teachers, not Maths and Science teachers”*.

When teachers spoke of being shown to use an IWB, implies that teachers could not see how the use IWB helps them design the way in which learners engage with teaching and learning activities in order to achieve the intended learning outcomes. They indicated that lot of

information was presented, but there was limited time to process it. It could be seen that before using ICTs, teachers needed more time to think of learning opportunities that they may create, capabilities and limitations of ICTs and specific outcomes that they wanted to address, not use ICTs because of their availability. The comments further show that teachers preferred ongoing support and professional development opportunities to model how to teach with ICTs, not to be provided with technical knowledge.

Teachers pointed out that training should be for all teachers, because those who do not teach MST might feel isolated. Teacher 13 however pointed out that teachers should take the initiative of learning to use IWBs saying: *"I don't think we should wait for the department to train every teacher. I went for the training, but it was not enough. I have learnt to use most of the stuff on my own, so I train my colleagues...So in my school, the board is used by any teacher,.."*

This comment shows that some teachers took responsibility of using IWBs. It further shows some teachers realised that it would not be feasible for the Department of Education to train all teachers. Two teachers however indicated that they were more concerned with basic needs.

5.9 Needs analysis

It was revealed that ICTs were provided without consultation with key stakeholders. Teacher 15 reported: *"In our school, we do not have enough classrooms. Our classes are overcrowded. We need more classrooms"*. An emphasis on the classrooms as the basic need is understandable considering that only 55% of schools have adequate classrooms in Mpumalanga (Department of Basic Education, 2019). Teacher 16 reported *"In our school, the Tablets and laptops are kept in the principal's office, because it is secured. We need classrooms, before we even think of spending money of securing Tablets...."*

Teachers' comments show that ICTs were provided without thorough needs analysis. Teacher 5 pointed out that *"They (ICTs) were just brought to our school...I have created a Whatsapp group and it works well for me"*.

In conclusion, the results show that Whatsapp was the commonly ICT used for teaching and learning than ICTs provided at MSTA schools. Frequent usage of Whatsapp can be attributed to convenience of accessibility of cellphones to both teachers and learners and that security of cellphones was not schools' responsibility. IWBs were commonly used as representational tools, probably because similar teaching practice was applied.

Seemingly, ICTS were provided without proper consultation with respective stakeholders. Teachers pointed out basic needs, such as classrooms that should have been prioritised.

6. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The purpose of the study was to investigate factors that teachers experience as enablers and constraints in using ICTs available in MSTA schools. These findings enrich our understanding on usage of ICTs and determine actions expected from learners, but we could not determine level to which learning experiences was enhanced. These results echo previous studies in that ICTs were not used or underutilised (Hawkrige, Jaworski & McMahon, 2016), due to security reasons (Mdlongwa, 2012; Mathipa & Mukhari, 2014).

An increase in security measures led to inaccessibility of ICTs and less usage. OECD (2015) recommends that ICTs should be located in classrooms than have users to commute to centralised locations. A study by Kozma and Vota (2014) revealed that almost a third (27%) of laptops in schools could not be used due to security measures in developing countries. It has been noted that access to ICTs does not translate to usage (Chigona, Chigona, Kausa &

Kayongo, 2010; Laurillard, 2012). Easy access to ICTs provides explorative opportunities and enable teachers to become confident (Zhao & Frank 2003). Teachers shared small interventions they have tried with ICTs and thus created a critical mass of innovators, but not enough for the whole province.

It is evident that the teachers started from “Emerging” stage in that IWB was used as a representational tool (Alfaki & Khamis, 2018), in that it requires little adjustment from existing teaching (Zhao & Frank, 2003). Presentation of content digitally does not change the way learners learn (Laurillard, 2012). Almost two decades ago Miller and Glover (2002) argued that IWB should not be used to fit the existing teaching practice, but that teaching should be redesigned to facilitate learning. De Korte (2007, p92), the social constructivist echoes that teaching should be seen as a creation of learning opportunities to facilitate knowledge building.

The common usage of ICTs as representational tools implies that learners were commonly expected to listen, view, read, download and answer questions individually and as a group. Learners appeared to have limited time to process all information (Clark & Mayer, 2016). According to Cognitive Learning Theory, learners were able to ask questions after processing learning material verbally, visually or both and integrate acquired information with what they already know (Clark & Mayer, 2016). The convenience and affordances of Whatsapp enabled teachers to move from “Emerging, Applying, Infusing to Transformation” stages.

It was evident that teachers to see the impact of using ICTs. Else use of ICTs was seen as an add-on, instead of using ICTs as an integral part of teaching and learning. Teachers pointed out that they were provided with technological knowledge, but not given a chance to think critically about the curriculum and own context (Bath & Bourke, 2010).

Our study highlighted the importance of conducting needs analysis before ICTs are provided. Lack of infrastructure is echoed by the School Monitoring Survey 2017/2018 which shows that only 59% of schools in South Africa comply with physical minimum infrastructure standards (Department of Basic Education, 2019). The report shows that only 76% of schools have running water, 80% have adequately functioning sanitation, 67% with classrooms, 87% with fencing and 55% with Internet.

Teachers were provided with technological knowledge, but they did not have time to rethink of rationale for use of ICTs, their own teaching practice and context. Hence ICTs were commonly used to complement the existing teaching practice (Laurillard, 2012).

Future research should include learners’ voice, focusing on how the use of ICTs helped them learn and what actually helped them learn. The results of this study cannot be generalised, as this was a case study of MSTa pilot schools.

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EXPLORING DISTRIBUTED LEADERSHIP AND ASSET-BASED PERSPECTIVE IN IMPROVING SOUTH AFRICAN RURAL SCHOOLS

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Abstract

This paper dwells on a theoretical discussion of distributed leadership and asset based perspective as complementary approaches in the improvement of South African rural schools. Research pertaining to schools located in rural contexts is largely dominated by deficit paradigms which undermine the potential and talents of various stakeholders involved in the provision of education in rural schools. In essence, school improvement is a complex endeavour that may not be effectively tackled by a single school leader hence the relevance of distributed leadership. Thus, in seeking to explore school improvement in South African rural schools, this paper uses a two-pronged theoretical framework consisting of distributed leadership and asset-based approach. I, argue that an application of a blend of asset-based approach and distributed leadership theory is essential for improvement of South African rural schools.

Keywords: Assets; Distributed leadership; Education; Rurality

Introduction

School improvement is concerned about schools being made better places for learning (Hajisoteriou, Karousiou, & Angelides, 2018). It emphasises renewal and an attempt to improve learners' performance (Makoelle. 2014). School improvement in South Africa is essential due to globalisation and modernisation wherein South Africa partake in international educational initiative such as international tests for learners. South African learners have always performed poorly in the said tests as compared to other learners from emerging economies (Moorosi, & Bantwini, 2016).

At national level, there is a great disparity in terms of resources and academic performance of learners in South African schools. In relation to learner performance, there are South African schools that have excellent performance. In essence the performance of these schools is at par with the best performing schools in the developed countries. Yet in the same country, there are schools which are labelled as dysfunctional partly due to their poor performance (Chikoko, Naicker & Mthiyane, 2015). The schools with excellent performance largely consist of ex-model C (former white schools) while the less performing schools are those located in rural areas, farming, townships, informal settlements and mining areas. Learners who attend the first category of schools are mostly Whites, Indians and black African middle class. The second category of schools is attended by mostly black and some Coloured learners. Comparatively, the second category of schools is found in multiple deprived contexts which include poor infrastructures and lack of resources (Maringe & Moletsane, 2015). Former model C schools learners out perform their counterparts in multiple deprived contexts including rural schools (Maringe & Moletsane, 2015). If the challenge of learner performance in general and school improvement in particular is not addressed, it is unlikely that South Africa will achieve the educational aspirations of United Nations' sustainable development goals and African Union Agenda 2063.

School improvement is linked to school leadership. Townsend (2011) argues that school leadership is essential for learners' high academic achievement. Other scholars claim that school leadership is second to classroom practice in relation to their importance on student

outcomes and school impact (Bush, Bell & Middlewood, 2010). In a systematic review of literature, Hitt and Tucke (2016) conclude that leadership practices that influence learners' performance include, inter alia, building trusting relationships, providing individual consideration, effective human resource management, creating communities of practice, acquiring and allocation resources for mission and vision, creating a supportive learning organisation and building collaborative processes for decision making. Another essential role of school leadership pertaining to school improvement is teacher professional development. Tran, Hallinger and Truong (2018) found that school principals' leadership practices which are school context sensitive are essential for teacher professional development which in turn leads to school improvement. Their findings highlighted such leadership practices as moral purpose, collaboration, learning support, and motivational strategies.

More studies about school improvement have been done in developed countries (Harris, 2004; Leithwood, 2016). In South African, there is an emerging literature about effective leadership in multiple deprived context including rural areas (e.g. Chikoko, Naicker, & Mthiyane, 2015; Maringe, 2015). In a qualitative study that involved five school principals regarding effective leadership practices in multiple deprived context, Chikoko et al (2015) argue that schools located in multiple deprived context, including rural context, require strong leadership that draw from strength-based approaches to realise their goals.

While the existing studies about school improvement and leadership provide insights into how leadership influences school improvement, little is known about distributed leadership and asset-based perspective in improving South African rural schools. Thus, this paper is intended to contribute knowledge in this regard. With increased knowledge about application of a blend of asset based and distributed leadership approaches, schools located in rural areas are likely to improve. The paper commences by highlighting the need to shift from deficiency discourse about rurality to strength-based discourse. Thereafter, a two-pronged theoretical framework is discussed. Lastly, the paper dwells on the application of a theoretical blend of asset-based perspective and distributed leadership in improving South African rural schools.

The need to shift from deficiency discourse about rurality to strength-based discourse

Literature on rural schools is largely dominated by deficit discourses. Such discourses describe rural context in comparison with urban context and highlight deficiencies in rural context (Masinire, Maringe & Nkambule, 2014). These include, but not limited to, poverty, exclusion, neglect, disease, backwardness and depopulation (Balfour, Mitchell & Moletsane, 2009). The deficit discourses portray an image of needy and problematic schools. This image is only part of the truth, but not absolute truth. If it is regarded as the absolute truth, it would call for deficiency-oriented approaches in an effort to address such problems (Kretzmann & McKnight, 1993).

The deficiency discourse undermines the potential and talents of various stakeholders involved in the provision of education in rural schools (Masinire, Maringe & Nkambule, 2014). Lack of improvement in rural schools is due to the dominance of deficiency discourse in education research. To promote change in rural schools, there is a need to focus on strength-based epistemologies (Moletsane, 2012; Makhasane & Khanare, 2018). Thus, there is an urgent need for a paradigm shift in discourse and conversations about rurality and school improvement. This positional paper attempts to contribute knowledge to such discourse and conversations.

Theoretical framework

This paper is underpinned by a two-pronged theoretical framework consisting of asset-based approach and distributed leadership. The two theories provide an appropriate strength-based lens to inform school improvement in South African rural schools.

Asset based approach is rooted in the idea that stakeholders in any community are endowed with talents, skills and capacities that can be used for the benefit of the community (Kretzmann & McKnight, 1993). Thus, the development of the community should ideally be driven from inside out. It is bottom-up approach in which collaboration, participation and dynamic partnership is prioritised (Ebersohn & Eloff, 2006). Each stakeholder within the community is capable of contributing to the development of the community. The school and classroom settings as well as individuals and groups possess skills and talents that can be used for school improvement. The schools located in rural contexts also have assets that can be mobilised for their benefit. Chikoko and Khanare (2012), for example, found that one rural school had a various assets that the School Management Team identified in addressing the needs of vulnerable children. Such assets included. Inter alia, vulnerable children themselves, School Management Team and local organisations. Even though asset-based approach advocates for the school to use its own assets, the school still needs resources from outside (Kretzmann & McKnight, 1993). In this way, school improvement can be enhanced through the relationships people or organizations that are external to the school.

Distributed leadership is based on the assumption that leadership emanates from various sources (Spillane & Orlina, 2005). In other words, leadership in a school is exercised by more than one person. As this theoretical paper is concerned about improvement of South African rural schools, distributed leadership perspective was deemed to be a suitable theoretical lens in explaining and proposing leadership practices of various formal and informal leaders. Such leaders include principals, deputies, Head of Departments (HoDs) and learners. Literature shows that distributed leadership has a positive impact on learners' performances and change in the organisation such as the school (Harris, 2008).

Distributed leadership theory does not undermine the leadership role of the principal; rather it provides an explanation of the manner in which the principal shares leadership and management roles with others. In South Africa, the educational policy framework which has its roots from the Constitution encourages distributed leadership. This is clear in the establishment of School Governing Bodies, and Learners' Representative Council of learners as per the mandate of South African Schools Act. In this arrangement, the principal is empowered to invite various stakeholders to take part in the transformation of education. As a result, distributed leadership is promoted (Williams, 2011). Spillane and Diamond (2007) suggest co-leading practices of various leaders who apply distributed leadership principles namely: collaborated, collective and coordinated. Collaborated distributed leadership practice is where multiple leaders focus on one activity at one place simultaneously. Various leaders may also work separately even though their tasks are interdependent. This distributed leadership practice is collective distribution. Coordinated distributed leadership practice manifests in the activity that is carried out in sequence.

Applying a theoretical blend of asset based and distributed leadership theories for school improvement

In this section, I discuss the application of asset-based approach and distributed leadership in improving South African rural schools. The discussion is organised into two broad issues emanating from asset-based approach: (1) Harnessing assets within the schools and (2)

harnessing assets outside the schools. In keeping with the focus of this paper, I also highlight how leadership could be spread among various leaders.

Harnessing assets within the schools

The principles of asset-based approach and distributed leadership provide a helpful guide in understanding the potential and possibility of the manner in which school improvement in South African rural schools can be enhanced. One of the principles of asset-based approach is that every individual in the school has abilities, talents and skills that can be used to contribute to the vision and mission of the school in general (Kretzmann & McKnight, 1993; Ebersohn & Eloff, 2006) and school improvement in particular. In this way, learners, teachers and school principals are endowed with potential and skills essential for school improvement. The harnessing and use of these assets requires an effective leadership hence the relevance of distributed leadership. As observed by Harris (2004) leadership is more effective when is distributed across multiple leaders. Cognisant that schools in general and rural schools in particular have different vision and mission, the achievement of them (mission and vision) depends on how stakeholders understand and work towards their achievement. In a situation where leadership is spread across multiple leaders in a school, the articulation of the vision and mission can be the ‘business’ of various leaders at different levels of the school. For example, if the school’s vision and mission are developed to encourage academic excellence in a given school, the principal should communicate this message to learners and teachers at school level. Similarly, the Head of Departments communicate should communicate the same message to teachers during departmental meetings. In turn, the teachers should articulate the message at classroom level.

In an effort to improve school performance, stakeholders are expected to embrace change. This is more likely in a situation where various leaders among teachers and learners influence others to accept change for betterment of schools. The principals’ roles as formal leaders are fundamental in creating and enabling environment where leadership can emerge from multiple sources (Williams, 2011). Mobilisation of assets within the schools also allows for teachers to learn from each other regarding the best practices in improving learners’ performance. In essence, teachers whose learners perform well are assets which can be used for the benefit of other teachers. School leaders have a duty to identify such assets and to create necessary conditions for teachers to learn from one another.

Learners can be regarded as important assets (Chikoko & Khanare, 2012) for school improvement endeavours. Since the most important task in a school is teaching and learning, the performance of learners is a bench mark that can be used in determining school improvement. Thus, in considering learners as assets the role of various school leaders is of paramount importance. The formal leaders such as the principal and other members of School Management Team (SMT) should set high standards of expectation and performance for all the learners in the school. Learners should be made aware that rural context is not a barrier to high performance. The principal, SMT and teachers can engage in a collective distributed leadership practice where formal leaders (Principal and other member of SMT) motivate learners at school level while the informal leaders (teachers) perform the same task at classroom level. Furthermore, learners as assets should be allowed to identify opportunities that the school can explore in order to enhance school improvement. There is empirical evidence that where learners are given an opportunity to air their views about academic issues, their performance is also likely to improve (Hajisoteriou, Karousiou, & Angelides, 2018). They should also suggest how they can contribute to the improvement of their school. Learner leaders in collaboration with SMT and teachers can lead this process.

Teachers are also assets that are useful for school improvement. In a single case study conducted in Lesotho about leadership practices of turnaround low-performing school, Makhasane and Khanare (2018) found that teachers assisted each other in their endeavour to improve the performance of learners. Thus teachers' talents and skills should be harnessed and identified for school improvement. The teachers play fundamental role in the process of teaching and learning hence school improvement cannot be realised without their contribution. In the teaching and learning process, the teachers perform multiple roles which include, but not limited to, using teaching aids, classroom management and facilitating class discussion. There are also other activities that teachers perform to enhance learning. Quality teaching and improvement are possible where teachers collaborate and learn from one another. The SMT should create an enabling environment for this collaboration.

Harnessing assets outside the schools

Asset-based approach recognises the importance of assets from outside the schools in complementing those available within the schools (Eloff & Ebersohn, 2006). Thus in improving South African rural schools external assistance is still essential. School improvement, for instance, requires capacity building (Harris, & DeFlaminis, 2016). Networking with schools that perform well can assist struggling schools. In this way the former schools can be assets which can be used by the latter. In such networking arrangements teachers in struggling schools can learn about effective pedagogical practices from their counterparts in well-performing schools. Similarly, the principals and other formal leaders (deputy principals and HoDs), can learn effective leadership and management practices from effective school leaders in rural context. In order to create and promote networking with various schools leadership is required. While the school principal may provide such leadership, teachers are in a better position of identifying their counterparts in well-performing schools or schools that excel in specific subjects. In this way, distributed leadership becomes relevant.

Different resources are essential for improvement of schools. Yet many rural schools in South Africa lack resources (Khuzwayo, 2018). Schools located in rural context are often said to be lacking various resources including teaching aids. In view of the call in this paper to consider asset-based perspective, there are resources which can be identified and used in rural South African Schools. It is, therefore, imperative for multiple school leaders to identify and harness such resources. These require collaboration between schools and external organisations. In each rural context, there are external organisations that may be willing to assist the local schools. However, there should be a deliberate effort from the schools to ask for assistance. The local businesses, for instance, can donate financial and other materials to schools. In seeking assistance from the business community, the school may be required to submit a proposal which includes the budget. The members of SMT may not have skills and knowledge of drawing up the budget, but through harnessing of assets and distributed leadership the drawing up of the budget can be delegated to knowledgeable teachers (such as accounting teachers).

The establishment of partnership between the school and local leadership structures such as traditional leaders, local government councillors, and religious leaders can be of assistance for school improvement endeavour. The members of these structures may provide required resources by the school or influence those who have resources to extend a helping hand to the school.

Conclusion

This paper provided insights into the use of a blend of distributed leadership and asset-based approaches in a quest to improve schools in South African rural schools. While the paper acknowledges that there are visible challenges facing South African rural schools, the paper argues that deficit discourses and conversations fail to highlight strengths and skills of rural communities. The paper further argues that strength-based discourse in literature can inform practice pertaining to school improvement in South African rural context. The discussion in this paper hopes to have set the scene for further empirical inquiries about application of distributed leadership and asset-based approaches in improving South African rural Schools.

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STUDENTS' PERCEPTIONS OF THE FLIPPED CLASSROOM A TRADITIONAL UNIVERSITY IN THE EASTERN CAPE

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Abstract

The flipped classroom is an active, student centred approach that has been shown to provide better learning outcomes than traditional lectures in the classroom. However, there is still a shortage of research that evaluates the effectiveness of the flipped classroom, especially in South Africa, in higher education. The purpose of this paper is to investigate students' experience of a flipped classroom to improve teaching and learning in a South African university. The study made use of a quantitative survey approach with 82 undergraduate students completing a questionnaire (63% response rate). The study found that students were very positive towards the flipped classroom approach. The students further indicated that there were a perceived improvement in learning and communication. However, the students' felt that the workload of the course had increased as they were required to prepare prior to class. The recommendation of the study is that the flipped classroom can be used in higher education, but more research is needed as to how to implement it effectively.

Keywords: flipped classroom; traditional university; teaching and learning; student centred approach; South Africa

Introduction

Universities worldwide are confronted with a variety of problems. One of these challenges includes the massification of higher education as more students now qualify for university education, resulting in larger class sizes and lower throughput rates (Baepler, Walker, & Driessen, 2014). Traditional universities in South Africa provide a theoretical orientated degree programme to their students. Universities have traditionally made use of the face-to-face model of lectures and tutorials as a passive mode of course instruction and delivery (Butt, 2014). However, due to the massification of higher education, it has become difficult for lecturers to interact with students and estimate the level of understanding of the individual student until a formal assessment is conducted (Roehl, Reddy, & Shannon, 2013). One of the ways that lecturers have attempted to overcome the problem of massification is to make use of technology to improve the delivery of course content. When class material is made available online while the traditional class time is used to build conceptual understanding and cognitive skills among students, the approach is known as 'flipping' the classroom (Baepler, Walker, & Driessen, 2014).

With the flipped classroom approach, the traditional lecture and content is moved outside the classroom. This means that the activities of understanding and remembering, as described in Bloom's Taxonomy of Learning, occur outside the formal class time. The higher order activities of the Bloom's Taxonomy (creating, evaluating, analysing and applying) are incorporated during class time in the form of case studies, discussion or simulations to allow the lecturer to assess the students' understanding and correct any misconceptions immediately (See, & Conry, 2014). This type of learning environment comprises of an active learning pedagogy and collaborative problem solving (Butt, 2014).

Several studies have shown that this type of active classroom approach can perform better than traditional lectures when learning outcomes are compared. This is mainly due to the lecturer's ability to assess the students' understanding of the coursework as they interact

during the activities in class time. The lecturer becomes a facilitator in the classroom that assists students towards active learning, which in turn mitigate some of the challenges presented by the massification and traditional pedagogy of learning (Baepler, Walker, & Driessen, 2014; Butt, 2014; See, & Conry, 2014). Thus far, most research has focused on the students' perception of the flipped classroom in higher education (Butt, 2014; See, & Conry, 2014; Abeysekera, & Dawson, 2015; Triantafyllou, Timcenko, & Busk Kofoed, 2015). There is a limited body of knowledge available regarding the implementation of this teaching approach in higher education in developing countries, especially in South Africa (Le Roux, 2017). Sohrabi and Iraj (2016) state that only a few studies have reported on the implementation and student acceptance of the flipped classroom in this domain. The aim of this paper is then to investigate students' perception of the flipped classroom at a traditional university in the Eastern Cape.

Flipped classroom

Technology is a useful tool to facilitate effective communication among students and lecturers and thus, has the potential to increase throughput rates and student pass rates. Liu, Wu, and Chen (2013) define technology integration in universities as the "the amalgamation of a wide range of electronic devices and software that can be used to support education, learning and assessment at higher education" (p. 3).

One of the recent technological developments that has been introduced in teaching and learning is the 'flipped classroom' or 'flipped learning'. The origin of the flipped classroom started in 2006 when two high school teachers, Jonathan Bergmann and Aaron Sams, started to record their live teaching sessions and posting it online for their students to watch. The videos were initially used as a method for students that missed their chemistry class to catch up. The popularity of the videos soon became evident as other schools started making use of the videos as plans for substitute teachers, to learn chemistry content themselves, or revision for examinations (Bergman, & Sams, 2014). Flipped learning is a new pedagogical approach that moves direct, and often passive, instruction from the classroom to the individual learning space. Students have to prepare for the class by reading, watching recorded lectures, or listening to podcasts. The lecturer then uses the classroom as a dynamic, interactive, student-centric learning environment to apply concepts and engage creatively in the subject matter (Govender, & Maharaj, 2014). The purpose is to apply the knowledge that the students received prior to the class in order to problem solve with their peers. This approach has the advantage that it will improve collaboration among students and the lecturer, allowing for a more meaningful relationship between the various parties.

However, there are some challenges associated with this teaching pedagogy. These include the awareness and acceptance of the flipped classroom concept among lecturers and students, a lack of information technology support to implement the approach, and poor planning on the lecturers' part to incorporate the flipped classroom in their teaching pedagogy (Govender, & Maharaj, 2014).

Characteristics of the flipped classroom

The characteristics of a flipped classroom are discussed by Bergman and Sams, (2014) and Abeysekera and Dawson (2015) as active students where technology is used to facilitate active learning and the class time is spent on personalised instruction by providing real-world scenarios in order to help students grasp challenging concepts. This means that class time and traditional homework time is exchanged and students are engaged in higher order critical thinking and problem solving by making use of active learning and peer learning.

Advantages and Disadvantages of the Flipped Classroom

Studies have found that there is resistance to the flipped classroom approach. The resistance is mostly found when the approach is first introduced, but there are some students that remain opposed to the flipped classroom despite the advantages it poses (Baepler, Walker, & Driessen, 2014). These are mostly students that dislike group learning activities or prefer doing assignments on their own (Roehl, Reddy, & Shannon, 2013). Fulton (2012) states that flipped classroom advantages include that students can learn the material at their own pace, while the in- class activities provide the lecturer with better insight into student difficulties as they can use the time more effectively and creatively. The class content is available to students 24/7 via technology. Lecturers have also reported increased levels of student achievement, interest and engagement with the learning material as they are more actively involved in the learning process. Students that have missed class can watch the lectures at any time so that they do not fall behind. The second success factor, access to technology, applies to both lecturers and students. Technology is an integral part of the flipped classroom. Berrett (2012) states that technology has made it possible for lecturers to either produce their own videos or access lectures by leading authorities on the subject at no cost. Students can also access these resources from anywhere, meaning that learning is no longer relegated to the classroom. This type of differentiated instruction provides for the students to learn at their own pace and create flexibility in the content that is being presented (Roehl, Reddy, & Shannon, 2013). However, technology at universities has been limited to computer programs intended to supplement the lecturers' work thus far, e.g. processing software programmes or student management systems. Technology has not been integrated directly into classroom instruction, which means that a teaching pedagogy shift will have to be emphasised among lecturers (Flipped Learning Network, 2014).

A literature review of the flipped classroom in higher education was conducted in 2015 by O'Flaherty and Phillips (O'Flaherty, & Phillip, 2015). During the review, a total of 28 articles were identified on the topic that were published during the time period 1994 – 2014. The review found that the articles were published from 2013, indicating the novelty of the research topic area. Most of the studies (Berrett, 2012) were conducted in the United States of America, while the rest of the studies originated from Australia (Butt, 2012), the United Kingdom, Malaysia and Taiwan. The collective results from these studies indicate that indirect evidence of improved academic performance and student and staff satisfaction with the flipped approach are being reported, but there is still a lack of conclusive evidence that it will contribute to building lifelong learning in higher education (O'Flaherty, & Phillip, 2015). In South Africa a few research studies on the making use of the flipped classroom in higher education have been published in recent years. These studies are mostly limited to observations and reflections from the lecturers' perspective in their attempts to implement a flipped classroom. Mulder and van Oordt (2015) conducted a pilot study in an undergraduate taxation class at the University of Pretoria. The students used a podcast as a revision tool and later a lecture replacement tool in a flipped classroom strategy. While three quarters of the students indicated that the podcasts were helpful as a revision tool, only half of the students indicated that they were satisfied with the flipped classroom learning strategy. The North West University has adopted technology enhanced teaching and learning as part of their institutional philosophy. One of the factors that have been reported as an enabler in this process is the professional learning and development among the teaching staff. Le Roux (2014) reported that the flipped classroom had positive results among students in a rural campus of the University of the Free State. Factors that were identified in this study as important to the successful implementation of the flipped classroom include technology

problems and a student body not receiving instruction in their second or third language. The findings from this study suggest that the students were highly engaged along behavioural and emotional dimensions which allowed for higher levels of cognitive complexity and positive cognitive engagement.

Theoretical Framework

Constructivism is the theoretical framework used in this study and allows the student to link new information to prior knowledge. The flipped classroom allows the student to construct knowledge actively as they prepare for class. This knowledge is then tested as the lecturer provides a learning environment in the classroom that supports the students' efforts to acquire new knowledge and challenge them to make use of it to solve real-life problems (Sener, 1997). Therefore, the theoretical foundations used for justifying the flipped classroom typically focus on reasons why classroom time should not be used to deliver lectures. This means that students become active participants in the learning process as they are encouraged to seek the meaning in their experiences (subjective), which then become part of their knowledge. This approach is the foundation of the flipped classroom as students prepare for classes on their own by watching or listening to recordings. Knowledge is thus actively constructed by the student, not passively received from the lecturer (Taber, 2006). The purpose of preparing prior to the classroom is based on reducing the cognitive load on the students which allows them to process information more efficiently. Studies have reported a significant relationship between prior preparation for class and the students' mental effort, which states that students need fewer cognitive resources to learn new concepts with this approach (Flipped Learning Network, 2014). Although each student's subjective experience will be different, each is considered just as valid as those of their peers. Therefore, there are no objective criteria for what constitutes knowledge. This approach speaks to Vygotsky's theory that stresses the fundamental role of social interaction in cognition development. The zone of proximal development points to the difference of what the students can learn on their own and what they can learn with the guidance and encouragement of a knowledgeable person (McLeod, 2007). The flipped classroom allows the students to work in groups and learn from each other while the teacher becomes a facilitator in this process. This means that the teacher's role is no longer only to structure in-classroom time but now also incorporates providing learning resources that can be used by the student before or after class. This allows the students to move at their own pace through the learning material, thus personalising instruction (Davies, Dean, & Ball, 2013).

Methods

A quantitative survey method was used in this research study to elicit students' perceptions about whether a flipped classroom can improve the communication and access to course material. A descriptive survey research design was adopted in this study. Therefore, a descriptive research design was deemed suitable to explain and provide a detailed analysis of the state of the research problem which was clearly defined and made use of formal measures to collect primary data (Babbie & Mouton, 2014).

A structured questionnaire called the Student Perception of Instruction Questionnaire (SPIQ) was used to collect data. The SPIQ has twelve Likert-scale items that was previously published and assessed for internal consistency and reliability. The original instrument had a Cronbach alpha coefficient of 0.75, which was deemed acceptable (Pallant, 2010). The Likert type rating scale provided the students with 5 options (Strongly Agree, Agree, Neither Agree or Disagree, Disagree, Strongly Disagree). A score of below 3 indicated a positive impact while a score above 3 indicated a negative impact. A pilot study was conducted to test

the survey questionnaire. Two staff members at the university were asked to evaluate the questionnaire in terms of ambiguity and user friendliness. Both staff members expressed satisfaction with the questionnaire. Ethical approval was obtained for the University Research Ethics Committee to conduct the study.

The study was conducted at a traditional university in the Eastern Cape, and the study population consisted of one second year class that was registered for a Database course during the second semester of 2016. Thus, the entire class was the study population and no sampling was conducted. The research study was divided into three cycles: The first cycle involved 4 weeks of traditional lectures, the second cycle of 4 weeks introduced blended learning into the course, while the third cycle of 4 weeks made use of a flipped classroom to deliver class content. In this study, only the results for the first and third cycles will be reported. During the flipped classroom the students were given a worksheet prior to the class. On the worksheet the address of the YouTube video they needed to watch was provided as well as the questions that they needed to answer while watching the video. The questions helped the students to identify the most important information and provided discussion points during the class. A total of 131 students registered for the course, of which 82 completed the questionnaire after the first and third cycle of the study. This is a response rate of 63% which was deemed acceptable. The students were informed that the questionnaire would be confidential, their participation was voluntary, and they could withdraw from the study at any time without prejudice.

The descriptive statistics (mean and percentages) were used for data analysis that is represented in Table 1, using the Statistical Package for Social Sciences (SPSS 24). The Cronbach alpha coefficient (α) was used to test for internal consistency of the measuring instrument. A high Cronbach alpha coefficient suggests that the scale used is reliable. Values of 0.70 and above represent a good level of reliability, whereas values between 0.50 and 0.69 are considered to indicate an acceptable level of reliability (Pallant, 2010). A Cronbach alpha of 0.77 was calculated for the current questionnaire which was found to be acceptable.

Results

Table 1 provides the mean for the first twelve questions as well as the difference between the answers for the first and second cycle. A positive difference shows an improvement for cycle 1 (traditional lectures) and cycle 3 (flipped classroom).

Table 1. Average scores for cycle 1 and cycle 3

#	Question items	Mean for Cycle 1	Mean for Cycle 3	Difference
1	For the past four weeks in this class, I communicated a lot with other students	2.52	2.00	0.52
2	For the past 4 weeks in this class I talked with my lecturer	3.99	3.81	0.18
3	For the past 4 weeks, I have had to work hard in this course	2.24	1.97	0.27
4	I have learned a lot in this course so far	1.95	1.79	0.16
5	The assignments and projects I have worked on in this course deal with real-life applications and information	2.23	1.94	0.29
6	The availability of course materials,	2.28	1.82	0.46

	communication, and assessment tools helped me improve my learning			
7	For the past 4 weeks, I have applied my out-of-class experiences and learned from practical applications	2.65	2.70	-0.05
8	For the past 4 weeks, I have explored my own strategies for learning	2.38	2.24	0.14
9	Over the past 4 weeks, I have needed technical assistance for this class	2.51	2.24	0.27
10	For the past 4 weeks, availability and access to technical support and resources have helped me improve my learning	2.29	2.03	0.26
11	I would choose to take another course like this one	2.43	1.97	0.46
12	I like the routine in this class	2.15	1.88	0.27

Table 1 indicated that the students were very positive about the flipped classroom with only one question (question 7) registering a small negative difference between the results of cycles 1 and 3. The three questions that showed the biggest improvement were question 1 (0.52), question 6 (0.46) and question 11 (0.46). Question 1 spoke to the improved communication in the class, which is one of the benefits of the flipped classroom, while question 2 showed that the course material and assessment were more accessible to the students. Students indicated in question 11 that they enjoyed the flipped classroom and would choose to take another course that makes use of this approach.

The students were also asked which of the following characteristics have helped them improve their learning experience during the flipped classroom experience. The characteristic that received the most support was the class exercises and worksheet (28.4%), followed by the increased availability and access to content and course material (27.2%). The use of online resources, such as Google and YouTube, was supported with 19.8% followed by improved communication with the lecturer (12.3%).

Discussion

The objective of the study was to investigate students' perceptions of a flipped classroom at a traditional university in the Eastern Cape. The students were exposed to the flipped classroom during a second year semester course. The method of teaching was gradually changed from a traditional classroom to a flipped classroom by introducing technology into the teaching process. Overall, the students perceived the change as positive (87.9%) and enjoyed the new method of teaching (90.9%).

Improved communication among peers and with the lecturer is one of the most important advantages that the flipped classroom provides to the teaching and learning environment (Question one and two). Many authors have reported a marked improvement among the communication processes in their classroom previously, which is in line with the results of this study (Abeysekera, & Dawson, 2015; Fulton, 2012). The students were very positive (84.4%) about the improved ability to communicate amongst each other, while there was a small improvement with the communication with the lecturer (15.6%). While the lecturer was available during classes to participate in group discussions, the size of the class did not allow for individual attention. The layout of the classroom was also un conducive to small group activities, which prevented the lecturer from being able to access all the groups.

The majority of the students perceived the workload for the course to have increased according to question three (84.8%). This was expected as the students now have to prepare for the class. If they do not watch the video and complete the worksheet before the class, they are unable to follow the discussions in the class. In order to accommodate the students' resistance to the introduction of 'homework' before class, the exercises were initially included in their tutorials during the previous week.

The majority of the students felt that they had learned a lot in the course (90.9%, question four) and were able to use real-life applications and information during the class discussions (81.8%, question five). This is in line with the previous findings in the literature where higher order thinking skills are used during class time to solve problems instead of students passively receiving the information. Two thirds of the class (63.9%; question eight) also acknowledged that they had to reflect and explore their own way of learning during the class.

Class material is more accessible when the class is flipped as resources are available online. The students agreed with this statement (87.9%) while 69.7% stated that the availability of the resources had improved their learning (question six, nine and ten). Students also reported that their need for technical assistance with the class increased slightly as they needed to find online resources.

Conclusion

The flipped classroom is an innovative method to improve teaching and learning. The student-centred approach was well received by the students and while the perception was that the workload increased, the students could also explore their own way of learning during the class. The flipped classroom provides the opportunity for students to learn at their own pace and convenience, which is important for the digital natives currently in higher education. The limitation of the study is that it was a case study conducted with just one class which means that it is difficult to generalise to the student population in South Africa. Regardless, the results of the study do contribute to the scholarship of teaching and learning. The study also made use of quantitative research methods which limits the understanding of the topic. Future studies should use qualitative methods to reach a deeper level and richness of the students' perceptions around the flipped classroom.

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MANAGING BULLYING IN A SOUTH AFRICAN RURAL PRIMARY SCHOOL: THE ROLES OF EDUCATORS

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Abstract

Bullying remains an ongoing challenge in South African primary schools with repercussions for the victims educationally and psychologically, their families and those around them. Despite several attempts to curtail bullying in individual school contexts, the phenomenon remains on the rise. With its actual causes still a contestation; attempts to curb the phenomenon are ongoing. Considering that parents entrust their children to teachers to ensure discipline, how teachers engage with bullying is fundamental in understanding how parental trust is maintained. This qualitative study explores how teachers in a particular school manage bullying. It focuses on individual and collective strategies used by ten teachers in a previously disadvantaged primary school in the KwaMashu Township in KwaZulu-Natal, South Africa. Data was gathered using individual and focus group interviews. The study adopts the asset-based approach as a framework to explore how teachers manage bullying because it is underpinned by the notion that individuals have talents and abilities that if utilised effectively can contribute to the achievement of the intended goals. Findings indicate that teachers were managing bullying using individual efforts and getting assistance from colleagues. However, it is clear that the kinds of strategies used by teachers (such as ignoring acts of bullying, using corporal punishment and asking learners to fight back) were exacerbating bullying. These findings show that bullying was escalating at the school because of the use of fragmented management strategies by the teachers. The main challenge was that teachers lack capacitation on the management of bullying and the inability to coordinate their expertise and efforts to work as a team with common goals. We recommend the capacitation of primary school teachers by way of creating awareness of the policy on bullying, providing skills to detect and mitigate bullying effectively and a more integrated approach, including the school-community engagement.

Keywords: Bullying, managing bullying, previously disadvantaged primary schools, South Africa

1. Introduction

Bullying in primary schools is a global concern with negative implications on the wellbeing, futures, and careers of affected young children. Bullying in South African primary and high schools continue to increase at a worrisome trend (Protogerou & Flisher, 2012; Steyn & Singh, 2018). Juan, Zuze, Hannan, Govender, and Reddy (2018) summarise the common types of bullying in South African schools as follows: cyberbullying, threatening others, sharing of embarrassing information, forcing other learners to do something, hitting or hurting others physically, stealing, spreading lies, leaving others out of games and making fun of fellow learners. In the view of Juan et al. (2018), these kinds of bullying are common in no-fee schools that are often located in communities experiencing low socioeconomic status. Bullying has educational and psychological repercussions on the victims, their families and those around them (Hazeltine, 2018; Krusell, Hohwü, Bjereld, Madsen, & Obel, 2019). To combat bullying effectively, teachers' knowledge, skills and attitudes are fundamental (Lester, Waters, Pearce, Spears, & Falconer, 2018). Hence, the South African Department of Basic Education (DBE) (2012) considers teachers as crucial role players in curbing bullying in individual school contexts.

Irrespective of the desire to curb bullying, there are no specific guidelines for teachers to use in schools. The lack of particular instructions means that the identification and effective

management of bullying would largely depend on the individual teacher's abilities (VanZooeren & Weisz, 2018). This study, therefore, sets out to investigate how teachers individually and collectively manage bullying in a specific school context.

1.1 Background

1.1.1 Causes and consequences of bullying and victimisation

Children's poor behaviour and performance at school is largely linked to poor parenting that exposes children to bad mannerisms in some societies (Herne, 2016; Marshall, 2012). In a study conducted in the Uthungulu district of KwaZulu-Natal, Steyn and Singh (2018) concluded that the home is mostly responsible for school bullying in the area. However, the relationship that exists between the home environment and children's violent behaviour at school is debatable because the nature of bullying varies according to context. Mlisa, Ward, Flisher and Lombard (2008) blame school culture and other community-related factors, but Andershed, Kerr and Stattin (2001) propose in-depth investigations to ascertain the actual role of the home in children's negative behaviours at school. Teachers' inability to implement alternatives to corporal punishment effectively is identified as a contributory factor to bullying in the classroom (Maphosa & Shumba, 2010).

Research shows that victims of bullying are more likely to become bullies themselves as a revenge mechanism and in retaliation against their former perpetrators (König, Gollwitzer, & Steffgen, 2010). Rosen, Scott and DeOrnellas (2017) corroborate with König et al. (2010) that such situations are bound to occur when teachers ignore incidences of bullying in their classrooms. Bullied children are likely to be absent from schools with the possibility of eventually dropping out, developing health problems, some isolating themselves and in severe cases, considering suicide (Laas & Boezaart, 2014; Krusell et al., 2019). The magnitude of these consequences in the short and long-term, coupled with the fact that bullying is ongoing, reiterates the need to investigate strategies teachers use in combating bullying in individual school contexts.

1.1.2 The challenges associated with curbing bullying

The South African National Education Policy Act (Department of Education, 1996) based on the Bill of Rights enshrined in the democratic constitution of South Africa, acknowledges the existence of bullying in South African schools. It also recommends the creation of an enabling environment that protects the rights of learners and nurtures them to fulfil their potentials holistically (DBE, 2012). The argument here is that an enabling teaching and learning environment indirectly curbs bullying; hence, a school needs a philosophy that preaches respect for others as a subtle motto to undo aggressive tendencies. Thus, integrating safety and principles of compliance into the school curriculum can potentially create an environment healthy for child development (Venter, 2013). Nunan (2018) argues that learners need more committed safeguarding by teachers to combat bullying.

However, Mienie (2013), based on an American and Australian example, argues that the management of bullying should extend beyond merely promulgating laws and policies. What policies expect schools to do in their contexts, in terms of how to manage bullying often leads to misinterpretation and negligence. More commitment is needed to combat bullying among learners effectively, especially in an age of technological advancement. It has increasingly become more challenging to manage the flow of information, the free speech ideology in democratic societies and varied forms of bullying (Mienie, 2013). Based on these complexities, pre-service and in-service teachers need sufficient capacitated and ongoing professional development to assist in managing bullying in their school contexts effectively.

(Maphosa & Shumba, 2010). Some teachers currently do not adequately care and support learners, which Smit (2018) considers fundamental in the journey to combat bullying. This study aims to understand how teachers in a selected school in the KwaZulu-Natal province of South Africa manage bullying. It also intends to understand why they manage bullying the way they do. The study pursues the following questions; how do teachers in the selected school manage bullying? And why do teachers manage bullying the way they do?

2. Theoretical framework

The study adopts the asset-based approach as a framework to explore and understand how teachers in a previously disadvantaged primary school in the KwaZulu-Natal province of South Africa manage bullying. The asset-based approach is developed by Kretzmann and McKnight (1993) from a community-based development study. The notion that individuals, including teachers, have talents and abilities that can be effectively used to achieve intended goals underpins the asset-based approach. The emphasis is the importance of dynamic partnerships and collaborations among stakeholders (Ebersöhn & Eloff, 2006). We attempt to explore how teachers currently manage bullying, gauging their level of cooperation and the implications thereof. Partnerships create space for the effective utilisation of the individual's inner potentials to effectively for the benefit of the organisation (Ebersöhn & Eloff, 2006; Kretzmann & Knight, 1993). We assume that strategies to manage bullying effectively in previously disadvantaged primary schools are embedded in the richness of the teachers' inner abilities if fully exploited (Watson, 2014). Teachers will feel empowered and do more in terms of managing bullying if allowed to utilize their skills positively. From an asset-based perspective, teachers have untapped skills, knowledge and potentials that can be harnessed to manage bullying effectively. Thus, building relationships that embrace the talents and strengths of individual teachers rather than identifying and criticising their problems and weaknesses has positive implications on the management of bullying (Ebersohn & Eloff, 2006).

3. Research design and methodology

The study used a qualitative single case design (Yin, 2018), focusing on a previously disadvantaged primary school within the KwaMashu Township in the KwaZulu-Natal province of South Africa. Bullying is ongoing in the school; hence, the need to engage teachers in their natural setting and explore the phenomenon in detail. Purposive sampling was used to select ten teachers of varied ages (32–56 years) for the study. These teachers have at least seven years of teaching experience. They are from diverse cultural and religious backgrounds; thus, with varied notions, interpretations and perceptions of the phenomenon of bullying. Data were collected using individual semi-structured and focus group interviews lasting approximately an hour. Collage, which is an arts-based method whereby participants are allowed participants an opportunity to express their views beyond words, guided the focus group interviews (Mitchell, 2011). The teachers participated in two groups of five, sharing strategies, challenges and prospects about the management of bullying. Peers shared data from group discussions to emphasise how it is potentially relevant to manage bullying as a collective when compared to individualised efforts. It provided spaces for teachers to critique their strengths and weaknesses. The results from individual interviews and focus groups were triangulated to ensure the validity and reliability of the findings (Flick, 2018).

Data from individual and focus group interviews were obtained using audiotapes and video recordings. While individual interviews lasted for 45 minutes, the videos were an hour long. Three types of questions were asked to teachers to understand their knowledge of bullying. These questions include how they manage bullying and why they manage it the way they do,

as well as the challenges they encounter in the process. The data obtained from individual and focus group interviews were scrutinised using content analysis to detect trends and to interpret meanings concerning the focus of the research. The data were categorised thematically (Guest, MacQueen, & Namey, 2012). This categorisation led to the emergence of themes such as strategies teachers used to manage bullying, why they used them and challenges encountered in the process. The research aims and available literature on the management of bullying informed these emerging themes.

The University of KwaZulu-Natal and the KwaZulu-Natal Department of Education issued an ethical clearance. Teacher participation was voluntary, and consent forms were signed to permit video and audio recordings. Fictitious names were used to anonymise participants identities. Participants were informed of their rights to ask for termination of records and to exit the research process when they deem necessary.

4. Findings and discussion

The focus of the study guided the teachers to categorise their strategies employed in managing bullying into two categories – “the bad way” and “the right way”. The major themes include teacher’s individual efforts at managing bullying, teacher-to-teacher support and challenges associated with the management of bullying. The challenges include teacher attitudes towards bullying, the lack of appropriate skills, overcrowded classrooms, lack of support from the school management team (SMT) and poor engagement with departmental policies.

4.1 Individual efforts at managing bullying

It emerged that some teachers used tactics similar to corporal punishment to deter perpetrators from further victimising others (Maphosa & Shumba, 2010). This was done without appropriately diagnosing and solving the problem in its entirety. Teacher 1 attested:

I don't have a specific method to respond to bullying. Sometimes I punish the perpetrators ... if it is verbal, I ask the victim to ignore the perpetrator.

Allen (2010) argues that using punitive measures could lead to more violent bullying behaviours. However, participating teachers erroneously assumed that ignoring an incident of bullying or punishing the perpetrators would make the problem go away. Teacher 10 agrees with the commonality of this approach by saying:

Sometimes I use a stick, or I make the perpetrator to pick up papers in the school grounds or even clean toilets.

The erroneous approach of punishing the bully and ignoring the problem at hand is not limited to South Africa alone (see Byers, Caltabiano, & Caltabiano, 2011). Using a stick in the classroom is tantamount to corporal punishment, which is unacceptable (Laas & Boezaart, 2014). Strangely, South African teachers view corporal punishment as an effective method to deal with bullying in the classroom (Mayeza & Bhana, 2017). Although this might deter perpetrators from further indulging in bullying, it is violence against children with negative implications (Naker, 2019), and this aggravates the problem. This teacher may see the approach as intimidating and capable of deterring the perpetrators, but this is superficial, short-term and ignores the victim’s plight entirely (Theoklitou, Kabitsis, & Kabitsi, 2012). Research shows that victims not adequately attended to may contemplate suicide at some point or develop defense mechanisms of various types. Such persons become aggressive themselves or stay away from school for fear of further victimisation (Andershed et al., 2001; Ndebele & Msiza, 2014).

Some of the teachers ignored bullying entirely in their classrooms, an act that indirectly legalises the phenomenon with potentially harmful consequences (see Rosen et al., 2017). When interrogating the reasons for such approaches, teachers gave varied reasons in defence. Teacher 7 said:

I don't ignore them purposely. I am extremely busy...I respond to the learner, and sometimes I forget to follow-up...

Forgetting to follow up on bullying incidences is problematic because teachers are expected to be committed and have the capacity to attend to bullying incidents as well as support learners by giving the necessary advice to victims and their parents (Greeff & Van den Berg, 2013). The department also expects teachers to follow up on victims, provide care for victims as well as help bullies with anger control to prevent future occurrences (DBE, 2019).

Teachers lacked the skills needed to deal with incidences of bullying effectively. As such, they avoided taking ownership or responsibility of bullying incidences by referring them to their colleagues, the principal, HOD or even to the learners' parents. In corroboration, Teacher 6 said:

I send the issue to the principal or the Head of Department (HOD)...If they come to report to me, I tell them to go and report to their class teachers...I call in their parents and ask them to intervene.

When teachers lack skills to manage bullying, there are probabilities for the phenomenon to exacerbate (Kearney & Smith, 2018).

4.2 Teacher-to-teacher support

Teachers adopted an approach termed, "passing the buck" to the next teacher, as compensation for the lack of appropriate strategies to combat bullying. Hence, teachers passed the crisis to colleagues whom they considered had the potentials to deal with the situation at hand. Though unethical, teachers were unanimous that it served as a support mechanism for those unable to find suitable solutions to manage incidents of bullying in their classrooms; thus, demonstrating what Ebersöhn and Eloff (2006) consider a dynamic partnership and collaboration. Teacher 5 expounded:

Teachers here are very supportive of one another when a teacher has a case of a child bullying, [and cannot handle it] they try to assist whoever they can...We share strategies on how to deter bullies.

These teachers attempted to cooperate among themselves in the management of bullying. Marshall (2012) applauds teachers who put aside their differing views, attitudes and beliefs about bullying to help one another achieve a common goal. However, these attempts did not meet the desired results due to the varied challenges.

4.3 Challenges associated with the management of bullying

Challenges encountered include; teachers' attitudes towards bullying, lack of appropriate skills, overcrowded classrooms, lack of support from SMTs, poor engagement with departmental policies and parent-community relationships.

4.3.1 Teachers' attitudes towards bullying

Teachers were passive towards verbal and emotional bullying which they considered as, usual, attitudes that can be attributed to individual, cultural and environmental norms that treated especially verbal assaults as normal, irrespective of its implications on the victims. For example, teachers viewed males as strong (masculine) enough to exercise their strength when bullied by fighting back (Swearer, Turner, Givens, & Pollack, 2008). Rather than engaging inappropriate intervention strategies, teachers encouraged victims to fight back as a way of being on par with their perpetrators. Areff (2015) revealed that some teachers consider victims who are unable to fight back as "cowardice" or "sissies." The term "sissies"

is commonly used to refer to boys, who rather than fighting for themselves when bullied report the incidence to their mothers (Areff, 2015; Collins, 2013).

Attitudes such as these are associated with cultural norms that have the tendency to exacerbate bullying erroneously by encouraging victims to fight back (Ostrander, Melville, Bryan, & Letendre, 2018), an approach that creates more bullies, making it cumbersome to curb the phenomenon. Teacher 6 said: "...Men do not cry; they fight back..." in effect legalizing bullying irrespective of the psychological and emotional trauma borne by victims (Hendricks & Tanga, 2019). Teacher 5 corroborated the passive attitude by teachers towards emotional bullying by saying:

Teachers responded efficiently when they saw that the victim's life is being threatened...There is no focus on petty bullying reports such as name-calling...name calling hasn't killed anyone.

This teacher ignored the emotional trauma borne by the victim (Hendricks & Tanga, 2019). Hence, boys that report name-calling are considered "not man enough," because such forms of bullying were erroneously considered as a rite of passage. Such unprofessionalism continues to subject innocent learners to the hands of bullies (Nunan, 2018).

4.3.2 Teachers' lack of appropriate skills to manage bullying

Teachers lacked the skills that were necessary to engage effectively with the incidences of bullying. Teachers were unable to detect and intervene with bullying timeously. Teacher 6 expounded:

Sometimes we don't know whether they are playing or fighting...I am not sure how to go about helping the victim...I have never been trained on how to manage bullying so we use trial and error....

When teachers lack the skills to determine when learners are bullying each other from when they are playing, it poses a threat to managing the phenomenon. Protogerou and Flisher (2012) note that teachers need to be alert because bullies themselves are often very skilful and know how to cover their tracks, and when not vigilant enough it may develop into an unnoticed pattern (Laas & Boezaart, 2014). Judging from efforts teachers were making, there are possibilities that more is achievable if they are empowered (Kretzmann & McKnight, 1993). This accentuates the need to capacitate teachers with appropriate skills to enable them to dictate and resolve cases of bullying to avoid its negative consequences (Hazeltine, 2018; Lester et al., 2018). Teacher 1 corroborated the need for capacitation saying, "Younger teachers help with identifying the new forms of bullying." As such providing professional development for in-service teachers on the management of bullying is a step in the right direction in an era when school bullying and violence is an on-going discourse.

4.3.3 Overcrowded classrooms

In the view of the teachers, overcrowded classrooms made it challenging for them to identify incidents of bullying quickly. There were unrealistic expectations of the teachers to deal with all challenges associated with crowded classrooms, including bullying. Teacher 8 said:

I can't focus on counselling the victim as there is no time...I have to focus on extreme forms of bullying and I can't split myself in half.

Researchers attest that crowded classrooms, in disadvantaged primary schools, like in South Africa, is not new nor changing anytime soon (Marais, 2016; Segalo & Rambuda, 2018). Overcrowding in classrooms needs to be dealt with to ensure the effective management of bullying in schools.

4.3.4 Lack of support from the school management team (SMT)

Teachers reported the lack of much-needed support from the SMT in their efforts to manage bullying at the school. The DBE emphasises the essential roles of SMTs that include capacitating teachers at the school level to deal with existing challenges (DBE, 2012). Teachers argued that the SMT considers the seriousness of a bullying incident before responding, making it difficult for certain forms of bullying to be managed appropriately. The SMT approach reported by teachers ignores the implications of victims. According to the teachers, the SMT was prone to offer mostly emotional support and often avoided being directly involved in the effective management of bullying. Teacher 10 explicated:

SMT doesn't get involved in solving bullying...teachers are instructed to use their discretion in managing bullying...The[y] only attend to the matter when the parents come in to complain...Management is not helpful when it comes to the practicality side...they don't want to get their hands dirty in managing bullying.

SMTs are expected to be the backbone of the school management (Khuluse, 2004), especially in applying the code of conduct that deals with issues such as bullying. Such a role includes involving parents in the discipline of those who perpetrate bullying and victimisation and counselling victims (DBE, 2019; Laas & Boezaart, 2014). Positive outcomes are likely to be visible where there is an active collaboration between the SMT and teachers (Lu & Hallinger, 2018). This call for partnership echoes the asset-based approach that calls for partnership within organizations to ensure effective utilization of an individual's inner potentials for the achievement of intended goals (Ebersöhn & Eloff, 2006; Kretzmann & Knight, 1993; Watson, 2014).

4.3.5 Poor engagement with departmental policies

Teachers lamented the apparent incorrect interpretation and implementation of bullying policies. Schools are expected to incorporate the existing framework embedded in the constitution into their codes of conduct (Laas & Boezaart, 2014). The consensus was that school policy on bullying was not correctly disseminated and to that effect, some teachers claimed ignorance of its existence. The lack of appropriate sensitisation gave teachers leverage to use ineffective strategies to manage bullying on the basis that there are no specific bullying policies in place at the school. Teacher 2 said:

I have not seen or heard of that policy in this school...it has not been shared with us...It is there as a mere decoration because it is not applied.

Narratives such as these suggest a gap between policy and practice, which can be reasoned as a contributory factor to on-going bullying incidences in the school. In similar rhetoric, Teacher 3 said: "...If the policy does not relate to our school, it seemed as [if] it was copied from another school..." Teachers also claimed that some parents and the community members were hindering their efforts to manage bullying effectively.

4.3.6 Parent-community related challenges

Teachers bemoaned the negative attitudes and actions of some parents and community members, which inhibited efforts made towards managing bullying at the school. Teacher 9 said:

...Some parents defend their children if they are said to be bullies, they become rude to teachers and they blame the teachers...Some parents get adamant that their children are victims when they are actually the perpetrators of bullying.

Herne (2016) notes that the blame game in debates concerning the way bullying is perpetrated and managed in schools are a regular occurrence. Poor learner behaviour is often associated with poor parenting. However, Andershed et al. (2001) argue that the role of the home in perpetuating bullying in schools remains inclusive. Teacher 7 elaborated on the

effect of parents' counterproductive approaches towards their efforts to manage bullying: "...Some parents are inconsistent in their interventions, they overly punish the perpetrators or they don't punish them at all and this works against the teachers' efforts..." Contrarily, the legislative framework on bullying and the DBE expect parents and schools to work hand-in-gloves to effectively deal with bullying (DBE, 2019; Laas & Boezaart, 2014).

Teachers perceived that learners copied certain negative behaviours from the home front, warranting the need to create a good parent-teacher working relationship. Otherwise, they are "fighting a losing battle" (Marshall, 2012). The mere fact that some parents and community members wrongly view bullying as a rite of passage exacerbates its occurrence in schools, especially among boys.

5. Conclusion

Controversies about bullying in schools are an ongoing discourse, with debates often primarily focusing on secondary or high schools and limited in primary schools. As seen in the present study, the majority of learners and teachers are negatively affected by high levels of bullying in the primary schools in South Africa. Our findings indicate that teachers are making attempts at managing bullying. However, the kinds of strategies they use (such as ignoring acts of intimidation, using corporal punishment and asking learners to fight back) were rather exacerbating bullying.

Based on teachers' inadequate skills to manage the multitude of bullying types in the primary schools, we recommend a two-pronged approach to curb bullying in primary schools. Firstly, the capacitation of primary school teachers needs to occur, which includes awareness of the policy on bullying and skills to detect and mitigate bullying effectively. Secondly, a more integrated approach that includes other stakeholders is required. This integration is in the form of a school-community engagement. We also suggest further research to provide more information on what teachers do or refrain from concerning bullying.

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A COMPARATIVE STUDY OF BILINGUAL AND MULTILINGUAL LEARNERS' PERFORMANCE ON MATHEMATICS WORD PROBLEMS

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Abstract

This paper compares the bilingual and the multilingual learners' performance on grade 9 mathematics word problems in one school in the Motheo district in the Free State province of South Africa. Allowing both multilingual and bilingual learners to interpret word problems in vernacular language simplifies the procedure and the laws to write a mathematical notation using representations that slightly differs to the way the language of learning and teaching is used in mathematics. This is a quantitative research study and 100 learners voluntarily participated in a five items word problem task with 87 multilingual and 13 bilingual learners. Grade 9 learners were tested in five word problem tasks focusing on addition of money, fractions and percentage. The Excel software was used to analyse the descriptive data to find the mean and the standard deviation, while, the t-test was used to find the significant difference between the bilingual and multilingual learners' performance on mathematical word problems. The findings revealed that there is no significant difference between the bilingual and multilingual learners' performance on word problems involving the addition of money, fractions and percentage. However, bilingual learners performed better than the multilingual learners did on word problems that include both addition of money and percentage. The conclusions is that the multilingual learners might have an advantage over bilingual learners, however, there might be factors that contribute to their advantage which are not investigated in this study.

Keywords: *Bilingual learners, multilingual learners, performance, word problems.*

Introduction

There is a growing trend on multilingual speaking learners over the bilingual speaking learners globally and in South African schools. The learners' interpretation and solving of mathematical word problems in English, as the teaching and learning language, has been an issue globally and also in South Africa (Abedi & Lord, 2001; Bernado, 2002; Jitendra & Woodward, 2019; Sepeng & Sigola, 2013). However, the major concern that most authors refer to is the language used for teaching and learning of mathematics, especially word problems. The problem presented in written words often poses numerous challenges to learners and accounts for low levels of performance, since, they require that learners read and comprehend the text of the problem, identify the question that needs to be answered and finally create and solve a numeric equation (Krick-Morales, 2019). However, if this assumption is true bilingual learners who are able to read and write in both languages may perform better in mathematics word problems than multilingual learners who are not able to read and write when they are required to interpret and solve mathematics word problems in grade 9 classes.

In South Africa, bilingual and multilingual learners are common especially in the Motheo education district in Bloemfontein. The grade 9 learners are speaking two or more languages fluently. In this education district, two official languages are used as the language of teaching and learning (LoLT) namely Afrikaans and English. The schools that form part of this study use English as LoLT to assess learners on word problems. In this study, bilingual learners refer to all learners who speak and write Sesotho as the home language and English as the

language of teaching and learning. In this study, multilingual learners are regarded as the learners who speak and write any three languages such as Afrikaans, isiZulu, Sesotho and English, but use English as the LoLT. Then, English becomes a challenge to the bilingual and multilingual learners when they are to translate word problems written in English that require them to use mathematical notations to solve the words problems.

The authors align themselves with Phakeng (2016) when explaining the multilingual context as the presence of multiple languages but only two languages are in competition namely, home language and the language of teaching and learning. Most studies that investigate multilingual learners' performance on mathematical problems focused on the mother tongue and the LoLT (Botes & Mji, 2010). Some studies have been conducted on the bilingual and multilingual learners learning and assessment (Adler, 2001; Barwell & Clarkson, 2004; Phakeng, 2016) and these studies focused on the use of English for teaching and learning whereas the use mother tongue to learning and assessment could yield better results. Our view in this study is that, learners are exposed to the English language when they learn mathematics. Furthermore, they have been assessed in English in all the examinations and the informal assessments. We want to find out whether bilingual and multilingual learners who are taught in English and assessed in English would perform better than each group when given a word problem-solving task written in English.

Some authors are of the view that speaking two languages can be associated with cognitive benefits with regard to attentional control processes (Kempert, Hardy & Salbach, 2011;), although such benefits may be found in more proficient bilingual learners. Moreover, bilingual learners have a wide range of proficiencies in modes such as listening, writing, speaking and reading in their two languages (Moshkovich & Nelson-Barber 2009). In the context of the schools in the Motheo district, learners need plenty of practice in English as a second language and Sesotho as the first language in order to have proficiency in both languages. Therefore, if this assumption is true, multilingual learners who are competent in more than three languages may presumably perform better than the bilingual learners may.

Related literature

In this paper, we compared the bilingual and multilingual learners' mathematics performance on word problems. The context was chosen not only because of the great importance attributed to mathematics in the school curriculum but on the assessment of mathematical word problems, since they strongly relate to the English language. According to Bernardo (2002, p. 284), "Learners who are considered to have understood the word problems are able to form an accurate mental representation of the different quantitative elements of the problem and the relationships among the elements that are relevant for solving the problem". This view shows the complexity of the process in learners' minds who speak and read two or more languages to solve a word problem task. In addition, there are some variations in the linguistic aspects of word problem representations and problem-solving (Bernardo, 2002).

Some studies have been conducted on bilingual learners and mathematical problem solving (Bernardo, 2002; Ambrose & Molina, 2013; Telli, Rasch & Schnotz, 2018.). The research by Telli, Rasch and Schnotz (2018) was about what bilingual learners do when solving word problems, which are similar to our study, although our study goes further. Our study investigates how grade 9 bilingual and multilingual learners perform on word problems. Telli et al. (2018) found three categories on what learners did namely, the language, the effect of daily experience to the solution process and re-contextualising the problem. However, even though these categories are important in the initial stages of the word problem for this study,

the study focuses more on how the learners perform. Telli et al.'s (2018) findings state three things in relation to the categories that, first, learners' daily experience influenced the solution. Second, learners had difficulties in re-contextualising the problem if the problem is not related to their daily experience. Third, the language learners need to have word problem repertoire and language skills for their modelling competencies. These categories are important for the bilingual and multilingual learners to interpret and solve the word problems.

Lachmair, Dudschig, La Verga and Kaup (2014) suggest that understanding numbers and language is based on the similar modal representations in the brain. For the bilingual and multilingual learners to make sense of grade 9 mathematical word problems, there is a need for one to have a mental image of the key words about the problem. Thereafter, use the mental image to represent the problem in the mathematical notation form. Then, work out the mathematical notation to find the solution to the word problem. Njagi (2015) draws our attention to the fact that learners seem unable to create a mental representation that links the text of the word problem to appropriate mathematical expression. However, limited research has been conducted on how bilingual and multilingual learners link the word problem text with the appropriate mathematics expression. This process serves as a base for learners to perform their solutions on the word problems; however, this study focuses more on bilingual and multilingual learners' performance on mathematics word problems. The bilingual and multilingual learners, without prior knowledge and continuous practise of word problems, however, form incorrect problem representations and this most likely leads to an incorrect solution (Bernardo, 2002). If this assumption is true, the bilingual and multilingual learners may struggle to interpret the word problems from English to mathematical notation and may perform lower when solving grade 9 mathematics word problems. In contrast, if the bilingual and multilingual learners are competent in all the languages and can interpret the word problems from English to mathematical notation, they will be able to solve the word problem tasks to find the correct answer.

This study aligns with Setati (2002) who observed the teaching and learning of mathematics in South African classrooms as using the bi/multilingual teaching through code switching as a common teaching and learning resource. Furthermore, Cummins (1979) argues that positive cognitive results are achieved once a learner attains a certain level of linguistic competence in his/her second or third language, and the further the child progresses towards proficient bilingualism. Whereas, for multilingual learners observed by Halai (2004) in two multilingual classroom in Pakistan identified four aspects that help determine learners' sense making in mathematics as (a) how they understand the particular usage and structure of the language, (b) how the use of everyday language shapes mathematics learning, (c) how learners express mathematical thinking in their own language, and finally, (d) how language is used in the textbooks as compared with how the teacher uses language. These aspect play an important role when learners are given tasks on word problems that require their interpretation.

The paper reports on a comparative study conducted on grade 9 bilingual and multilingual learners' performance on mathematics word problems when they have interpreted and solved mathematical word problems presented in vernacular and in English as a language of teaching and learning.

Research questions

- Do bilingual learners perform better than multilingual learners in mathematics word problem tasks?

- Do multilingual learners perform better than bilingual learners in mathematics word problem tasks?
- Is there any difference in the multilingual and bilingual learners' mathematics performance on word problem tasks?

Methods/techniques

This study used a quantitative research approach to explore the bilingual and multilingual learners' performance in mathematics words problems. A survey research design was used to gather descriptive data from 100 grade 9 learners with 87 multilingual and 13 bilingual learners in two classrooms in one school. The grade 9 learners voluntarily participated to complete five word problem tasks. Each statement was a question that needed to be solved by interpreting the word problem into a mathematical notation and follow the mathematical laws and properties to find the solution.

The design of the word problem task was the lead author's responsibility, the task was sent to two colleagues in the university and two experts in mathematics for content validity. The task was divided into two sections, namely biographical information and the word problem statements and questions. The authors designed the word problem task from the existing grade 9 textbooks questions on addition, percentage and fractions and the new items were proposed and ended up with five statements and questions. Firstly, the question included the addition of money. Secondly, the question was on percentage including a food bill. Thirdly, the question included a fraction including winning. Fourthly, there was a fraction involving spending. Lastly, there was a fraction involving sharing of interest over a number of years. After all the suggested comments from the colleagues and feedback from grade 9 learners' responses on the task, authors deemed the instrument relevant to collect data on bilingual and multilingual learners' performance.

Permission was sought and granted from the university and the school where research was conducted. The learners informed their parents about the research and the parents signed on their behalf, also, learners signed the ascent forms to agree to participate in the study.

The grade 9 learners were in a public school and were introduced to the mathematics word problem task by the lead author using two local vernacular Afrikaans and Sesotho examples and explanations to some point when interpreting and making sense of the task. During teaching, when learners interpret the word problems into mathematical notation, they changed the language from vernacular to English the LoLT. The authors administered the five statements with their questions to a total of 100 learners in two classrooms. The task lasted for a period of 30 minutes and all the scripts were collected and later analysed using the Excel spreadsheet.

Results

Descriptive and inferential statistics were used to analyse data for this study. The descriptive analysis was used to find the mean and the standard deviation of the scores of bilingual and multilingual learners on grade 9 word problems involving the addition of money, fractions and percentage. An inferential analysis through the t-test was used to find the significant difference between the bilingual and multilingual learners performance.

Descriptive analysis

Table 1: Mean and standard deviation for bilingual learners on word problem tasks

Bilingual	Question 1	Question 2	Question 3	Question 4	Question 5
mean	1,05	0,65	0,88	1,51	1,73
standard deviation	2,46	1,62	1,54	2,46	1,00

The data on table 1 showed that bilingual learners performed lower on percentage including the food bill and fractions including winning with the mean scores and standard deviation of 0,65 (1,62), and 0,88 (1,54) respectively. Also, bilingual learners performed better on tasks involving the addition of money, fractions including spending and fractions involving the sharing of interest over a number of years with the mean scores of 1,05 (2,46), 1,51 (2,46), and 1,73 (1,00) respectively. The inference shows that bilingual learners performed low on tasks involving the winnings and the food bills, while, they performed better on tasks involving spending and addition of money. This may show that bilingual learners are exposed to tasks involving the spending of money.

Table 2: Mean and standard deviation for multilingual learners on word problem tasks

Multilingual	Question 1	Question 2	Question 3	Question 4	Question 5
mean	1,478348	0,73	0,96	1,27	1,48
standard deviation	2,758621	1,64	1,31	2,66	0,98

The data on table 2 showed that multilingual learners performed lower on percentage including food bill and fractions including the winning with the mean scores and standard deviation of 0,73 (1,64), and 0,96 (1,31) respectively. Multilingual learners performed better on tasks involving fractions including spending, the addition of money and fractions involving the sharing of interest over a number of years with the mean scores of 1,27 (2,66), 1,478348 (2,758621) and 1,48 (0,98) respectively. The inference shows that multilingual learners performed similarly to bilingual learners. However, multilingual learners performed high on the addition of money and the fractions involving sharing of interest over a number of years.

Table 3: Comparison of performance between bilingual and multilingual scores in all the questions

Bilingual	Question 1	Question 2	Question 3	Question 4	Question 5
mean	1,05	0,65	0,88	1,51	1,73
standard deviation	2,46	1,62	1,54	2,46	1,00

deviation					
Multilingual					
mean	1,478348	0,73	0,96	1,27	1,48
standard deviation	2,758621	1,64	1,31	2,66	0,98

Table 3 shows that multilingual learners performed better than bilingual learners did on word problem tasks involving the addition of money, percentage including the food bill and fractions including the winnings with the mean scores. Bilingual to multilingual mean scores and standard deviations were 1.05 to 1,478348, 0.65 to 0.73, and 0.88 to 0.96. Whereas, the bilingual learners performed better than multilingual learners on fraction tasks involving spending and fractions on sharing of interest over a number of years. Multilingual to bilingual learners had the mean scores of 1.27 to 1.51, and 1.48 to 1.73.

Inferential statistics – t-test

Table 4: Comparison of overall mean scores of bilingual and multilingual scores in mathematics word problems

	Bilingual	Multi-lingual
Mean Scores	9.08/15	9.34/15
Standard deviation	3.04	3.06
P-value	0,771	

Overall, data shows that multilingual learners had a higher mean score of 9.34 and the standard deviation of 3.06, while the bilingual learners had a lower mean score of 9.08 and the standard deviation of 3.04. The p-value of 0.771 indicates no significant difference between the bilingual and multilingual learners' performance on word problem tasks.

Discussion of the findings

The findings revealed that there is no significant difference between the bilingual and multilingual grade 9 learners' performance on word problems, though, bilingual learners performed better than multilingual learners did on word problem tasks in questions 1, 2 and 3 involving the addition of money, fractions and percentage. The multilingual learners performed better than the bilingual learners did in questions 4 and 5 on tasks involving fractions on spending and sharing for a number of years with the slightest of the margins. The bilingual learners performed better than multilingual learners on addition of money to find the balance, percentage on food bill and fraction on winnings, whereas, the multilingual learners performed better on tasks involving the fractions on spending and sharing of interest for a number of years.

In this study, when bilingual and multilingual learners interpret word problems they start by analysing the word problem written in English words to develop the mental representation of what the problem is. They then write down the word problem in mathematical notation form

before attempting to solve it. The solving of the mathematical notation involves mathematical procedures that are learnt as the properties of fractions, percentage and whole numbers.

The bilingual and multilingual learners' ability to use the second language and/or first language helps them to interpret mathematical word problems. It is therefore, an important task for the bilingual and multilingual learners be provided with an opportunity to interpret the word problems in their vernacular in order not to miss the important meaning of mathematical notations. In this sense, the task becomes meaningful in terms of representing the word problem written in English words to mathematical notation. Therefore, the bilingual and multilingual learners who have such ability are better word problem solvers and have a better use of mathematics and language.

Conclusion

The study concludes that there is no difference in performance between bilingual and multilingual learners performance, though this needs to be investigated further. There is a need for further compare the bilingual and multilingual learners' in one Motheo district school on word problem tasks to be assess in their native languages and the LoLT. There should be an awareness about the performance of bilingual and multilingual learners on word problem tasks to further develop new approaches and methodologies.

Recommendations

Based on the findings of this study, the following recommendations were made: The multilingual and the bilingual learners should be presented with a word problem task that requires them to read and comprehend the text of the problem in their vernacular, identify the key terms of the problem that needs to be understood before they use the LoLT to finally create and solve a numeric equation. The test developers are encouraged to look at the word problem tasks on multilingual and bilingual mathematics learners' performance to examine the factors that contribute to their performance in different contexts.

Competing interests

The authors declare no financial or personal relationships that might have inappropriately influenced the writing of this article.

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EDUCATORS' ROLE IN THE MANAGEMENT OF DISCIPLINE IN SECONDARY SCHOOLS IN THE ILEMBE DISTRICT

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Abstract

Learner behaviour in secondary schools is fast becoming a serious bone of contention. The purpose of this study is therefore to investigate the role of educators in the management of discipline in secondary schools in the ILembe District. A qualitative-based study underpinned by the interpretive research paradigm was employed to explore the perspectives of educators in their role of managing discipline. The chosen research design for this research was a case study. The sample comprised eight educators who were purposively selected from four secondary schools in the ILembe District, KwaZulu-Natal. The method of data collection used in this study involved direct data collection in the form of interviews, which is consistent with qualitative researchers collecting data directly from the source. A semi-structured interview schedule was used to collect the data from the participants. The findings of the study indicated that restorative discipline, when applied as a whole-school approach, is effective in the management of discipline. The participants were of the opinion that when learners are held accountable for their actions, they apply the necessary measures to correct their behaviours accordingly. The findings also revealed that educators who apply assertive discipline are able to manage discipline in classrooms effectively, whilst allowing for the communication of acceptable behaviours. Furthermore, the participants provided strong viewpoints that the effective presentation of the curriculum is imperative to creating an environment that is conducive to teaching and learning. It is therefore recommended that in implementing strategies to manage discipline, educators should apply a collaborative approach to the management of discipline in secondary schools. The educators recognised that further collaboration could lead to greater achievement in managing discipline in schools.

Keywords: Discipline; educator; learner; management; assertive discipline; restorative discipline; communication.

Introduction

With the democratisation of South Africa and the change in the educational landscape, particularly with the devolution of the management of South African schools, the management of discipline heavily centres on positive discipline practices. There has been a shift from punitive discipline to positive discipline as past discipline strategies that were adopted by educators and school managers were synonymous with instilling fear in learners as a means of maintaining discipline. One such strategy that was widely adopted was Canter's (1988) classroom management strategy of 'authoritarian discipline', which, on the one hand, involves encouraging the learner by using positive reinforcement in the form of praise for every positive behaviour acted out. On the other hand, it involves increasing the severity of punishment to correct behaviour that is negative. Contradictory to this school of thought, MacFarlane (2007) argues that using reinforcement to discipline a learner for behaviour that is negative can adversely affect learners' self-esteem and ultimately damage their self-efficacy. Additionally, a strategy widely used in the past was the 'laissez-faire'

strategy. This strategy places focus on allowing learners to make thoughtful and correct choices with regard to their behaviour, and the instructor intercedes only when the need arises (Bierman, 1997). However, Nagel (2001) states that by employing a laissez-faire management style, educators can rouse frustration, may cause confusion amongst learners and in this way, could contribute to disorder in their classrooms.

In recent times, the gradual increase in violence plaguing South African schools has caused researchers to conclude that schools are rapidly becoming environments that display violence and bad discipline. In the past, corporal punishment served as a rudimentary measure to deal with all discipline related problems in schools. Many educators are of the view that corporal punishment was the most effective method for ensuring a well-disciplined school and an effective teaching-learning environment. Nkosi-Malobane (2019) states that in the past, schools were one of the safest places for learners and educators, but in recent times, the school environment has fallen prey to activities like theft, bullying, gang-related activities and violent crimes such as murder. Intervention strategies by the Department of Education have been implemented, yet have been deemed unsuccessful as offenders of misconduct are suspended for a short term and then allowed to return to school with no further repercussions for the offences committed. This study's impetus is thus the lack of effective strategies for managing discipline in secondary schools.

The premise of this research stems from an increase in cases of learner indiscipline in schools across South Africa. Hence, the research question for this study was: What are educators' roles in the management of discipline in secondary school in the ILembe District? The ILembe district, like other districts in KwaZulu-Natal, consists of numerous secondary schools, all of which are faced with issues of indiscipline, which negatively affect the functioning and performance of these schools. The aim of the study was to investigate educators' roles in managing discipline in the ILembe District. The objectives were firstly to investigate the extent to which educators manage discipline in secondary schools, and secondly to establish the roles played by educators in managing discipline in secondary schools in the ILembe district.

Literature underpinning the study

Since the prohibition of corporal punishment, South African educators have been grappling with ways to manage discipline in schools. Since then, not much support has been provided to educators with regard to managing discipline. The concern lies in the fact that indiscipline is escalating in South African secondary schools and very little is being done to keep schools safe. South Africans' frustration regarding the extent of violence and indiscipline in schools was demonstrated in 2015 when 23 000 citizens signed a petition calling on the Basic Education Minister of Education at that time to investigate the extent of violence in schools (Nkosi, 2015).

Pertaining to the responsibility of educators in managing discipline, Rosenblum-Lowden (2000) posits that classroom management far precedes discipline within the confines of the classroom. It encompasses the skilful planning of lessons, the ability to provide a structured and safe environment where children can learn, curriculum coverage, and being able to manage behaviour problems. As educators begin to improve their management strategies in the classroom, they facilitate learning, create a sound culture of teaching and learning, and minimise discipline problems. Educators, as managers of the classroom, are responsible for

maintaining discipline in order for teaching and learning to take place, and to ensure that the objectives of the lesson are fulfilled.

Mtsweni (2008) conducted a study in South Africa based on the role of educators in managing students, which clearly shows that there is minimum support from the Department of Education in managing discipline in schools. It has been noted that educators attribute the insurmountable problem of maladaptive student behaviour in South African secondary schools to the banning of corporal punishment, (Naong, 2007). Despite policies and procedures stipulating guidelines for the management of discipline, educators and stakeholders are grappling with finding strategies that are appropriate enough to successfully assist them. Undeterred by the legal framework that guides educators in managing the discipline crisis in schools, indiscipline in schools has soared to critical levels. A plethora of legal frameworks designed by the Department of Education only serves as strategies for the implementation of disciplinary management on paper. The reality of the current state of indiscipline in South African schools manifests a great need for intervention.

It is worth noting that the South African education system is still recovering from a past that involved forceful discipline in the form of corporal punishment (Morrel, 2001). Despite the many gains of the democratisation of South Africa, there is a void in the functioning of the education system in terms of effective disciplinary measures for schools. Marais and Meier (2010) report that South African educators are continually stressed about the alarming lack of discipline in schools. This is supported by Makota, Leoschut and Leoschut (2017), who state that the South African government has endorsed a variety of policies and procedures aimed at assisting with the response to violence in schools, yet it still continues to remain a problem in our schools, thereby affecting the academic performance of learners as well as their safety. The problem of indiscipline is prevalent in most schools, thus the question arises as to whether or not ill-discipline is a result of poor management. There seems to be much need for management strategies that can assist educators in maintaining discipline in the classroom.

Theoretical Framework

Restorative discipline and Assertive Discipline theories were used to guide this study. The first theoretical framework addresses the management of discipline within classrooms by educators. The second theory fits into the gap left by the first theory, where discipline also needs to be managed outside the classroom.

Due to the legal implications of the administration of an effective disciplinary measure, educators need to subscribe to a non-discriminatory, non-violent and constitutionally sound strategy of dealing with indiscipline in schools. According to Hopkins (2002), the foundation of this theory is accountability, and it stems from each person being responsible for his or her own actions and taking steps to ensure that wrong actions are rectified. The reason for choosing the Restorative Discipline Theory in this study was that it moves away from the traditional top-down authoritarian approach to punishment, and focuses on the creation of long-term strategies that can be used to eradicate indiscipline in schools. The Theory of Restorative Discipline is therefore compliant with the human rights of everyone involved in a discipline-related matter (Hansberry, 2009; Margrain & Macfarlane, 2011).

According to Charles (2002), Canter's assertive discipline approach is based on the premise that educators have a right to teach whilst expecting learners to behave appropriately and

these goals are only deemed achievable once rules of behaviour are determined and implemented. If educators in the classroom are assertive, the result will be a culture of teaching and learning where learners can learn effectively and be accountable for their actions. The Assertive Discipline Theory therefore upholds the values of the South African Schools Act in that there is no place and need for punitive measures of discipline. Canter (1989) posits that it is not sufficient for educators to know how to deliver content in the classroom as they also need to be thoroughly trained in classroom management skills.

Methodology

This research is located within an interpretivist paradigm. The choice of qualitative research within the interpretivist paradigm was due to the integration of human interest (Yin, 2018). The lens of interpretivism allowed the researcher to gain insight into how discipline is managed in secondary schools, and to what extent each stakeholder is involved. A qualitative approach was chosen to explore the beliefs, observations, perceptions and real-life experiences of educators from secondary schools regarding their role of managing discipline. The purpose of inquiry for this study was therefore exploratory. This approach was selected because it allowed the researcher to gain complete understanding of the phenomenon being investigated from the participants' perspective, and also enabled the researcher to present her findings in a narrative form (Leedy & Ormrod, 2005). The chosen research design for this research was a multiple case study.

The participants were asked questions directly related to effective strategies that they had employed in managing discipline. The sample, consisting of two educators from four secondary schools in the ILembe District, was appropriate for this study as it investigated educators' role in the management of discipline. Furthermore, the participants were purposively selected as each participant belonged to the school discipline committee and thereby provided valuable information regarding the management of discipline.

Data was collected by means of interviews, using a semi-structured interview schedule. According to Lavery (2016), semi-structured interviews are used by researchers due to the fact that these are extensive. All of the participants willingly signed the consent form, thereby consenting to voluntary participation in this study. In order to ensure credibility, the researcher developed open-ended questions in the interview schedule and, as such, questions were phrased in a way to allow maximum participation and for the participants to respond in their own words. The triangulation of methods that was employed included interviews with all stakeholders and field notes, which were analysed in great detail. Furthermore, the researcher allowed the participants the opportunity to verify all data collected so as to depict the actual words and experiences of the participants. In this way, the participants had the opportunity to correct errors of fact or the interpretation of the researcher.

The process of data analysis entailed the researcher finding information to address the objectives and research questions posed in the study. The researcher found ways of using this information such that it represented the actual experiences and opinions of the respondents. The researcher then arranged the data so that analysis could be facilitated without difficulty or inaccuracy. The data was then transcribed. The researcher then organised the material into categories and labelled them as per language used by the participant. These categories consisted of detailed information and the exact words used by the respondents. The researcher compiled a table of themes that emerged from the codes, and lastly, reflected on the findings of the data and compared them with the literature reviewed for this study.

The researcher not only made the participants aware of all research processes, but clearly outlined these to the participants as they were further informed of the purpose for the research. The participants were accordingly informed by the researcher that their participation in this study was entirely voluntary and that they would receive no monetary reward for participating in the study. Furthermore, the researcher also ensured that the information that the participants provided did not reveal their identity in any way whatsoever.

Findings

The researcher used the themes to analyse and interpret the data in relation to the research question. In doing so, some verbatim quotes from the participants are presented in order to accurately capture the participants' experiences. The findings, as stated below, revealed how these educators managed discipline in their secondary schools in the ILembe District.

The role of educators in applying restorative discipline in the classroom

Four participants reported that their role as educators in applying restorative methods of discipline is deemed to be effective in managing discipline. This is further supported by the findings of Narain (2015), who posits that by imposing sanctions that require learners to take accountability for their actions, they develop self-discipline.

The use of positive reinforcement to correct the wrong behaviour of learners was commended by many of the participants, stating that much success was achieved when learners took ownership of their poor behaviour and engaged in the necessary remediation to improve relationships. One participant responded *"At the end of the day, if we haven't improved the child, then we have wasted our time. The positive reinforcement that you impose on learners turn their lives around."* The use of restorative discipline as a management approach served as the foundation of all legislative framework guiding the management of discipline in school as it focuses on corrective measures rather than punitive ones. Restorative discipline also adheres to the stipulations in the South African Schools Act (84 of 1996), regarding the school Code of Conduct, which states that "[T]he main focus of the Code of Conduct must be positive discipline; it must not be punitive and punishment oriented but facilitate constructive learning" (SASA, 1996, p. 12).

The role of educators in maintaining communication with learners

Five out of the eight participants stated that communicating with learners to develop a good rapport was essential in ruling out indiscipline in their classrooms. One participant stated:

Communication works best for me. First, you communicate with the learner that has committed the act of indiscipline. Then lay out the consequences. Personally, for me, I develop a rapport with the children that I teach. I always go in being rather firm, laying certain ground rules, of course. I think it is also very important, apart from your written rules, when your learners come to you the first time, they need to know what is acceptable and what is not. And likewise, you give them the opportunity to express themselves.

The educators further stated that communication can be used to enhance positive discipline by creating relationships that display trust and respect amongst learners and educators. The need for an open line of communication about inappropriate behaviour is also reiterated by Mtsweni (2008), who asserts that educators need to openly communicate with learners and address inappropriate behaviour such that they are able to help correct it.

The assertive educator

Six participants noted that the use of assertive discipline was effective in managing learners' behaviour. The educators who claimed to be assertive in their classrooms reported that they had achieved success in fostering an environment that was conducive to teaching and learning and had also gained the respect of all the learners in the school. When asked about their roles in managing discipline in the classroom, one educator responded:

So when learners come to my class, they know they are coming to my class for one thing and one thing only. And I think if you set those rules down right at the outset... there's very little room for ill-discipline. I'm serving thirty odd years in the profession and I don't have serious discipline problems in my class. It's formal. As so as long as you stick to that formula, you won't have too many discipline problems in the class.

The participants maintained that for learning to take place, classroom management was crucial. They further concurred that by setting the tone in the classroom and laying down rules with appropriate consequences, effective teaching and learning could take place. One participant stated, *"Educators need to set the tone in the classroom. He needs to have rules in the classroom. Once he has classroom rules, he is able to achieve discipline."* Such an approach to managing discipline is reinforced by Canter (1989).

From the data, it was evident that the assertive stance of educators allowed them to build positive relationships with their learners and to teach them how to adopt appropriate classroom behaviour skills, thereby enabling effective teaching and learning. This is in line with Okunade (2015), who states that with the use of assertive discipline, educators are assertive in their approach, but build positive relationships with their learners, thus creating an environment in which learners are aware of what behaviour is acceptable, and thereby facilitating effective teaching and learning.

Effective presentation of the curriculum

A crucial finding of this research stemmed from the effective presentation of the curriculum as a means of managing discipline in the classroom. Five participants reported that many discipline problems arose from educators not presenting the curriculum in a way that learners are able to understand. These educators felt strongly that when presenting the curriculum, educators need to be knowledgeable in their subject matter and be confident with the content that they present during lessons. One participant stated,

If you are not prepared, and you don't know your content matter and you are lackadaisical about everything, you are going to set the tone for students to actually take over the class. So my strategy is firstly, you have to be organised, you have to be prepared for the lesson and you have to also engage pupils in activities.

However, the participants also voiced their frustration at the lack of professional conduct displayed by newly appointed educators who do not have the necessary skills to present the

curriculum in a disciplined classroom environment due to a lack of training, both from the educational institutions at which they qualified, and from school management.

Collaboration

The data revealed that collaboration existed when all stakeholders were included in the management of discipline in schools. Four participants stated that when all school stakeholders were included in the management of discipline, discipline in those schools was effective owing to their collaborative efforts. One participant stated,

I'm the head of the Discipline Committee and discipline is a collaborative effort. I may head it [the committee], but it is a collaborative effort. We all work together. For me, our school produces excellent results. It is very effective.

This is in line with the local findings of Mtsweni (2008), whose study revealed that in order for discipline to be maintained, collaboration is required. This further concurs with the shared responsibility of managing discipline. Since the decentralisation of education, there is a balance in the involvement of stakeholders in governance. This is reiterated by Lemmar (1999), who states that the devolution of management in schools allows for participatory involvement in decision-making at all levels of school governance. It is therefore worth noting that, in as much as the role of educators is imperative to the management of discipline in schools, discipline should be managed as a whole-school approach through collaborative efforts.

Conclusion

Since the transformation of the education system, educators have been left defenceless against indiscipline since they have not been sufficiently trained to develop and implement strategies to manage discipline. Educators, through their training and responsibilities, have the expertise and competencies to assist in leadership. By engaging learners, using a variety of teaching techniques, and introducing new ideas, educators can significantly manage learner behaviour. The study confirmed that educators who are assertive yet approachable are able to successfully manage discipline in their classes. What seems evident is that the use of positive discipline approaches to correct inappropriate behaviour through self-reflection allows for a long-term approach to managing behaviour in schools. The study further confirmed that communicating and developing a rapport with learners encourages them to be mindful of displaying appropriate behaviours. There was strong support for educators to be knowledgeable and trained in both curriculum and classroom management skills.

Furthermore, educators, as managers of their classrooms, should be encouraged to create meaningful relationships with all related stakeholders such that they are able to exercise their position of authority and take charge of discipline in their classrooms. As asserted by Gahungu (2018), empowering educators to exercise influence and control, and entrusting them with more accountability will heighten collaboration with school leadership on setting and reinforcing effective school-wide expectations for safety and a positive environment.

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BLENDED LEARNING APPROACHES AT HIGHER EDUCATION INSTITUTIONS TO PREPARE MATHEMATICS PRE-SERVICE TEACHERS FOR PRACTICE: A REVIEW OF LITERATURE

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Abstract

Blended learning has been growing in popularity as it has proved to be an effective approach for accommodating an increasingly diverse student population whilst adding value to the learning environment through incorporation of online teaching resources. Despite this growing interest, issues regarding the definition of the concept of blended learning, selection of the most appropriate design for a blended course, and proper implementation of blended learning in instruction are still inconclusive. As a result, teachers in higher education institutions have developed different understandings of the term ‘blended learning’ and its different designs. This paper reviewed literature on blended learning as an approach to the teaching and learning of mathematics in higher education institutions in South Africa and other developed countries. It provides insight and understanding of current and future trends regarding how conventional face-to-face instruction in mathematics is influenced by online learning. Data was analysed using Appleton’s (1995) three-stage method that consists of data reduction, data display and drawing of conclusion. The findings revealed that blended learning approaches are used in higher education mathematics courses with an emphasis on online and face-to-face traditional methods.

Keywords: Blended learning, Face-to-face conventional learning, Mathematics instruction, Pre-service mathematics teachers

Introduction

Technologies such as computers, graphic calculators and the Internet are widely acknowledged as mathematical tools, but instructional approaches using technology still plays a limited role in many mathematics classrooms (Bennison & Goos, 2010; Marcelo, Borba, Askar, Engelbrecht, Gadanidis, Linares & Aguilar, 2016). South Africa is not an exception in this peripheral role played by technology in mathematics classrooms. The inclusion of technical mathematics (offered for the first time in Grade 12 National School Certificate Examination in 2018) is a move towards a technologically-enhanced curriculum and instruction in South Africa (Department of Basic Education, 2018). Mostert and Van-Heyningen (2011) observed that many teachers received poor quality schooling and training, and hence suggested that the affected teachers should enrol for continuous professional development programmes in higher education institutions (HEIs). Admittedly, mere encouragement by curriculum documents does not guarantee effective adoption and utilisation of technology for instructional purposes. Possible solutions to insufficient knowledge of mathematics among South Africa learners and pre-service teachers (Bowie & Reed, 2016; Deacon 2016; Mostert & Van-Heyningen, 2011; Ndlovu, 2016; SACMEQ, 2012; Ubah & Bansilal, 2018) include additional support for teachers to improve their professional development, especially around being technologically savvy.

Technology is a prominent feature of many mathematics classrooms and the use of technology affects every aspect of mathematics education: what mathematics is taught, how mathematics is taught and learned, and how mathematics is assessed (National Council of

Teachers of Mathematics [NCTM], 2000). With technology advancements in teaching and learning, HEIs champion the benefits and opportunities posed by the fourth industrial revolution (4IR) instruction (Eady & Lockyer, 2013; Jones, Hollas & Klepsis, 2016; Liljedahl, Santos-Trigo, Malaspina & Bruder, 2016; Stols, Ferreira, Pelser, Olivier, Van der Merwe, De Villiers & Venter, 2015). These institutions have a growing responsibility to prepare teachers who are digitally literate to invigorate mathematics teaching in the 21st century classroom. A research report by Stols, Ferreira, Pelser, Olivier, Van der Merwe, De Villiers and Venter (2015) indicated that although many South African teachers have access to the web, they fail to use available resources to improve their teaching.

Moreover, Ngambi, Brown, Bozalek, Gachago and Wood (2016) noted that integration of information and communication technology (ICT) in teaching and learning has the potential to make mathematics more enjoyable and accessible to a greater and more diverse number of learners. Mahesh (2017) further observed that for the last twenty years, South Africa's higher education institutions have recorded digital progress in pedagogical practices by means of the use of ICTs. However, inadequate adoption of instructional technologies in the teaching of mathematics means that learners are deprived of opportunities for enhanced understanding of complex mathematical contents, which technology can help to simplify, make more understandable and improve on their performance. In view of this, the National Plan on Higher Education (NHE) in South Africa, through the Department of Basic Education (DBE, 2018), provides the context and systems for reformation of the educational system to keep pace with global educational standards and help raise well-skilled learners. To achieve this goal, the NHE has made it mandatory for HEIs to develop and employ new ways of preparing pre-service teachers for effective teaching in the South Africa context in line with 21st century teaching and learning tools (Green, Adendorff, & Mathebula, 2014; Fluck, 2018).

Research question: This review intends to respond to this research question: To what extent does a blended learning approach used in higher education mathematics courses with emphasises on online and face-to-face traditional methods prepare pre-service teachers for practice?

Methodology of research

The number of published journal articles that directly explore South Africa pre-service mathematics teachers' use of blended learning in mathematics instruction is low, which is an indication of the dearth of documented empirical research in this area. In view of this limited published research, this paper follows a systematic procedure of literature review (Dunst & Trivette, 2009) to establish the literature sources available on blended learning in mathematics instruction at higher education level.

After identifying all relevant published and unpublished research evidence by conducting a Google search, the researcher settles on three sources of information for this review: (1) Research Gate; (2) UJoogle; and (3) internet search engines with keywords related to blended learning in mathematics and other related disciplines. Research Gate was used as a database because it focused mainly of international and locally peer-reviewed research on education. UJoogle is the University of Johannesburg's search engine. Two methods were used to identify relevant articles from the three sources of information that related to the title of the paper. The first method is looking for articles that are cited in the existing article. The second method is to look for articles that cite the existing article. With respect to the research journals consulted, the researcher relied on use of google to identify articles related to blended learning in mathematics instruction. The 70 articles reviewed in this paper were

published within the last 10 years in peer-reviewed internationally and locally accredited journals.

Review of related literature

This review includes frameworks specifically designed for pre-service mathematics teachers' application of blended learning, as well as those used for teaching development of mathematics instruction. After identifying studies that fitted the synthesis criteria, we read and analysed the articles to categorize components related to blended learning at HEI which the authors discussed under the following five themes: 1) trends of development of ICT in South African education system; 2) conceptual understanding of blended learning; 3) the use of blended learning in teaching and learning of mathematics; 4) the kinds of research being developed in blended learning; and 5) the use of blended learning in mathematics teacher education programme.

Trends of development of ICT in the South African education system

Over the past twenty years, South African HEIs have recorded digital progress in pedagogical practices using information and communication technology (ICT) (Ngambi, Brown, Bozalek, Gachago & Wood, 2016; Mahesh, 2017). Accordingly, there have been four phases of technology-enhanced teaching and learning practices being experienced in South Africa (Czerniewicz & Brown, 2005; Pejout, 2004; Mahesh, 2017). Phase one (1996-2000) involved the transition from blackboards and overhead projectors to PowerPoint presentations and the use of animations and voice recordings. Phase two (2001-2005) involved policy statements linked to the growing technology being made available for teaching and learning and development of infrastructure needed to execute such a plan. Phase three (2006-2010) championed professional development of higher education teachers to improve their technical skills and the development of pedagogical strategies using these acquired skills. Phase four (2011 to present) continues with professional development but extends this to adapting teaching and learning strategies that includes digital and flexible learning tools, such as in blended learning. This phase does recognise that, although mobile and social media are readily available to students now more than ever, teaching and learning practices in South African HEIs remain largely unchanged.

To achieve the goal of this fourth phase, more schools than at present are expected to be developed into e-schools, consisting of a community of both teachers and learners. Such schools should have access to ICT resources that support curriculum delivery, as well as connections to ICT infrastructure. These schools should equally have qualified and competent school leaders who use ICTs for planning, management, and administration. The schools should have learners who utilise ICTs to enhance learning. In such schools, the teachers and learners will be able to develop skills on how to use ICTs. It is important to note that all this would only be possible if there is a strong and stable connection to ICT infrastructure and access to resources that will improve on the use of blended learning approach in pre-service mathematics teacher programme.

Conceptual understanding of blended learning from the literature

Blended learning is still a concept that lacks a firm definition, however, but many agree that it is a combination of direct contact between lecturers and students and online instruction with

respect to various digital platforms. Sharma (2010) observed in a non-South African context that blended learning is not new, and contrary to what some may think, it has been in use for more than 20 years. Blended learning emerged in the educational context because of the accessibility of computer technology in and outside the classroom, and the expansion of the pedagogical potential of ICT for teaching and learning (Hong & Samimy, 2010; Schechter, Kazakoff, Bundschuh, Prescott & Macaruso, 2017).

Several researchers (see e.g. Tayebnik and Puteh, 2012; Christenson, Horn, and Staker, 2013) defined blended learning as a combination of instructional methods or pedagogical approaches. Blended learning is seen as a mixture of online learning or web-based training with face-to-face communication and more traditional methods of learning and teaching (Tayebnik & Puteh, 2013; Kintu, Zhu & Kagambe, 2017). As such, blended learning embraces the use of online environments to offer complementary learning experiences that allow face-to-face time and space to be used more efficiently and effectively (Glazer, 2011; Johnson & Haria, 2015; McGee & Reis, 2012; Means, Toyama, Murphy & Bakia, 2013; O'Byrne & Pytash, 2015). However, going by the various definitions of blended learning raised by different authors, this research argued that blended learning is a mixture of online and face-to-face teaching and learning methods that caters for individual students' abilities to learn at their own pace. From this perspective, blended learning not only involves a combination of conventional face-to-face learning with technological-based tools, but also unites multiple teaching models.

Use of blended learning in higher institutions of learning of mathematics

The use of blended learning in teaching and learning of mathematics is an area of growing interest among educational researchers. The 2015/2016 academic session in South African HEIs saw an expansion of the use of blended learning to support teaching, learning and research as HEIs faced the chaos and uncertainty that emerged during the #FeesMustFall campaign, a student-led protest movement that began in mid-October 2015 in South Africa (Kekana, Isaacs & Corke, 2015). The sudden closure of many institutions' doors meant that direct contact institutions had to suddenly change the teaching and learning platforms to a much more digital framework (Allison, 2015). Blended learning thus enabled most HEIs to maintain some level of contact with their students. It further addressed the issue of curriculum completion for various courses by making use of e-learning tools; such tools allow students to gain access to information, presentations, assignments and videos to ensure that they do not fall behind.

South Africa's higher education policies necessitated a move from the lecture style of teaching to a blended learning approach that engage the learners and equip them with skills to apply their knowledge to new situations and develop life-long learning skills (OECD, 2012). Blended learning, which is a combination of face-to-face and online teaching, is used to address some of the issues raised above. Tshuma's (2012) study on blended learning in a South African university adopted a developmental model used to address the issues of access to university for students from diverse backgrounds, different learning styles, levels of motivation and levels of preparedness. This study is in line with Salmon's five-stage model for online learning (Salmon, 2016), as well as active and collaborative activities that engage

the students in a face-to-face environment. Schutte and Mokoena (2016) research provided a comprehensive view of blended learning systems and discussed its possible application within the South Africa higher educational environment. At the end of the review, the authors identified blended learning as one of the top ten trends to emerge in the knowledge delivery industry. Blended learning enables higher education institutions to maintain some level of contact with their students as well as increasing access to higher and continuing education in Africa (Bower, Dalgarno, Kennedy, Lee & Kennedy, 2015).

However, several research outcomes observed that blended learning comprises multiple learning paths that provide opportunities for individualised learning, promotes active participation, student-centred and collaborative learning (for e.g. Johnson, Adams Becker, Estrada, Freeman & Hall 2016; O’Byrne & Pytash, 2015; Powell, Watson, Staley, Patrick, Horn, Fetzer & Verma, 2015). Accordingly, Mean, Toyama, Murphy and Baki (2014), Johnson et.al. (2016) and Powell et al. (2015), blended courses utilise small group instruction, individual tutoring, and cooperative projects in both face-to-face and online contexts that can be customized to meet students’ needs. Kennedy and Archambault’s (2012) research on teacher preparation for K-12 online and blended learning in United States of America suggests that teacher education programmes should prepare prospective teachers on multiple-format instructional process using both face-to-face and online contexts. This is in line with the recommendation of the U.S. Education Department’s National Education Technology Plan (2016), which calls for teacher education programs to provide pre-service and in-service educators with technology-based professional learning experiences to enable them to create compelling learning activities that improve teaching and learning, assessment, and instructional practices. The best way to understand the principles and practice of blended learning is that teachers should experience blended learning for themselves in their own professional development (O’Byrne & Pytash, 2015). This observation is in line with Kolb’s theory on Experiential Learning (Kolb, 1984), which asserts that knowledge is created through the transformation of concrete experience paired with reflection on the experience. Teachers need to engage in a blended learning course to understand first-hand the benefits, use and challenges of such instructional design.

Despite teachers’ understanding and use of blended learning in education (Stosic, 2015), Jeffrey, Milne, Suddaby and Higgins (2014) interviewed nine tertiary teachers from two state universities about their use of online and classroom components and the reasons for their decisions. Findings showed that these teachers valued classroom components rather than online, an attitude largely driven by their perceptions that specific learning functions were best suited to given formats. This finding resonates with Howard’s (2013) assertion that teachers with less confidence using digital technologies will perceive greater risks and negative effects on learning resulting from technical issues and problems than teachers with greater confidence. Research on the possible uses of blended learning is growing, but still limited in mathematics education instruction. However, there is need for a brief discussion on the kind of research being developed in blended learning.

Kinds of research being developed in blended learning

Research on blended learning has recorded a steady growth both in journal articles, and in international and local conferences. Most of the literatures reviewed in this section are broadly divided into four categories, namely: (1) research on the potential of blended learning for teaching and learning mathematics; (2) mathematics lecturers’ activities in blended

learning classroom; (3) affective studies on the use of blended learning; and (4) the use of blended learning in mathematics teacher education programmes.

Research on the potential of blended learning for teaching and learning mathematics

Several studies have explored the potentials of blended learning in mathematics instruction at different academic levels. An example is the research work of Korenova (2014) in South Korea which used digital technologies, such as the open-source software GeoGebra, that allow the students to experiment, create, verify hypotheses and thereby develop their creativity in mathematics. Elsewhere, Nehme, Seakhoa-King and Ali (2015) evaluated the implementation of technology blended teaching and learning in the Foundation Mathematics Programme at a private college in Kuwait with a view to identify improvements in student performance. The research found that there was an increase of between 12% and 35% in the normal expected time required for problem-solving practice with the MML (MyMathLab) system. Another example is Anderson, Boaler and Dieckmann (2018), report on a blended professional learning model of online and in-person meetings during which 40 teachers in eight school districts in the US learned about the new brain science, challenging the “math person” myth, as well as effective mathematics teaching methods. The findings showed a positive impact of an online class, which is focused less upon standards and more upon personal growth, mindset, and belief in the potential of all learners. However, Jeffrey, et. al.’s (2014) research on blended learning at Massey University revealed that most teachers used well-developed engagement strategies in their classroom teaching, compared to a minimal use of strategies online. Hence, there is need to examine what teachers do in blended learning, and signals steps that teachers and their institutions might take to build on the opportunities presented by blended learning.

Mathematics lecturers’ activities in blended learning classroom

As a teacher with 20 years of experience in teaching mathematics, I have learned that change is the only constant and that we never stop learning and must always evolve to meet the needs of our changing environments. A Math for America (2018) master teacher stated that with the blended learning classroom, teachers mostly sit at the back of the classroom looking at the computer to check on the progress of every single student that works on different things at the same time through their computers. The greatest advantage of this method is the fact that the students get into the classroom with basic preparation for the discussion that follows.

Another example is Bhatti, Laigo, Yohannes, and Pulipaka’s (2016) research on the use of a blended learning approach in teaching mathematics. MathLab was used to teach concepts in Calculus in a laboratory class. In the theory component, the teachers discussed lessons in the traditional classroom set up. Students were then assessed in a traditional closed book test, where they had to solve problems, with the aid of only a scientific calculator. Also, Siyepu (2018) explored the effects of instructional design using blended learning in the learning of radian measures among mathematics students in a London university. The focus was on the use of Khan Academy to supplement traditional classroom interactions. Khan Academy is a non-profit educational organisation created by educator Salman Khan with a goal of creating an accessible place for students to learn through watching videos in a computer. Results

showed that this study enhanced the students learning of radian measures. Learning through videos prompted the students to ask questions which brought about clarity and sense making to the classroom discussions.

It is important to understand that, blended learning is not limited to watching videos of recorded live classes. It is therefore crucial to communicate clearly with students what blended learning is, why it is being introduced, how it works, how they are benefitting, and what is expected from students.

Affective studies on the use of blended learning

Few research studies have focused on the perceptions and attitudes of pre-service teachers in their use of blended learning in mathematics instruction. In Gecer and Dag's (2012) research, participants of the research were experiencing blended learning for the first time in Kocaeli University, Turkey. The findings from the research revealed that the blended learning mode favours active participation of students, makes course materials interesting and useful, as well as increases students' learning abilities. These findings contradict the research outcome of Ashby, Sadera, and McNary (2011) that compared student success between developmental math courses offered online, blended, and face-to-face. The findings revealed that students of community college Baltimore County located in USA that registered for a blended learning mode algebra course performed less than their counterparts in face-to-face and online learning modes.

Ameloot and Schellens (2018) observed that blended learning has many opportunities for flexible learning, as well as many challenges in a selected university in Belgium. One of the major challenges is to keep students motivated. Thiyagu's (2011) survey research employed to determine the perceptions of all the mathematics trainees studying for the award of Bachelor of Education degree at various colleges in Virudhunagar District, Tamil Nadu towards blended learning. Findings revealed an improvement on B.Ed. trainees' perceptions towards blended learning. In addition, Krishnan (2016) conducted a research study at a private international university in Malaysia on students' perceptions of the face-to-face and online instruction in a hybrid mathematics course. Findings revealed that students preferred the face-to-face learning approach, because it enabled them to learn and understand mathematics concepts in a comfortable, interactive manner with their peers.

Ndlovu and Mostert (2018) analysed teachers' perceptions of using the modular object-oriented dynamic learning environment (Moodle) platform as a learning management system in a small-scale blended learning programme for in-service secondary school mathematics teachers in South Africa. The main finding was that in a blended learning Moodle facilitator provide in-service teachers with answers and feedback. A study conducted by Umoh and Akpan (2014) investigated students' perceptions of the use of blended e-learning tools in the teaching and learning of mathematics with undergraduate students of the University of Uyo, Nigeria. Findings revealed a positive effect on pre-service teachers' perception towards the use of blended learning tools.

Use of blended learning in mathematics teacher education programmes

It is worth to note that few researchers analysed the use of a blended learning in mathematics teacher education. Imas, Kaminskaya and Sherstneva's (2015) research offered a new web-course on a Moodle platform and added it to everyday classes. The study showed the growing level of students' activity during the semester at a selected university in Florence, Italy when they use blended learning. Singh (2015) reports on the use of blended learning in University of Limpopo Sovenga, South Africa as a move beyond traditional lecturing to incorporate face-to-face learning with e-learning. Singh (2015) also indicated that online component of blended learning allows students to have control over their instructional process.

Moreover, Naidoo, Naidoo and Ramdass's (2017) research revealed that blended learning offers pre-service mathematics teachers at Durban University of Technology, South Africa opportunities to extend ideas they had previously encountered in face-to-face classroom instruction. Another example that illustrates how blended learning can be used to promote learning of mathematical concepts is through the work of Comas-Quinn (2011) that explored the advantages and challenges of blended programs from different perspectives in an open university in UK. The study focused on those areas identified as conditions for teachers to effectively implement the online component that has been integrated into the blended curriculum. Contrarily, Hong and Samimy (2010), like Comas-Quinn (2011), explored the role of Korean teachers in the successful implementation of BL, but from a different perspective; data were gathered from students rather than from teachers. They particularly examined the relationship between teachers' use of blended learning and learners' reactions to blend learning. The article seeks to support decision-making processes in HEIs interested in using blended learning as a complement to other learning strategies. In line with this, Galvis (2018) explored factors that could influence University of Los Andes Bogotá Colombian decision to implement blended learning and addresses questions that should be answered in this regard.

Use of blended learning in teaching and learning of mathematics is an emerging research area that is expanding and growing fast. In few years to come, this research area will attract more followers among mathematics educators all over the world. It is important, we caution ourselves on the implementation of blended learning into mathematics classroom to avoid challenges of different kinds in terms of pedagogical, technical and management related issues. Research should consider the idea of Graham, Vaughan, Dziuban, Teodoro and Light (2017) to get the most out of face-to-face and blended learning environments. Learners must be provided with flexible learning environments that overcome situational barriers for learning.

Conclusion

Changes around technological development will continue to increase in pace. From this review, blended learning incorporates a variety of delivery styles, accommodates student needs to achieve the most effective learning. The blended model, currently being implemented in our institutions, implies presenting modules with a blend of the traditional

face-to-face method and online learning. The exact nature of the proposed blend will differ from module to module but should involve a blend of face-to-face and online learning.

Despite the popularity associated with blended learning from literature, why has the efficacy of blended learning not fully been ascertained? Moreover, online technologies have improved in quality and power, while the same cannot be said about online pedagogies. This could be attributed to the fact that some teachers allow the available technological tools to direct or shape their instructional choices, rather than technology being required to serve pedagogy. This review, though far from comprehensive, is an attempt to understand the state of use of blended learning in mathematics instruction at HEIs.

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THE ROLE OF MOBILE TECHNOLOGY IN ENGLISH FIRST ADDITIONAL LANGUAGE LEARNING: WHAT STUDENTS HAVE TO SAY

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Abstract

A case study was conducted on English First Additional Language classrooms in a selected University in the Eastern Cape Province, primarily to examine how learning with mobile technologies could support students in acquiring the knowledge and skills they would need to become more proficient in English First Additional Language and to understand how the use of mobile technologies generates stimulating changes in classroom activities. Constructivist theory was used as the lens of the study to explain the data collected from 80 Bachelor of Education first year students. A quantitative approach was adopted, using questionnaires. The findings suggest that technology integration: supports students' active learning; generates stimulating changes in classroom activities; expands the classroom into the real world, thereby enhancing the students' knowledge. The study recommends that students be allowed to use mobile technologies in class. However, lecturers have to avoid division between haves and have-nots among students.

Keywords: English First Additional; language proficiency; challenges; software - applications

Introduction

Many universities in sub-Saharan Africa (and South Africa), including the University under study, provide access to knowledge to a diversity of students from mainly rural, poor, and disadvantaged communities. Due to these socio-political barriers, many learners receive poor quality education throughout primary and high school. This means that such learners may leave primary, and even high school, without developing a strong command of the English language, and essentially, without reaching a sufficient level of Cognitive Academic Language Proficiency (CALP), which is necessary to successfully accomplish cognitively-demanding academic tasks (Brown, 2004). According to Hardman and Ng'ambi (2003), university tasks present challenges for under prepared students. Badenhorst and van der Merwe (2015) postulate that language competency and proficiency are central to academic achievement. For the purpose of this paper, English First Additional Language (FAL) proficiency refers to students' ability to utilise different parts of English language skills such as listening, speaking, reading, and writing (Grabe & Stoller, 2002). In line with international benchmarks, the use of technology has been identified in many institutions, including the institution under study, as an appropriate tool to support students, and improve the quality of teaching and learning English First Additional Language (FAL). Therefore, this current study aims to fill this gap by examining how learning with technologies could support students to be more competent and proficient in English FAL.

The study attempts to answer the following research questions:

1. What types of mobile technologies are students learning with in their English FAL classrooms ?
2. How are mobile technologies integrated in English FAL classrooms?
3. What changes do technologies generate in classroom activities in English FAL classrooms?

4. How can learning with technology enable, and sustain, students' engagement in classroom activities in English FAL classrooms?

According to Ahmadi (2017) one of the important elements for learning is the method that teachers use in their classes to facilitate language learning process. Within the Vietnamese context, on account of seeing that technologies are of utmost importance, the Ministry of Education and Training (MOET) (2008) put great emphasis on the reform of education through the implementation of technology applications at any level of education. Pourhossein Gilakjani, and Sabouri (2017) echoing Riasati, Allahyar, and Tan (2012) share the same sentiments that it is the teachers' responsibility to guide learners and be facilitators of their learning. Alsaleem (2014) conducted a study on the use of technology to improve learners' writing, vocabulary, word choice, and speaking ability using WhatsApp applications in English L2 classrooms and the results revealed that WhatsApp showed improvement in learners' writing skills, speaking skill, vocabulary, and word choice. Genclter (2015) asserts that teachers should encourage learners to find appropriate activities through using technology in order to be successful in language learning. Godzicki, Godzicki, Krofel, and Michaels (2013) conducted a study examining students' motivation and engagement in English FAL classrooms. The findings showed that students were more likely to engage in classroom when technology is used as an educational tool in class. Simply put, mobile technologies show an improvement when it comes down to accessibility and motivation. This finding is supported by Arifah (2014) who asserts that the use of technology does not only increase learners' motivation but technology also assists learners in developing their higher order thinking skills. Genclter (2015) support the view and points out that technology provides learners with activities, rapid information and appropriate materials which motivate them to learn more because they learn on the basis of their interests. In Kullberg's study conducted on Swedish students' perspectives of the use of technology in the English classroom in 2011, the findings revealed that students showed a more positive attitude and they would like to adopt computers more in the classroom (Kullberg, 2011). The findings of the study on Spanish students' attitudes to the use of technology after learning with in English FAL classroom, the findings showed that the students found usefulness of technology to their English language learning (Kopinska, 2013). In order to attract their attention in English FAL teaching and learning, Ahmadi (2017) suggests that lectures combine multimedia and teaching methodology.

Theoretical Framework

Constructivist theory and Self efficacy were the lens of the study. Constructivist theory posits that learning is an active and constructive process in which a learner actively construct his or her own reality through interaction with objects, events, and people in the environment (Bhattacharjee, 2015). In English FAL learning, constructive theory encourages active participation of learners in their own learning because for learners to develop an understanding of concepts, they must actively engage in meaning making (Ertmer and Newby, 2013; Olusegun, 2015; Amineh and Asl, 2015). From the second language learning perspective, constructivists believe that efficient language learning needs to be grounded in the actual use of the language, and mediated through meaningful and authentic interactions with others in a social context. Social interaction promotes collaborative learning among students for more meaningful learning.

Self-efficacy is defined as the belief in one's ability to achieve a goal, or an outcome (Bandura, 1977; 1997). According to Self-efficacy Theory, individuals are likely to engage in activities to the extent that they perceive themselves to be competent at those activities. This

implies that lecturers should give the students opportunities to be active, and participative, in classroom activities, in order to be more competent at the activities, and more efficient in English FAL learning. Student's experiences on their use of cellular phones and social networks should equip them with the necessary skills to deal with challenges, thereby instilling self-confidence in learning with technologies in their English FAL classrooms (Freynik, 2014). Bandura (1997:3) further argues that "beliefs in one's capabilities to organize and execute the courses of action" are key factors of human agency. According to Onwuegbuzie and Collins (2007), one's beliefs system influences behaviour choice, effort invested, persistence, and task success in the learning process. On the other hand, teachers with high self-efficacy are more likely to set higher standard for learner behaviour and to use class time more effectively (Ahmadi, 2018).

Method

The positivist paradigm was adopted in the study. Due to the chosen paradigm, quantitative inquiry was employed because the study gathered quantitative information from the learners who most experienced with the studied phenomenon (Patton, 2002). This was done through the case study design as it is an in-depth, intensive enquiry reflecting a rich lively reality and exploration of a bounded system (Cohen, Manion & Morrison, 2007; Creswell, 2003). The researcher conveniently and purposively selected the University in the Eastern Cape for the reason of accessibility. From the selected university, a total sample of 80 first year B. Ed students were purposively selected, because it is their first year at university, and most of them were from educationally-disadvantaged schools in rural areas, where English is their first additional language.

Questionnaires were used to collect data from students. Questionnaires were relevant in this study because they allowed for anonymity and privacy which encouraged more responses on sensitive issues and they work well with larger samples (Cohen, *et al.*, 2011). The first section of the questionnaire consisted of items with different aspects to show students' personal technologies, and technologies in English FAL classrooms, as well as English FAL language practices. The second section included the following items: knowledge of the types of technology that students were learning with in their English FAL classrooms; how technology was integrated in English L2 classrooms; the changes that the technologies generated in classroom activities; and how learning with technologies enabled and sustained students engagement in classroom activities. Students were to tick the statements they agree with in each section. The questionnaires were well-structured, and not very long. In addition to its face value, items in all sections had content that was directly linked to the aims and objectives as well as the research questions of this study, in order to come up with valid and accurate data that helped in understanding the phenomenon under study (Thomas, 2013). It had both open-ended and closed-ended questions, in order to elicit valid responses for the study. One English FAL class had an opportunity to complete the questionnaire at two different times, to check for the reliability of the questionnaire. The responses from this questionnaire were similar, and this showed the stability of the instrument. A high degree of stability shows a high degree of reliability of the instrument (Cohen, *et al.*, 2011).

The researchers explained the ethical obligations to the participants and these acted as guiding principles to keep the researcher in check. The researchers also sought permission to conduct research from the institution. The participants' responses were processed with SPSS version 20 to perform descriptive statistics in which frequencies and percentages were computed and analysed in order to answer the research questions.

Results

The students' responses in all the tables and figures below reveal the integration of technologies in their English FAL classrooms. The researchers explain the students' responses to questions based on the four research questions stated above.

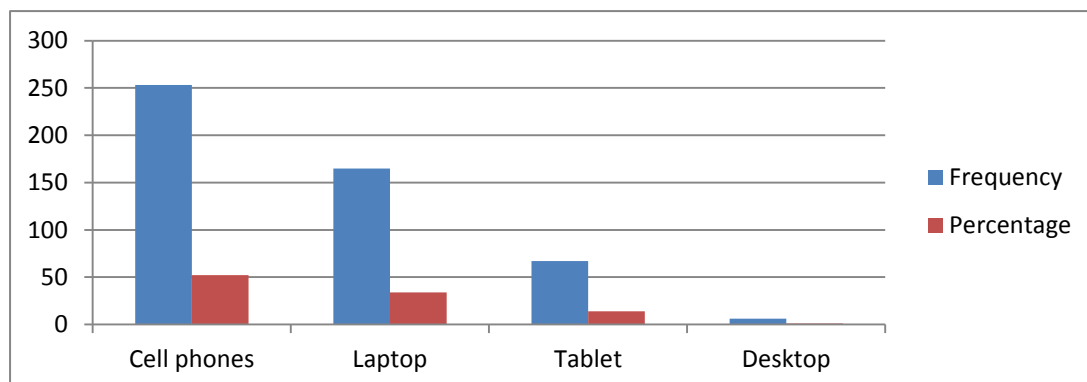


Figure 1: Types of Technology Owned by Students (n= 80)

The graph above indicates that the majority of the students (52 %) owned cell phones; 33.4% owned laptops; and 13.4%, tablets. The least owned device was the desktop (1.2%). These findings need to be taken very seriously. If 52% of the students owned cell phones, there was a need for the lecturers to consider the fact that there were activities that could have been done by students in their classrooms, as most cell phones had features that could have assisted them in English FAL learning.

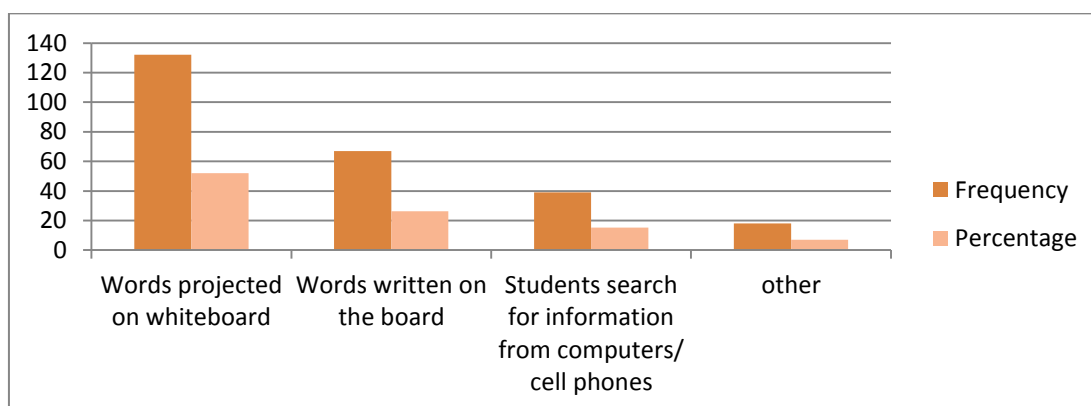


Figure 2: Transmission of New Information (n= 80)

To respond to how mobile technologies are integrated into teaching and learning of English FAL the students' responses are shown in the graph below. 52% shows that words are projected on the whiteboard. 26% of the students indicates that words are written on the board. 15 % of students shows that students searched for information from computers, or cell phones, i.e., they learned English FAL with technologies in their classrooms. The minority of students (7%) reveals that there are other devices (that are not listed) used by their lecturers to introduce, and practise information. Generally, most lecturers use data projectors during content delivery in their English FAL classrooms.

Effective questioning is a key aspect of the teaching and learning process. The graph below shows that 66% of the students indicated that their lecturers mainly used open-ended questions. 24% of the students mentioned that the lecturers mainly used questions that

required recall of information. Such questions were based on memory or retention, rather than reasoning. Therefore, lecturers, who asked such questions, were not encouraging students to critically examine the content taught. 10% did not respond to the question.

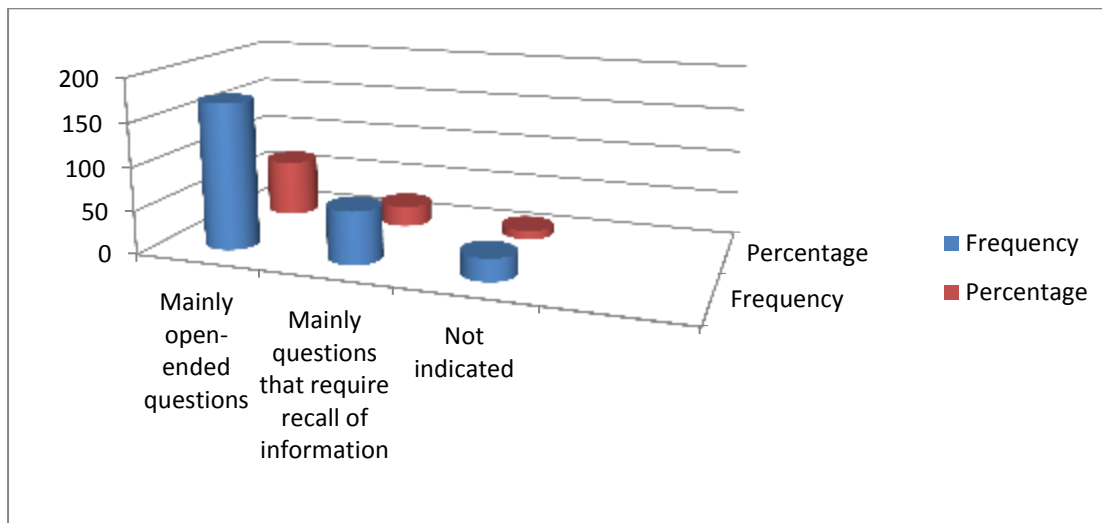


Figure 3: Lecturers' questioning style

The students' responses below shows the best practice (student engagement) in order to remember what is taught in a lesson. The 45% of students indicates that they understood best in a lecture when they write things down or take notes for visual review. Most students, 54% remembered more about a lecture when tape-recorded for re-listening later. This further strengthens the view that many students are eager to learn with technologies.

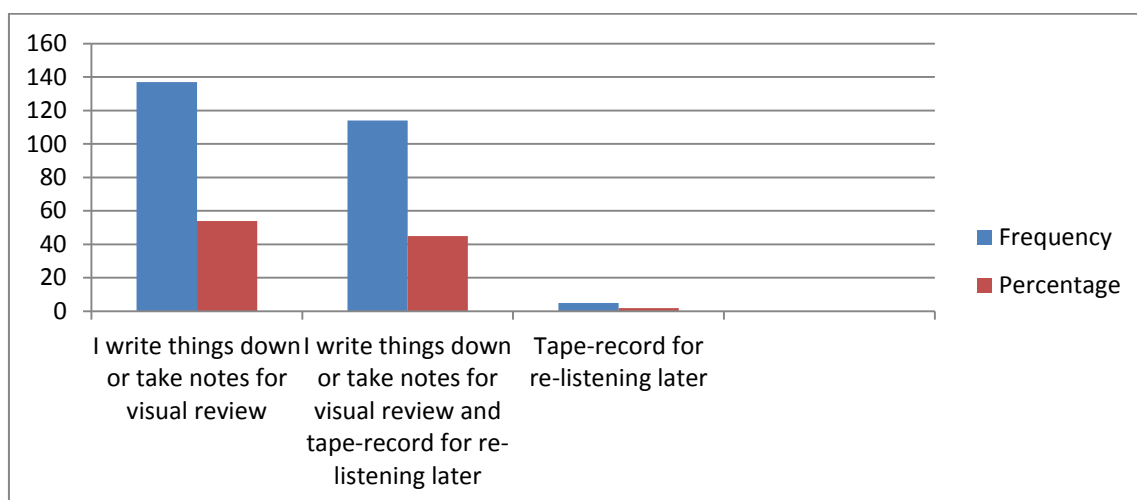


Figure 4: Students' use of mobile technologies

It is also evident that 2% were students with compound learning style preferences.

Discussion

The findings of the data collected on the types of mobile technologies that student are learning with in their English FAL classrooms indicated that students in the institution under study owned technological devices. Most of the students owned cell phones. Having cell phones was not strange, considering their backgrounds, because cell phones can be found in

remote, rural communities, and across age groups, and income and literacy levels. Moreover, cell phones are relatively cheap, compared to other new devices, like tablets, and laptops. From the data collected, it is, therefore, clear that the students were ready for, and capable of, using cell phones to fulfil their learning and socio-emotional needs, similar to (Kullberg, 2011). According to Freynik (2014), student's experiences on their use of cellular phones and social networks should equip them with the necessary skills to deal with challenges, thereby instilling self-confidence in learning with technologies in their English FAL classrooms. Self-efficacy which is the theory that forms the basis of this study posits that students are likely to engage in activities to the extent that they perceive themselves to be competent at their activities as indicated by Bandura in his theory (Bandura, 1997).

These ever-present devices could make a highly likely learning tool to employ in the classroom, when the need arose. For example, most of the students indicated that they use their cell phones to record the lecture instead of writing down notes. Students could also use the mobile devices (cell phones, laptop and tablets as dictionaries, when they did not understand the meanings of words, i.e., they used the device to search for the meanings of English words. Electronic dictionaries provided a multidimensional presentation of English translations, and other explanatory information. Given its large storage capacity, it can provide a full range of synonyms, as well as grammatical and stylistic information, in an efficient manner. These personal technologies created an opportunity for groups to construct knowledge together; thus, linking reflection and interaction (Bhattacharjee, 2015).

As regards the integration of mobile technologies in English FAL lessons, the study revealed that technologies are powerful tools to be used by auditory and tactile learners. It also revealed that listening to the recorded lecture after class assisted the students to get a better understanding of the content. Through playing the recorded work several times, students had a chance to even pick up something they did not hear during the lesson. Simply put, students realised the usefulness of mobile technologies (Kopinska, 2013). The study also revealed that lecturers encourage students to be participative in class through discussions. Figure 3 indicates that lectures asked open – ended type of questions that requires students to express themselves as Ahmadi, (2017) suggested that one of the important elements for learning is the method that teachers use in their classes to facilitate language learning process. Riasati, Allahyari, and Tan (2013), Pourhossein Gilakjani, and Sabouri (2017), support the view of learner-centred approach to teaching. In Table 1 most students indicated that their lecturers encourage problem-solving, original, or imaginative work and group work. The use of inexpensive and user-friendly technology, such as cell phones, generated some potentially beneficial, and intriguing, possibilities to increase students' collaborative work. These technologies allow peers to learn from one another, and aided weaker learners through constructive, scaffolding. In this study, collaboration among students was essential to knowledge-building, as it provided them with an opportunity to discuss, and reflect on, their learning, as well as their experiences in their practice environments. There are students in Figure 1 who revealed that they use their mobile devices as resource centre. They use their cell phones and laptops to search for information. The majority of students also indicated that they learned best when they wrote down the information, and read it later, rather than when they listened quietly to the lecturer. It is the English FAL lecturers' responsibility to afford students an opportunity to read extracts in class from their gadgets, so as to develop their reading skills. When students communicated with other students regarding their tasks or group discussions, or with their lecturers they were expected to select the best and most economical words to communicate clear and meaningful messages. There was an availability of more planning time for students to produce good utterances. This shows that learning with

technologies reduced conformity and convergence, e.g., hostile language, and the likelihood of information overload. This finding is in line with Alsaleem (2014) study on the use of WhatsApp which showed improvement in learners' writing skills, speaking skill, vocabulary, and word choice.

As far as the changes that technologies generate in classroom activities, most students indicated that their lecturers used mainly open-ended questions which allowed the freedom for students to come up with unique, new, or imaginative ideas as encouraged by the Constructivist Theory (Bhattacharjee, 2015). This also reflects teacher-learner interaction. Students became interactive in class. Mobile technologies encourage active participation and collaborative learning. Simply put, students had an opportunity to express their thoughts, no matter whether it was right or wrong, and heard explanations offered by their peers.

The findings of this study revealed that learning with technology enable and sustain students' engagement in their activities. Irrespective of whether lecturers decided to adopt new technologies in the teaching and learning of English FAL, students were found to be already using them to support aspects of their learning. The purported advantages of learning English FAL with technologies was students' active learning. The students' interactions with one another, and with their lecturers in class, generated more opportunities for students to participate, and to provide a greater amount of language production as Genclter (2015) highlighted that technology provides learners with activities, rapid information and appropriate materials which motivate them to learn. The researchers identified challenges such as lack of sufficient knowledge of technologies on both students and lecturers, lack of computer skills and unavailability of classroom resources, lack of experience in the use of technologies and how to generate changes in English FAL activities, and lecturer's attitudes toward technology integration in their teaching.

Conclusion

Students had positive attitudes toward the use of technology in their English FAL classrooms. It developed their intrinsic motivation, as they became curious, and adventurous, and it aroused their interest. In English FAL classrooms, the technological devices owned by students assisted them academically, and that contributed to the development of their English FAL proficiency. Indeed, students in BEd1 English FAL classrooms in the institution under study were in need of their lecturers' guidance to discover the best ways of learning English L2 with technologies for themselves. According to constructivists, lecturers should ask questions, rather than giving student's facts, engage with students in conversations, and allow them to arrive at their own conclusions. Integrating mobile technologies reduced the amount of passive learning, and encouraged more co-operative and active learning, and enhanced lecturer-student interactions. Students were able to manage their own learning process, by gathering information, and negotiating meaning themselves. It promoted better student work, because they became more engaged and excited about using the technologies which enhanced motivation, and concentration. It increased collaboration among the student.

The exposure to technological devices, such as cell phones, tablets, and laptops developed students' listening, reading, writing, and communication skills in English FAL classrooms. This finding is in line with the findings of the study conducted at the University of Illinois, Urbana by Douglas Mills, who wanted to improve his Master's students' listening, speaking, reading, and writing skills in English L2 for academic and professional purposes. According to him, using CALL in English L2 increased students' self-esteem, vocational preparedness, and language proficiency. Their vocabulary acquisition improved, as they used dictionaries

from their cell phones more often in class. The cell phones used in class consisted of various features, such as dictionaries, thesaurus, spelling and grammar check pane, etc., that assisted them in developing their academic writing skills.

Recommendations

Herewith some recommendations which the researchers hope can remedy some of the challenges identified by the study:

1. Students should be allowed to use technologies in class and be introduced to other types of devices they are not exposed to. However, lecturers have to avoid division between the 'haves' and 'have-nots' among students. Students should be advised on the types of technologies they could benefit from in selecting the devices; for example, to buy tablets, or cell phones, with third-generation protocols (3G), since not all cell phones have features found on computers
2. Lecturers and students should deal with internal barriers associated with their insufficient computer skills, by attending computer training on the use of technologies that would focus on learning English FAL with technologies.
3. The on-going training on the use of *Blackboard* and *turnitin*, and the use of English language software for both lecturers and students, should be organised. This should be conducted to improve students' listening, reading, and writing skills.
4. Lecturers should look for ways to deal with internal barriers associated with negative views of the use of technologies in their classrooms, especially, mobile technologies, such as cell phones, because they are relatively cheap, compared to other technological devices.

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TEACHERS' PERCEPTION OF VISUAL MORBIDITY AMONG PUPILS IN UDI LOCAL GOVERNMENT AREA, ENUGU STATE NIGERIA

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Abstract

The purpose of this study was to determine the teachers' perception of visual morbidity among pupils in Udi Local Government Area. Two research questions were raised for the study that adopted a survey design. Instrument for data collection was the questionnaire; known as Teachers' Perception of Visual Morbidity Questionnaire (TPVMQ) and contained 21 items that were presented in two sections A and B. Section A is made up of 8 items each with a 4 point response option Very High Extent (VHE), High Extent (HE) Low Extent (LE), Very Low Extent (VLE), while the Section B contain 13 items with 4 point modified Likert Type Scale of Strongly Agree(SA) Agree(A) Disagree(D) Strongly Disagree(SD). Validation of the instrument was done by three experts in Health Education, and reliability establish through the split half method. Spearman Brown Rank Order Statistic was used to determine the correlation coefficient value which yielded 0.83 and considered reliable. Data were collected by the researcher with the help of three research assistants. Mean, statistic was used to analyse data collected from a sample of 112 teachers drawn from a population of 1086 using the cluster sampling procedure. Findings show prevalence of visual morbidity ($x=2.30$) among pupils in Udi local government area and that the teachers showed adequate perception ($x=2.71$) of visual morbidity among the pupils. Implications of the findings for promoting best practices were articulated before recommending that health screening services should be made functional in primary schools among others.

Keywords: Perception, eye, prevalence, visual morbidity, mortality.

Introduction

Establishment and maintenance of a friendly environment, that is conducive for teaching and learning, remain cardinal in educational and school health programmes. Classroom is among the places in the school environment that require comfort. Visibility among the learners has remained a great source of concern to learner's comfort in the classroom. This is why lighting of the classroom to acceptable standard is required for the comfort of the learners. Ezedum (2006) established prevalence of visual problems among primary school children in Anambra State. This finding makes it imperative for a study to determine the perception of visual morbidity among pupils in Udi Local Government Area.

Visual morbidity describes the prevalence of illness associated with the eye. These illnesses which may be broadly categorized into ocular and optical problems among others include: eye strain, refractive errors, conjunctivitis and itching eye. It is the provision of the school health policy that adequate luminosity be provided for the classroom during instructions. However, where this standard is compromised, ocular problems are imminent. Lighting from natural and artificial sources was necessary in learning and working environment to prevent visual problems (Kotze & Acutt, 2003). Sun and electricity are the natural and artificial sources respectively. Excess or deficiency in the intensity of these sources creates exposure to eye problems.

Gateways to learning include the eye. Learners perceive their environment through the sense organs, which form gateways to learning. The eye is an indispensable organ to the child for learning. However, when there is any impairment of the eye, perception of information in the learning environment is threatened. Studies have revealed prevalence of various eye problems in the school children examined in India, Burundi, Nepal and Pakistan (Misera, Baxi, Damor, Nirav & Ravija, 2013) Specifically the studies revealed the following forms: refractive error (11.5%) squint (0.7%) colour blindness (0.05%) accidental trauma (0.3%) vitamin A deficiency (0.6%) and Trachoma (0.3%).

It could be possible that school children in Udi local government area might either be exposed to visual morbidity or are really suffering from same. Misra et al (2013) observed high prevalence of undiagnosed refractive error among pupils might be due to lack of awareness about eye diseases by teachers and parents. The focus of this study is to determine the perception of the teachers regarding visual morbidity in pupils in Udi Local Government Area. Determination of the teachers' perception in this direction will help the stakeholders in education formulate policies that would enable the teachers adopt best practices that would promote ocular and optical health. Perception means the way one looks at or sees things. In this study, perception will be taken to mean, the way teachers look at prevalence of visual morbidity among the pupils in Udi LGA.

Routine appraisal of the child's health at school is a provision of the Nigerian school health policy. This is expected to be done through various techniques such as screening. The aim is to detect early signs of failing health for the purpose of selecting intervention strategies to mitigate the impact. This agrees with the health belief model which believes that when one perceives the cost benefit of preventing diseases one will be inclined to adopt a preventive behavior than curative action. However low status of health appraisal for pupils in Anambra State public primary schools was established (Ezedum, 2006). This finding does not promote best practices in service delivery in education because some pupils could be suffering from any of the visual problems without being detected. It is against this background that the determination of the teachers' perception of visual morbidity among pupils in Udi LGA pupils has become needful.

Udi local government is one of the 17 local government areas that make up Enugu State with 82 primary schools in 28 communities organized into 4 zones, for convenience of administration. It is entirely rural in nature without provisions for eye clinics. Furthermore, majority of the school buildings are dilapidated in addition to lack of electricity supply for enhanced visibility during humid conditions. This condition seems to make the children to be seeing under stress thereby leading to strained eye muscles. On the other hand, the poor state of the buildings may cause lessons to be going on under a tree shade outside during an intense sun. The high intensity of the sun rays could dazzle the children's eye and cause ocular problems. Given these background, it becomes pertinent to determine how the teachers perceive the situation in relation to visual morbidity.

The purpose of the study therefore is to determine the teachers' perception of visual morbidity among the pupils in Udi local government area. Specifically, the study aims to determine the level of prevalence of visual morbidity among pupils in Udi local government area, and Teachers' level of perception of visual morbidity among pupils in Udi local government area.

To guide the study, two research questions have been raised thus: What is the level of prevalence of visual morbidity among pupils in Udi local government area? And, what is the teachers' level of perception of visual morbidity among pupils in Udi local government area?

Method

The survey design was adopted for the study. Population for the study comprised of 1086 teachers in the 82 public primary schools in the area of study. Cluster sampling technique was adopted to draw a sample of 112 used for the study. Each of the four zones of Ngwo, Udi, Affa and Ojebe-Ogene was regarded as a cluster. From each of the zones, four schools were selected using the simple random sampling technique of balloting to produce 16 schools. Using the systematic sampling technique, 7 teachers were drawn from each of the 16 schools to produce 112 teachers used as sample for the study.

Instrument for data collection was the questionnaire, known as Teachers' Perception of Visual Morbidity Questionnaire (TPVMQ) and contained 21 items presented in two sections, A and B. The section A contained 8 items with a 4 response options of Very High Extent (VHE) High Extent (HE) Low Extent (LE) Very Low Extent (VLE) that elicited information on the prevalence of visual morbidity among the pupils while section B contained 13 items with a 4 point modified Likert- Type scale response options of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) that provided information on the teachers perception of visual morbidity among the pupils. Validation of the instrument was achieved through the judgment of three validates drawn from Health Education field. Reliability was established through the split half method and the Spearman Brown Rank Order Statistic used to correlate the two sets of scores. The correlation co-efficient index value yielded 0.83, which was considered high enough to adjudge the instrument as reliable.

Data collection was done by the researcher with the help of three research assistants. Each assistant was assigned a zone for distribution and retrieval of copies of the questionnaire while the researcher took care of one zone. All the 112 copies of the questionnaire were duly completed and therefore qualified for data analysis.

Data were analysed using mean statistics. Each of the 4 separate responses of VHE, HE, LE, VLE; and, SA, A, D and SD were assigned weights of 4, 3, 2 and 1 respectively. Limit of real numbers was used to take decision. For items 1-8, mean scores of 3.50 – 4.00 were regarded as Very High Extent; 2.50 – 3.49 as High Extent; 1.50 – 2.49, as Low Extent and 1.00 – 1.49 as Very Low Extent, while for items 9-13 mean scores of 3.50 – 4.00 were regarded as Highly Adequate; 2.50 – 3.49 as Adequate; 1.50 – 2.49, as Inadequate and 1.00 – 1.49 as Lowly Inadequate.

Results

Table 1. Mean Responses of the Teachers on Level of Prevalence of Visual Morbidity Among Pupils. n =112

S/N	Item Statement	X	Decision
1	What is the extent of prevalence of refractive error among your pupils?	2.79	HE
2	What is the extent of prevalence of squint eye among your pupils?	2.51	HE
3	What is the extent of prevalence of colour blindness among your pupils?	1.01	VLE

4	What is the extent of prevalence of accidental eye injury among your pupils?	2.43	LE
5	What is the extent of prevalence of Vit. A deficiency among your pupils?	2.66	HE
6	What is the extent of prevalence of Trachoma among your pupils?	1.11	VLE
7	What is the extent of prevalence of Glaucoma among your pupils?	2.83	HE
8	What is the extent of prevalence of itching eye among your pupils?	3.02	VHE
	Grand Mean	2.30	LE

Key: **VHE** =Very High Extent; **HE** =High Extent; **LE** =Low Extent; **VLE**=Very Low Extent
 Data in Table 1 show a grand mean of 2.30. This means that there is a low extent prevalence of visual morbidity among pupils in Udi local government area. However, it is indicative in the Table that refractive errors ($x = 2.79$), squint eye ($x = 2.51$), Vit. A deficiency ($x = 2.66$), Glaucoma ($x = 2.83$) and itching eye ($x = 3.02$) exist to a high extent among the pupils.

Table 2. Mean Responses of the Teachers Level of Perception of Visual Morbidity. $n = 112$

S/No	Item Statement	X	Decision
9.	Visual morbidity is promoted by absence of screening services in schools.	2.34	IA
10.	Poorly lit and ventilated classroom promotes visual mobility	2.41	IA
11	School children who wear eye glasses show sign of visual morbidity.	3.01	HA
12	Pupils with eye problems will achieve less in school.	2.68	A
13	Pupils with itching eye lack concentration in the classroom	2.71	A
14	Illegible writing as the board can lead to eye strain	2.33	IA
15	Pupils with squint eye suffer social stigmatization only.	3.10	HA
16	Visual morbidity is a problem of the pupil alone.	2.61	A
17.	Adequate personal hygiene will surely reduce visual morbidity.	2.45	IA
18.	Adequate luminosity in the classroom keeps visual morbidity away.	2.55	A
19.	Visual morbidity could be associated with low vitamin supplement in the pupils	2.34	IA
20.	Health appraisal for pupils nips visual morbidity on the bud.	3.45	HA
21.	Untreated eye problems could lead to blindness.	3.20	HA
	Grand Mean	2.71	A

Key: **HA** = Highly Adequate; **A** = Adequate; **IA** = Inadequate; **HI** = Highly Inadequate

Data in Table 1 show a grand mean score of 2.71 which implies that the teachers show adequate perception of visual morbidity among the pupils. The teachers show inadequate perception for 5 items (2, 3, 7, 10 & 12) with mean scores of 1.50 – 2.49, adequate perception for 4 items (5, 6, 9 & 11) and highly adequate perception for 4 items (4, 8, 13 & 14).

Discussion

The purpose of this study is to determine the teachers' perception of visual morbidity among pupils in Udi local government area. The findings that the teachers showed inadequate perception of absence of screening services and poor ventilation as capable of promoting visual morbidity (Table 1 items 2 & 3) were surprising to the researcher. Teachers are expected to be fully aware of conditions that constitute exposure to eye problems. It becomes obvious that health appraisal would be held at low esteem by the teachers.

The finding that certain visual problems exist among pupils in the area of study is in tandem with previous studies that have revealed prevalence of visual problems among primary school children in both Nigeria and foreign countries (Ezedum, 2006; Misra et al. 2013) Absence of screening services in the schools promotes inability to detect prevalence of these visual problems. Screening services help to detect signs of abnormal health conditions such as visual problems. Majority of these visual problems could be detected and nipped on the bud where screening services are available.

However, the teachers showed adequate perception of visual morbidity with a grand mean of 2.71 (Table 1). The finding appears to contradict Misra (2013) who established that teachers lacked awareness about eye diseases among pupils. One may nurse the feeling that increase interest in conduct of screening services in school is capable of changing the state of the teachers' awareness. It was also a welcome development that the teachers showed adequate perception about adequate luminosity of the classroom as necessary for preventing visual morbidity among school children.

Implications of the Findings for Promoting Best Practices

Best practices in education could be promoted through committed implementation of school health services. Screening as a component of school health services ensures early detection of failing health among the pupils. The finding that the teachers did not perceive screening as critical in preventing eye problems is counterproductive to the promotion of best practices.

Given the fact that school children assemble from different epidemiological background, the school provides exposure to diseases of various nature. This is why Ejifugha (1999) observed that children who are faced with a lot of health problems such as communicable diseases, ocular problems and inquiries. This calls for adequate perception and high level awareness on the side of the drivers of education vehicle such as teachers for the promotion of best practices.

The study reveals that the teachers did not perceive poorly lit and ventilated classroom as capable of promoting eye problems. It shows that the teachers' knowledge about causative agents of diseases is questionable. In Nigeria today, the level of understanding of basic health knowledge particularly as it affects communicable and non-communicable diseases were very low (Ibinkule. (1993). However, teachers are not expected to be among such Nigerians. It is very difficult for most people to grasp the causative agents of common communicable diseases, not to talk about the mode of transmission and symptoms. When the level of knowledge, awareness and perception is low and inadequate, implementation of the strategies for promoting best practices will be shortchanged and perfunctorily done.

Promotion of best practices in education should include adequate teacher preparation through acquisition of appropriate and adequate knowledge. Poor knowledge of disease etiology is contributory to the high rate of superstition existing among people about diseases. It has

been suspected that most Nigerians still embraced beliefs in superstition and spiritual attacks as being responsible for certain ailments. Such ailments could include squint eye. It then becomes very important that the teachers' perception of visual morbidity be properly modified for the promotion of best practices in implementing strategies for a functional school health screening services.

Conclusion

Although the teachers showed perception of visual morbidity in various degrees of adequacy, the facts remains that that their perception has obvious implications for promoting best practices in implementing strategies for school health screening services. Prevalence of visual morbidity has been established among pupils in Udi LGA. However, frequent screening of the pupils could help detect the problem and subsequently assist in reducing the impact on the pupils comfort for studies.

Recommendations

The following recommendations have been made:

1. Health screening services should be made functional in schools.
2. Periodic retraining and refresher courses should be organized for teachers on strategies for implementing best practices especially in school health programme.
3. Morbidity education especially as it affects the eyes should be given serious attention in epidemiological studies.

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CONCEPTUALIZATION OF SEXUALITY EDUCATION BY PRIMARY SCHOOL LEARNERS IN RURAL AREAS OF THE EASTERN CAPE: AN IMPLICATION FOR SCHOOL MANAGEMENT

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Abstract

In spite of sex education being taught in schools, there is still a high rate of learner pregnancy in schools. This paper explored how learners conceptualize sexuality education in primary schools of rural areas in the Eastern Cape. The study adopted a mixed-methods approach using a sequential explanatory research design. Closed-ended questionnaires were distributed to five primary schools (130 learners the proportional stratified sampling technique was used to sample respondents in each school). Data collected through closed-ended questions were analysed using SPSS which resulted in the selection of four primary schools where open-ended questionnaires were distributed to two learners in each of the four purposively selected primary schools and data were thematically analyzed. The most glaring finding revealed that learners do not take sex education seriously because to them it is a "*school thing*" as parents do not talk about it at home. Participants also indicated that they would like to have sessions on sexuality education facilitated by their parents in schools. It was also revealed that sexuality education can reduce learner pregnancy if learners can stop being ignorant about sexuality issues. The study concludes that parents have to play a pivotal in sexuality education. Schools require a comprehensive sexuality education that includes a collaboration of teachers, parents, and learners as beneficiaries.

Keywords: Conceptualise, knowledge, comprehensive sexuality education, school management

Introduction and background

The scourge of the high rate of learner pregnancies in South African schools is a problem that cannot be ignored. Recently the Annual school survey (2017) reported an estimated 15504 pregnant learners in schools. Apart from this report in 2015, the Department of Basic Education [DBE] (2015) released statistics for the years 2010–2014, which places the Eastern Cape Province among those with the highest rates in the country with a recorded 28322 pregnancies. Furthermore, in the district where this study was conducted the Annual Survey for ordinary schools (2011–2013) reported pregnancy rates in 2011 were 847 and increased in 2012 to 857. The reports on learner pregnancies triggered the curiosity of the author about how primary school learners conceptualize sexuality education. Besides the above reports, the author was prompted by the fact that learner pregnancy in the school where she was a primary teacher was too high which led the author to be curious about primary school learner's conceptions.

The high learner pregnancy rate in primary schools in rural areas is the problem, hence, the researcher asked the following main research question: How do primary school learners in schools in rural areas conceptualize sexuality education? This paper seeks to explore how primary school learners conceptualize sexuality education in rural areas. The article entails the introduction and background, Literature and Conceptual Framework, Method, Results, Discussion, Acknowledgements, References, and Appendix.

Literature and Conceptual Framework

This study is guided by a conceptual framework which represents how the researcher synthesises literature and explains a phenomenon (Regoniel, (2015)). The key concepts that are being studied in this research study are conceptions, sexuality education, primary school learners and rural areas. In this study, the primary school learners in rural areas who are taught sexuality education are still falling pregnant in numbers. The researcher seeks to explore how they conceptualise sexuality education. She is of the view that being taught sexuality education was supposed to have positive results which are contrary to the above-mentioned statistics which indicate high learner pregnancy rate, hence, the curiosity on how the primary school learners conceptualise sexuality education.

Studies indicate that internationally, sexuality education was introduced more than four decades (Pardini, (2015); UNESCO, (2015) & Advocates for Youth, (2009)). In most countries continentally and nationally, reports indicate that sexuality education was introduced in less than three decades (Visser, (2005); Rosen, Murray, and Moreland, (2004)) though, in countries like Ghana and Zambia, sexuality education has just been recently introduced (Ghana News Agency, (2014) & UNESCO, (2015)). The above studies indicate that sex education has long been there. Furthermore, in South Africa, sexuality education was incorporated in Life Orientation and implemented in 1998 (Visser, (2005)). As far as the reports of the Department of Education, (2002); Rooth, (2005) and Madunagu, (2005) were concerned, sexuality education guides young people into having a healthy and responsible sexual life. Given this brief history of sexuality education, one would think that there must be a huge decrease in learner pregnancies.

Literature shows that many studies have been conducted (Onongha, (2016); Francis & Viljoen, (2014); Opara, Eke & Tabensi, (2012); Benzaken, Palep & Gill, (2011)) on conceptions of learners about sexuality education worldwide. However, the author realized that there are still some gaps that need to be closed. Many of the studies on conceptions of learners were conducted in secondary schools and reported that learners want to hear their parents' voices on the issue of sexuality education and some of the studies revealed that students believe it is important to have sex education as part of the school curriculum (Onongha, (2016); Francis & Viljoen, (2014); Opara, Eke & Tabensi, (2012); Benzaken, Palep & Gill, (2011)). This study is different from other studies conducted on this topic because it was conducted in primary schools in rural areas with a high pregnancy rate in the Eastern Cape Province. What makes this study to be more interesting is that it was conducted on learners who were much younger than the previously conducted studies (age range between 10 years and 15 years).

Methodology

To understand how primary school learners conceptualize sexuality education in rural areas, the researcher employed a mixed-methods approach. A sequential explanatory research design was more appropriate in this study as it aimed to know the "what" and the "how" part of the phenomenon (Creswell, (2003) & Tashakkori & Teddlie, (1998)). The proportional stratified sampling technique was used to sample respondents in each school for the first strand, which would allow the population to be divided into mutually exclusive groups (strata). The learners were divided into three strata according to gender, age, and grade. This kind of sample was mainly used to ensure that the different groups or segments of learners were sufficiently represented in the sample. The participants for the second strand were purposively selected. To collect the required data in this study, the researcher distributed

questionnaires with closed-ended questions to 130 primary school learners followed by the distribution of questionnaires with open-ended questions to the 4 purposively selected primary schools (2 learners in each school). The researcher further made follow up interviews to clarify issues that emerged during the process of data analysis. Informed consent and assent forms were signed by all who were supposed to sign. The right of participation was explained to the respondents and they were informed that they could participate in the study voluntarily and if they decided not to, no one would prejudice them; they were free to decline. The respondents were assured that all the responses obtained during the study would be kept private and would only be given to those who had been authorized to have it. To test the validity and reliability of the quantitative strand, careful sampling was done and the appropriate instrument was developed to measure the 'how' and 'what' part of the phenomena. The instruments were piloted with similar characteristics to those of the final study to test the validity. The researcher piloted the questionnaire in two primary schools in the area next to this study was conducted. The researcher chose the respondents who represented the features that she intended to describe. Procedures that can be used for assessing the trustworthiness of the data were constantly kept in mind, as suggested by Maree (2012). The issues of credibility, transformability, dependability and confirmability were satisfied. Data from quantitative strand were analysed using SPSS and qualitative data were analysed thematically. Integration of results finally was done.

Findings

Data in this study were collected into two strands (quantitative and then qualitative). The table before indicates the questions that were asked and the results in percentages.

Table 1: Composite table showing the results in percentages

Variables	Strongly Disagree	Disagree	Strongly Agree	Agree
1. We do not use knowledge and understanding acquired from sexuality education because sexuality education is only taught at school.	37.3%	10.4%	32.2%	19.2%
2. We are reluctant to use knowledge and understanding acquired from sexuality education because at home nobody talks about it.	0%	40.3%	59.7%	0%
3. We like to have sex "anyhow."	32.5%	0%	0%	67.5%
4. We do not take responsibility for our own lives regarding the prevention of pregnancy and sex-related diseases.	33.6%	0%	66.4%	0%
5. I know that having unprotected sex can spread diseases.	14.1%	0%	85.9%	0%
6. I understand that having unprotected sex can spread diseases.	0%	37.3%	40.3%	22.4%
7. Condoms were for those who were already infected by HIV&/AIDS	69.5%	0%	30.5%	0%
8. Primary school learners used the knowledge acquired from sexuality education to prevent pregnancy and sex-related diseases.	0%	30%	0%	70%
9. Primary school learners used understanding acquired from sexuality education to prevent pregnancy and sex-related diseases.	7.5%	40%	52.5%	0%

10. Knowledge acquired by primary school learners from sexuality education helps them to be more cautious.	0%	23.1%	0%	76.9%
11. Understanding acquired by primary school learners from sexuality education helps them to be more cautious.	0%	22.7%	62.3%	15%
12. Knowledge and understanding acquired by primary school learners from sexuality education could reduce pregnancy and sex-related diseases only if learners take it seriously at school.	35.2%	0%	64.8%	0%

The element of being ignorant among primary school learners was indicated in the first four responses to the questionnaire in the above table. These were the responses that made the researcher want to find in-depth information about why such responses. The questions that were asked in the open-ended questionnaire were informed by the responses from these first four statements. The responses from 5 to 12 indicate that primary school learners think that the knowledge and understanding gained from sexuality education could help to prevent primary learner pregnancy.

To understand how primary school learners conceptualize sexuality education in rural areas the discussion is articulated through two major themes that emerged from the integrated results from both strands of data collection. The first theme explains the ignorance that was indicated by the responses of primary school learners about sexuality education. The second theme describes how primary learners think about the knowledge and understanding they acquired from sexuality education. The attention is given to the first theme below which was:

Ignorance of sexuality education by learners

Based on the data collected, the learners on both strands of data collection indicated responses that show ignorance on their side about sexuality education. To be more specific, responses from the first strand revealed that respondents (33.2%) strongly agreed while 19.1% agreed that learners do not use the knowledge acquired from sexuality education effectively because sexuality education is only taught in schools. Thirty-seven point three per cent (37.3%) and 10.4% strongly disagreed and disagreed respectively with the above statement. Ignorance is indicated when learners strongly agreed and agreed (total of 52.3%) that they do not use the knowledge acquired from sexuality education.

A large majority of the respondents (67.5%) agreed that they were reluctant to use knowledge and understanding acquired from sexuality education because at home nobody talks about sexuality education while 32.5% disagreed with the above statement. Again reluctance to use knowledge and understanding acquired from sexuality education is ignorance.

The majority (66.4%) of the respondents strongly agreed that secondary school learners enjoy having sex “anyhow”; however, 33.6% strongly disagreed with the statement. This is a very huge percentage of learners who seem to strongly agree and agree that they like to enjoy sex anyhow is a concern to the researcher. Fifty-six point eight per cent (56.8%) of the respondents strongly agreed that they do not take responsibility for their own lives regarding the prevention of pregnancy and sex-related diseases while 43.2% of the respondents strongly disagreed with the statement. (See table 1 above showing the above percentages.) All the

above responses seemed to indicate that most respondents display a very high level of ignorance.

Based on the responses of the first strand, the author purposefully selected four schools from the five primary schools where the closed-ended questionnaires were distributed. The four primary schools that were selected indicated a high level of ignorance in the responses of the first strand. The author wanted to get in-depth information on the reason why this high level of ignorance about sexuality education. When participants were asked the following question: “Why are some primary school learners reluctant to use knowledge and understanding acquired from sexuality education effectively?” Six of the eight participants indicated that they do not take sexuality education serious because to them it was “*a school thing*” *nobody talks about it at home*. This was the reason why the author decided to then interview two primary school learners from the participants to verify what they were talking about when they say nobody talks about it at home. The author interviewed two learners from two schools and in both schools, all the participants indicated that parents do not talk about sexuality education at home. All the participants revealed that they would like to hear this from their parents. The responses of the majority of the participants revolved around wanting to hear the voice of the parents about sexuality education. Here are a few of what the participants articulated about this issue.

School D participant 1: I think I want to hear my mom talking about sex education to me. I am one of the victims of learner pregnancy at an early age because I never took sexuality education serious because I felt it was not important to my mom. My mom talks about everything with me but sexuality education.

School A participant 2: I think as learners, we are reluctant to use the knowledge we acquired from sexuality education because this seems to be a school thing nobody is talking about sex education at home. I want to hear what my parents say about this issue.

School C participant 1: Knowledge and understanding can reduce sex education only if sex education can be taught at school and at home. Unfortunately, we are not hearing anything at home, this seems to be a school thing.

School B participant 1: Learners are reluctant to use condoms and contraception when engaging in sexual activities because they do not think it's important. I think if it was important my mom could have told me.

Knowledge and understanding acquired from sexuality education can prevent sex-related problems.

Data collected revealed that primary school learners think that knowledge and understanding acquired from sexuality education can reduce sex-related problems. The majority (85.9%) of the respondents strongly agreed that they know that having unprotected sex can spread diseases, 14.1% strongly disagreed. Forty point three per cent (40.3%) and 22.4% of the respondents strongly agreed and agreed respectively while 37.3% of the respondents disagreed that they understand that having unprotected sex can spread diseases. Few of the respondents (30.5%) strongly agreed that condoms were for those who were already infected with HIV/AIDS while 69.5% strongly disagreed with the statement.

A large majority of the respondents (70%) agreed that they used the knowledge acquired from sexuality education to prevent sex-related problems and 30% of the respondents disagreed. A little more than half of the respondents (52.5%) strongly agreed that they used understanding acquired from sexuality education to prevent sex-related problems while 7.5% and 40.0% strongly disagreed and disagreed respectively. The majority of the respondents (76.9%) agreed that knowledge acquired by secondary school learners from sex education helps them to be more cautious while 23.1% disagreed.

Sixty two point three per cent (62.3%) and 15% strongly agreed and agreed that understanding acquired from sexuality education helps them to be more cautious while 22.7% disagreed. A large majority (64.8%) of the respondents strongly agreed that knowledge and understanding acquired by primary school learners from sexuality education could reduce pregnancy and sex-related diseases only if learners take it seriously at school while 35.2% strongly disagreed. The above responses seemed to indicate that most of the learners think that knowledge and understanding acquired from sexuality education can prevent sex-related diseases.

As indicated earlier that the author also distributed open-ended questions to eight primary school learners from four purposively selected schools. When the participants were asked the following question: *“explain whether you think knowledge and understanding acquired by learners from sex education can reduce pregnancy?”* The participants indicated that they think knowledge and understanding acquired from sexuality education can reduce sex-related problems. The following were the few of their responses. In their responses, it was also indicated that they think sex education should be taught by both teachers and parents. During the follow-up interviews with the two participants from each of the two primary schools, indicated that they think parents must give them sessions of sexuality education at home like teachers in school. One of the participants suggested that the parents' session can appear on the timetable like all other subjects may be fortnightly. The following are a few of the responses:

School C participant 1: Knowledge and understanding can reduce sex-related problems provided both parents and teachers teach us. For example, parents can appear on time-table twice a month.

School B participant 2: I think knowledge and understanding from sex education can only work when taken seriously.

School D participant 2: I think on knowledge and understanding acquired from sex education can reduce sex-related problems.

Discussions

The findings of this study revealed that there is an element of being ignorant amongst some of the primary school learners about knowledge and understanding acquired from sexuality education. The author found that primary school learners link not using what they have acquired in sexuality education to the non-activeness of their parents on sexuality education and in the process, they fall pregnant and infected by sexually transmitted diseases. The author is postulating this because the majority of the respondents in the primary schools agreed that knowledge and understanding acquired by learners from sex education could reduce pregnancy and sex-related problems only if primary school learners could take sex education seriously at school. This seems to suggest that primary school learners tend not to take sex education seriously; hence, the author believes that primary school learners tend towards being ignorant.

Some primary school learners reported that they do not take sexuality education serious because nobody talks about sexuality education at home they feel it is a “*school thing*”- (meaning they only hear about it at school). This seems to concur with some studies that reported learners were still having difficulty talking to their parents about sex education because their parents do not talk about sexuality with them (Naidoo, 2006) and what was recently reported by Onongha (2016) that learners prefer to discuss sexuality issues with their parents. It seems learners would prefer to talk about sex education with their parents but, because parents were not talking to them about it, they do not take sex education seriously.

Another finding revealed that primary school learners like to have sex “anyhow” despite knowing the consequences of engaging in unprotected sexual activities. The author is concerned about this finding because this could be the reason why primary school learners are still falling pregnant at an early age. The literature reviewed has indicated that statistics for the years 2010–2014 places the Eastern Cape among those with the highest rates in the country with a recorded 28322 pregnancies (Herald Live, 2015). This could be one of the reasons why, despite the decline in teenage pregnancies, there are still alarming numbers of teenage pregnancies. Primary school learners also indicated that they do not take responsibility for their own lives regarding the prevention of pregnancy and sex-related diseases.

The findings of this study indicated that primary school learners were indeed reluctant to use the knowledge and understanding to translate the meaning to the facts as it was suggested by Whelchel (2013) in one of the studies reviewed. Findings revealed that primary school learners had a narrow understanding of knowledge and understanding acquired from sexuality education to prevent sex-related problems because they wanted to hear their parents’ voices on this issue. However, at the same time, all primary school learners indicated that knowledge and understanding acquired from sexuality education could reduce sex-related problems. This seems to concur with the fact that students believe it is important to have sex education as part of the school curriculum (Benzaken, Palep & Gill, 2011). One can also associate this with what was revealed by Naidoo (2006), that learners were fully aware of the consequences of having unprotected sex.

This finding that indicates that primary school learners indicated that they believed information acquired from sexuality education could help them to be more cautious when practising sexual activities if it were not for the issue of not hearing it from their parents also seems to concur with Benzaken, Palep & Gill (2011). Primary school learners also disagreed that condoms were for those who were already infected by HIV/AIDS. The finding is in line with Madunagu (2005), in that sexuality education would guide young people into having a healthy and responsible sexual life. This is also in line with what Francis and Viljoen (2014) postulate that learners’ conceptions and experience of the teaching and learning of sexuality education may be useful in scaling up efforts to enhance the content of sexuality education and how it is taught.

Recommendations

Primary school learners have made it clear that for them to take sex education seriously, they need their parents to be involved; hence, this study recommends that the primary schools must work in collaboration with parents to ensure that sexuality education ceases being a “*school thing*”. The author also recommends that all primary schools should put more effort into trying to sensitize learners about sexuality education so that they can engage in sexual

activities responsibly. Primary school teachers and parents must make sure that they impart knowledge about sex education to learners in a manner that when they acquire it, they will be able to understand it because they can only be able to use it effectively provided they understand it. The author believes that there is a need for primary schools to work together with parents to make sure that primary school learners take sexuality education seriously as a subject.

Conclusion

The author concludes that the conceptions held by primary school learners on knowledge and understanding acquired from sexuality education can reduce sex-related problems if parents are actively involved. At the same time, the author concluded that primary school learners need all school stakeholders (teachers and parents) to be involved to understand that sexuality education is serious and important for their future. The study has tried to dig deeply into the conceptions held by primary learners on sexuality education and how they are influenced by their parents to reduce sex-related problems. This study has indeed shown that primary school learners are crying for the voices of their parents on the issue of sexuality education.

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IS SOUTH AFRICA SERIOUS IN ADDRESSING LIFE-PRESSING TRAJECTORIES THROUGH EDUCATION? PROBLEMATISING AND RECONSTRUCTING LIFE ORIENTATION FOR CITIZENSHIP EDUCATION

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...citizenship and democracy [through Life Orientation] need to be problematised and reconstructed for each generation...public schools must assist in the unending work of preparing citizens for self-governance and evoking a need for a [safe] social environment (Giroux, 1995:6).

Abstract

In this theoretical article, I respond to the Giroux (1995) assertion for the need to problematise and reconstruct education as a way to prepare South African citizens to participate in efforts to mitigate social pathologies such as violence, rape, killings, school related gender based violence. In problematising education in South Africa, I focus on Life Orientation in terms of content, time allocation and its prioritisation in the curriculum as unsuitable for preparing citizens towards self-governance and the creation of a safe environment. In this article, I am guided by two questions, namely, what are the challenges of Life Orientation in light of citizenship and social pathologies and how can Life Orientation be conceptualised to address the lived realities of the people of South Africa? In responding to these questions, I locate my arguments on critical emancipatory research. The argument of the article, among others, is that in light of social pathologies such as violence, there is a need for Life Orientation that is responsive and tailor-made to respond to the lived realities of learners and promote citizenship.

INTRODUCTION

The goal of effective and prosperous education should be to cultivate among its citizens positive aspects to promote Ubuntu values such as: social cohesion, respect and conflict resolution,. Promotion of good citizenship is underpinned in deliberately structuring education to inculcate values that are generally premised in Ubuntu. For problematisation and reconstruction of citizenship in South Africa, I focus on Life Orientation (LO), as inadequate and unappreciated to respond to lived realities of the people of South Africa particularly the learners. The focus on LO is premised within the understanding that it is arguably the only subject in the South Africans' basic education curriculum that attempts to impact good citizenship among learners. This is done by championing narratives that seek to propagate human rights, inclusivity, environmental and social justice and guide and prepare learners to respond appropriately to life's responsibilities and opportunities (National Curriculum Statement, 2011).

In an attempt to promote good citizenship education for life responsibilities and opportunities, LO has the following aims:

- It promotes self-motivation and teaches learners how to apply goal-setting, problem-solving and decision-making strategies;
- It seeks to guide learners to develop their full potential and provide them with opportunities to make informed choices regarding personal and environmental health, study opportunities and future careers; and

- It attempts to guide and prepare learners to respond appropriately to life's responsibilities and opportunities (Department of Basic Education, 2011, p. 8).

While appreciating the aims of the subject, I problematise LO by addressing two questions: why is there so much social unrest such as violence when LO seeks to produce good citizens and how should South African Life Orientation position itself towards social transformation to mitigate social pathologies? Responding to these two questions, I attempt to contribute ways in which education, particularly LO, can play a role to other efforts that seek to contribute to social transformation through education. Through this, learners can engage their minds in a critical manner to effectively deal with the pressing issues affecting South Africa (Akinsola, 2010).

CITIZENSHIP EDUCATION THROUGH LIFE ORIENTATION: JUSTIFYING ITS RELEVANCE IN A CONTESTED SOCIETY

In the context of social pathologies the ever increasing moral degradation witnessed by social violence, killings, xenophobia, rape, has arguable contributed to the religion in schools and other forms of social ills. It is no longer a secret that South Africa is becoming a mafia state, where seriousness of producing good citizens is questioned, contested and more so arguably ignored within the curriculum space especially at basic education level. While I agree with Westheimer and Kahne's (2004, p. 1) view that "educators and policymakers are increasingly pursuing programs that aim to strengthen democracy through civic education, service learning, and other pedagogies", the case of South Africa is arguably different as will be seen with the problematisation of LO. There has never been a more justified moment in South African education than now to rethink and inject new life into citizens through education towards maintaining social homogeneity. The emerging social trajectories, often unpleasant, are overshadowing the rainbow nation that people such as Nelson Mandela envisioned in post-apartheid South Africa. Furthermore, the complexity of social fabric and social unrest against women, foreigners and people of different colour are central issues propelling the need to problematise and reconstruct citizenship education in South Africa as premised in LO. The World Health Organisation (1999) supports the need for problematisation of LO because the conundrum of poor parenting, changing family structures, dysfunctional relationships, new understandings of learners' needs, decline of religion and rapid sociocultural change.

Citizenship education through LO is an effort to maintain the foundations of constitutional order and to improve upon it through informed critical reflection, deliberation and action (Schoeman, 2006). In essence, the rationale and need for citizenship education attempts to develop the identity of young people (Veugelers, 2011) who exhibit compassion, ethical commitment, social responsibility, a sense of interdependence and have the commitment for common good (Schoeman, 2006). This type of citizenship should not be interpreted as entailing uncritical citizens, docile and easily cheated, but should represent citizens who critically interrogate issues, are able to reconcile differences peacefully and engage in democratic practices that shun violence. Once, education achieves this, society becomes a safe space for all citizens. Life Orientation, when problematised and reconstructed, positions itself to fulfil such an agenda. The arguments of the article are couched in critical emancipation research.

THEORETICAL FRAMING: CRITICAL EMANCIPATORY RESEARCH

I attempt to problematise and reconstruct LO in South Africa through basing my arguments in critical emancipatory research (CER), a theoretical framework that is “vigilant and sensitive to the menaces of inequity, social injustice, lack of freedom, lack of peace and of hope” (Mahlomaholo & Netshandama, 2010, p. 10). The framework is suitable for framing this article because it challenges the “historical and social conditions of crisis and work[s] towards transformation of the existing social structures and replace[s] them with emancipatory ones” (Sinnerbrink, 2012, p.370). This framework “aims at deciphering practical problems by critical thinking and the use of knowledge which is free from superstition and prejudice” (Steinvorth, 2008, p.400). The framework has its roots in the critical theory traditions of the Frankfurt School of thought of 1923 and emerged as a quest to move “toward the possibilities of democratic politics and emancipation” (Anderson, 2011, p.35). Thus, the theory is align with this articles because it seeks to eliminate injustice, exclusion and discrimination (Tiniolatti, 2009) pertinent for democratic society and for shaping citizens such that they live together amicably. CER allows me to problematise curriculum arrangements in South Africa where LO is undermined and given unequal curriculum space. Through the lens of CER in problematising and constructing LO, South Africa has the impetus to build and nurture democratic citizens and in the process establish a just society (Brady, 2010). In essence, I chose this framework, concurring with Nkoane (2015), that it shares a counter-hegemonic stance that disrupts the mainstream understanding that LO is not an important pedagogical subject. Instead I argue through CER that LO, when given its justified status, has the impetus to promote social justice, hope, democracy, emancipation, inclusion and equity; the ingredients that arguably are missing and are uncultivated by South African education resulting in citizens moving towards making the rainbow nation a mafia state.

PROBLEMATISING LIFE ORIENTATION: TRAJECTORIES TO EFFECTIVE CITIZENSHIP EDUCATION

Even though LO sounds promising in theory it has become apparent that there are many problems in its practical implementation (Jacobs, 2011), hence; in this section, I unpack challenges related with LO in the curriculum space that warrant research to evoke the need to rethink curriculum in South African Schools that values citizenship education.

Lack of training of Life Orientation teachers

The challenge that many post-colonial states face is the lack of training of teachers in areas on citizenship education (Matemba, 2011; Dube, Mufanechiya & Mufanechiya, 2015). More often, the post-colonial state comes with policies that seek to instil good citizenship; however, such policy makes no effort to ensure that qualified personnel are available to ensure effective curriculum implementation. Life Orientation, a compulsory subject introduced as a part of Curriculum 2005, is the epitome for meaningful contribution to its youth (Strydom, 2011), yet there is no compulsory training of teachers. Given the foregoing argument, I agree with Maharajh, Nkosi and Mkhize (2016), Diale (2010) and Gama (2015) who highlight that the issue of untrained LO teachers is by far the greatest challenge. This serious trajectory towards good citizenship responds to social pathologies such as school violence. It is a trajectory because, as argued by Pillay (2012), many social issues in the country warrant the need for highly trained and specialised LO teachers, especially when they are expected to contribute to the holistic development of the learners in schools.

Undervalued subject

I problematise LO in South Africa by noting that it is generally an undervalued subject by the teachers and learners and even by other educational stakeholders such as universities. This is

despite its role being to produce peaceful and good citizens. First as indicated above, it is undermined by being taught by unqualified LO teachers. It is also undervalued because, to some teachers and learners, LO arguably does not offer equal employment prospects as compared to the sciences and Mathematics. Moreover, LO is said to be allocated to teachers who are underperforming in other subjects, implying that its knowledge content is not important. Because, the school setup does not value LO, learners also acquire the sense that the subject is not important; thus, impeding efforts to promote good citizenship. In addition, the problem is worsened by the observation noted by De Clercq (2013), that the majority of teachers have deeply ingrained negativity and scepticism towards their jobs and developmental programmes aimed at the lives of learners.

In the lens of CER, LO faces unjust treatment, which in turn promotes negative perceptions. Tertiary institutions, as stakeholders in basic education, worsen the plight of LO as the subject is given a very low Advanced Placement Score (APS). When learners enrol at universities, for example the University of the Free State, their LO is given one point if the learner has level 5 (60%+) and if the student has level 4 or less (59%-), it is not awarded any point towards the APS scoring. This rule only applies to LO, not to any other subject. The implication is that the university gives learners the impression that LO is not important, hence, effort should not be spent on it while they are in high school. Considering this, I agree with Nkoane (2015) that “dominant ideologies portray other ways of knowing and knowledge construction as deficient and non-rigorous”. Furthermore, Bernstein (1970) notes that the way “a society selects, clarifies, distributes, transmits and evaluates the educational knowledge it considers to be public, reflects both on the distribution of power and the principle of social control”. I also concur with Young (2015) that those with more power in society have access to, force and negate certain kinds of knowledge on others. In addition, I am also in support of Nkoane (2015), who posits that “for unknown political reasons of dominance in knowledge construction, some forms of knowing have been devalued, delegitimised and marginalised. It is under these circumstances that I disagree with Prinsloo (2007, p.169) that, “Life Orientation is one of the most successful accomplishments in the construction of the new education dispensation in South Africa”. Furthermore, this negates the proposal by Roux (2013) that the aim of LO is to guide and prepare learners for life and its possibilities (self-in-society). It equips them for meaningful and successful living in a rapidly changing and transforming society.

Too many concepts in Life Orientation

Another problem that I note with the current LO is that there are too many concepts that compromise the effectiveness of the teachers in teaching and learning. Life Orientation addresses the self, the environment, responsible citizenship, a healthy and productive life, study of religious tradition, social engagement, recreation and physical activity as well as career choices (Department of Education, 2003). The grouping of many concepts under one subject has various complications such as time, expertise of the teacher and inadequate content to warrant learners that have the impetus to be good citizens who shun violence, killings, rape among many other things. In some countries, such as Zimbabwe, the current content of LO makes four examinable subjects with the same ranking such as History, Physical Education, Religion and Family and Science.

Problematising LO particularly with efforts to promote citizenship, I undertook a document analysis focussing particularly on a Grade 9 LO textbook written by Botha, Cladeira, Cronje, Fourie, Ngetu, Vosloo and De Wet (2013). The book leaves a lot to be desired on the commitment of South Africa to promote good citizenship. Because of too many concepts, the

textbook is crowded and ineffective in addressing the necessary concepts to ensure negative behaviour change and change it towards peace-oriented behaviour. This textbook offers limited information that focuses on and seeks to ensure good citizenship. Only two pages (74 and 218) in the book are aligned with the contents that seek to promote good citizenship among learners. Given this foregoing observation, I agree with Magnani, MacIntyre, Karim, Brown and Hutchinson (2005) that increased efforts should be devoted to the development of Life Skills programmes, especially to mitigate the disturbing level of risk behaviours displayed by young children and adolescents. Hence, I am of the view that, only two pages are not enough to ensure that values of citizenship are transmitted to the learners. In light of this trajectory, LO positions itself to underachieve the intended purpose of cultivating peace-loving citizens.

Inadequate time allocation

Time allocation of Life Orientation within the curriculum space is contested. The time allocation also depicts the value associated with the subject. The LO subject is allocated two hours a week, which arguably is not enough considering the wide range of themes that the subject must address and the composition of LO. Apart from the time that it is too limited, the curriculum requires that the two hours must be divided in two, one for theory and another hour for physical education. As a result, observations have been made that, in most schools the practical aspect is spent with learners playing on the sport fields, more often with no dedicated supervision and guidance of the teachers. This is not to imply that doing sports is not important. The implication of all this is that LO has only one hour of theory, which includes amongst others, the development of democratic citizens. This implies that the curriculum space for LO is inadequate to inculcate values that can help learners to acquire respect for human rights, commitment to civic participation and a responsible attitude towards not only their own health but also that of others (Sinclair, 2003).

Unresponsive to emerging social pathologies

Rigid curriculum practices and inadequate space for curriculum change and innovation are major challenges in many post-colonial states in Africa. Curriculum packages remain the same for a long period of time despite the ever changing and contemporary trajectories. Because of the delay to curriculum change and innovation, education is arguably becoming irrelevant to address the lived realities of the society. The unresponsive curriculum, with special reference to LO, has a huge negative impact towards challenging education as a tool to directly and pointedly address lived realities such as school violence, which threatens the social fabric (Mncube & Steinmann, 2014) to promote good citizenship. My argument in this regard is that, effective citizenship, whether in well-established democracies or in those in transition to democracy, requires a curriculum (Mathebula, 2009) that is responsive to address emerging social trajectories that present ambivalence and ambiguity of the future of the South Africans who pin hopes on education to respond effectively to social realities. In this regard, I agree with the observation by Paterson (2013) that redress towards increased rates of drug and alcohol experimentation, sexual activity, youth delinquency, suicide attempts, anti-social activities and physical aggression should form part of a responsive curriculum to shape good citizens. Informed with such an approach to the curriculum, as expressed by Mangrulkar, Whitman and Posner (2001), responsive curriculum has the impetus to delay the onset of drug use, prevent high-risk sexual behaviour, teach anger management, improve academic performance and promote beneficial social adjustment. The current situation negates and disagrees with the observation by Prinsloo (2007) that the “LO subject forms an excellent basis for equipping learners to respond positively to social demands, assume responsibilities, and optimise their life chances”.

RETHINKING LIFE ORIENTATION

In this section, part two of the article, I attempt to suggest ways in which LO can be reconstructed towards curriculum relevance to address pressing issues of the day such as school violence. In so doing, I also attempt to respond to a question posed by Sinclair (2003, p.5) “can education (more specifically LO) help build these skills and values and thereby contribute to a more peaceful world?” Framed well, given equal status such as other subjects in the curriculum, LO has the potential to respond to social trajectories from a preventative, promotive and an ameliorative perspective (Rooth, 2005) and more so in an educational space. In suggesting ways to reconstruct LO, I agree with Davies (2004) that LO has the potential to challenge violence and transforms conflict that requires attention to conflict transformation, pedagogical practices and procedural designs. The following are ways that I believe can help towards relevance to address social pathologies.

Reconstruct teacher training and professionalism

A successful education system in the world is the one that pays attention to its human resource development and in this particular case, teachers. Teacher education enables the nation state to produce teachers that are capable to help learners address their lived realities through democratic and non-violent ways with respect for diversity. As discussed earlier, the majority of LO teachers are not trained, which implies that educating learners in LO is left to chance and unproductive teachers in other subject areas as well as, to any teacher to address issues of overstaffing. Such an approach entails a lack of commitment to ensure effectiveness of LO, not only for terrors of performativity (Ball, 2003) but to educate for citizenship. Given the foregoing argument, I agree with Jacobs (2011) that the Department of Education needs to take responsibility for LO by taking this learning subject seriously, thereby instilling in the learners and teachers an appreciation for the subject. Failure to do so, (not taking LO seriously) this trajectory will be reflected in society through social unrest, crime and a lack of respect for humanity. As a result, this may lead to a society that is suffering moral degradation, yet the solution lies at producing the kind of LO teacher that is able to instil values particularly within the learners that will make South Africa a better society. Reconstructed teacher education in respect of LO brings value to the subject, emancipates learners to construct epistemologies of caring, characterised with instilling and cultivating awareness and measures to rupture inhumane acts, such as racism and bullying (Davids & Waghid, 2016). The training of teachers will allow LO teachers to be respected and acknowledge for their role in producing a fully rounded holistically developed learners. In the current situation, LO teachers are seen as less academic who waste time on non-important issues of nation building. This attitude results in a failure to understand the role that LO can play to maintain the social fibre. In essence, if South Africa is serious in mitigating social pathologies such as violence, rape, abuse and murder, there is a serious need to relook citizenship education premised in LO, by investing first on producing teachers needed to meet emerging problematic social challenges. Not by default, but specifically trained LO teachers to rebuild the morality standing characterised by democratic tendencies such as respect for human rights for all citizens.

Citizenship as a standalone subject

Citizenship education has traditionally been seen as a cross curricular theme, and has to be integrated across the school curriculum as well as in co-curricular or extracurricular activities (Hebert, & Sears, 2001). While this approach resides especially with transdisciplinary schools, the nature of the South African society calls for compulsory and standalone (notwithstanding the value of an interdisciplinary approach) citizenship education.

This will allow more time to reconstruct the lost social and moral fabric through education. As a standalone subject, citizenship education has the impetus not only to provide learners with the necessary knowledge but also with opportunities for the development of desirable traits of public and private character such as justice, respect for individual worth, fairness, cooperation, persistence, moral responsibility, empathy for others, caring, civility, respect for law, civic mindedness and honesty (Schoeman, 2006). The fact that citizenship is grouped with other concepts such as sports, limits the space for teachers to engage fully with learners and equip them to become effective citizens who participate peacefully and democratically towards others in society for the common good for all.

Increase value on LO at university entry level

The university as a stakeholder of basic education occupies a crucial role in the process of reconstructing LO. The current situation shows that LO is rendered as unworthy knowledge. Such an approach frustrates efforts to decolonise knowledge by making other forms of knowledge dominant and appropriate as entry level to universities. For instance, the CER allows me to problematise the University of the Free State enrolment procedure as a means to devalue LO, which becomes unfair to learners who have performed well in LO to gain entry to a programme of their choice. The negative approach or reducing the value of LO speaks a lot of colonialism of knowledge in many post-colonial packages in terms of decolonisation. Given the foregoing discussion, I agree with Nkoane (2015) that there is a need to challenge “hegemonic dominant discourses that try to monopolize knowledge production systems and domesticate other parameters for the interpretation of realities as historically obsolete, irrational and pre-modern”. If, LO is to achieve its goal of good citizenship, there is a need for its recognition as an important curriculum subject that has the impetus to transform the South African society as well as the teaching and learning environment. Recognition in this case implies giving LO the same status as other subject in the basic education curriculum, also affording it the same rating for the enrolment of students in universities. Failure to do so creates the impression with learners and teachers that LO is a mere subject that does not have value in life, yet, this is not true especially, for a country that seeks to ensure that citizens contribute to the development of the country.

Conclusion

In this article, I have attempted to argue that LO as a subject in basic education presents more trajectories than solutions to address social trajectories such as violence, rape and killings, school related gender based violence that are prevalent in the South African schools and society. I attempted to problematise LO in terms of its time allocation, lack of training of educators, overcrowding of concepts among many other things. Apart from the problematisation of LO, I went further to suggest ways on how LO could be reconceptualised to address the social pathologies effectively. The argument of the article is that LO can transform groups and societies through mechanisms and institutions that seek to end conflict (Abu-Nimer, Khoury & Welty, 2007) and can enact effectiveness of values, skills and behaviours that form a political culture that is supportive of democracy (Harber, 2004). I recommend therefore that, teachers who are in favour of redress towards the high rate of violence in and out of the teaching and learning environment should afford LO an important subject status in the mainstream curriculum. This may result in enforcement of good citizenship education in an effective and efficient manner for social transformation through education.

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ENHANCING INQUIRY THROUGH MOBILE LEARNING IN GEOMETRY

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Abstract

The impact of digitisation seems to be intense in various industries including the education industry. However, utilisation of hand-held devices in mathematics classrooms is still clustered with challenges. This qualitative case study reports on the improvement of inquiry through utilisation of mobile devices in Grade 11 Euclidean geometry. It departs from the premise that the SAMR model contributes in guiding the inquiry-based facilitator to infuse mobile teaching and learning in geometry classrooms. Participants were 97 Grade 11 mathematics students from three schools who were purposefully sampled. Observations were conducted where the researcher was the participant observer through engaging students in utilising their smartphones for classroom inquiry. Availability of internet at schools and students having advanced smartphones became an advantage to inquiry-based learning that inculcated inquiry skills such as metacognition, self-regulated learning and student centred learning in learning geometry. Mobile learning needs to be prioritised in mathematics classrooms in order to afford students a chance to apply ubiquitous learning through the smartphone and other hand-held devices as the devices are easily accessible to most students.

Keywords: geometry, inquiry-based learning, mobile devices, mobile learning, smartphone, technology.

Introduction and background

The fourth industrial revolution marks an era that builds on extended usage of digital resources or digitisation. In such era, Davis (2016) asks whether technologies accessible to human imply useful tools that can be used to improve lives. The impact of digitisation seem to be intense in diverse industries including education industry. The fourth industrial revolution poses high demands in classroom teaching to cater for students' needs, for example, to fulfil their dire need to operate digital technologies when learning. Diverse connotations are attached to the meaning of technology. In this study, technology is an item of educational technology. It refers to usage of digital resources for teaching and learning, particularly mobile devices in this study. Mobile devices are more convenient and envisaged to enhance mobile learning for inquiry purposes. Mobile learning (m-learning) apply as an approach of retrieving the learning content through utilising mobile devices. The character of current students is that of digital natives. The digital natives in this study are students who carry smartphones most of the time, spent time on play stations and more other digital devices. Mobile devices such as smartphones, i-pads and tablets allow browsing the internet at a convenient time and space; and further has features such as camera video and networking features (Lahiri & Moseley, 2012). In addition, Lahiri and Moseley (2012) highlighted that mobile devices can facilitate cooperative experimentation and can support interactive learning. Further, a mobile device can assist users to access utilities such as e-books, google search and many more functions.

In geometry particularly, students battle with conceptual understanding, application of concepts in problem solving and memorising readymade concepts in theorems and axioms that they know nothing of their origin. For purposes beyond the classroom, students are able

to utilise their mobile devices to search for personal information, however for classroom purposes they are restricted from using the devices they own and use in their daily life. Such restrictions contribute to students' ignorance when having to apply mobile learning for content related matters, for examples to access geometrical concepts. In this sense, students are deprived of learning by inquiry through utilising the most accessible material, in order for them to search deeper and acquire knowledge by themselves.

Learning by inquiry or inquiry-based learning refers to where students apply exploration and discovery to find and create knowledge. Inquiry-based learning requires students to independently seek information through diverse mechanisms to supplement their experiences. This study argues that students are smartphone owners; they perform diverse entertainment activities with their smartphones rather than educative activities. Further, this study aver that students find geometric concepts incomprehensible even when the concepts are accessible and exposed to them through mobile devices they own. Therefore, this study explores how smartphones as accessible m-learning devices augment inquiry in the learning on Euclidean geometry. The critical question asked in this study is that how can smartphones be used to augment geometric inquiry in order to transform teacher dependent learning to inquiry-based learning. Based on the SAMR (Substitution, Augmentation, Modification and Redefinition) model, enhancement considers substitution and augmentation. This study has revealed that, in learning geometry students can use smartphones not merely as communication tools, but as tools that can enhance inquiry-based mobile learning. Mobile learning could substitute and augment information found from other sources, for example textbooks. This is an advantage seeing that students are attached to their smartphones rather than other resources. Mathematics classrooms have been for centuries neglecting the type of a learner who is a digital native in most of the contexts out of the classroom. Mobile devices, such as, smartphones, iPads, tablets and more are associated with chaos when used in mathematics classrooms, but this study has shown that when teaching is well planned the effective usage of a smartphone including other mobile devices for inquiry purpose is probable. Teacher guidance and facilitation need to engage students in a way that draws their interest in utilising the most liked resource to perform relevant and earnest classroom tasks.

Research has predicted an era where students in all grades will be utilising "mobile learning devices" including smartphones (Norris, Hossain & Soloway, 2011: 18). More than 50% of students in South Africa from ages 9-18 own cell phones and mostly smartphones (Porter, 2016). Norris et al. (2011) further motivated that when students utilise mobile learning devices or smartphones in the classroom a significant improvement in learning is recorded. Norris et al (2011) aver that mobile learning devices are very essential in learning. In emphasis, a research conducted by Mavhunga, Kibiringer, Chigonga & Ramaboka (2016) sought students' views on the usage of smartphones in the classroom. Muvhunga et al., (2016) report that students pronounce a smartphone as an essential tool that can be used to search and process information. Nonetheless, students acknowledge distractions contributed by cell phone usage in the classrooms, but concur that smartphone usage policy is necessary in schools (Mavhunga et al., 2016). In light of this, mathematics classrooms need classroom policy for smartphone usage in cases where there is a dire need for smartphone usage for teaching and learning purposes. If classrooms do not have any mobile device usage policies, classrooms may indeed turn out to be chaotic uncontrollable environments. According to Porter (2016) the usage of smartphones in classrooms pose adverse effects. Table 1 outlines facts raised by Porter (2016) in relation to students' usage of smartphones in South Africa.

Table 1 Smartphone etiquette in South African classrooms

Students' usage of smartphones
Only few students utilise their smartphones to access education sites, for example, Master Maths
Some students can access education sites through their smartphones for assistance with home-works
Smartphone usage is limited to ordinary tasks such as using it as a calculator and contacting friends and classmates to enquire about school work
Ringling students' phones causing disruptions during the lesson
Students continue to check face-book, and communicate through WhatsApp or messaging during lessons.
Porter (2016)

Mobile device technology is outlined as a good way to orientate students to ubiquitous computing (Tsybulsky & Levin, 2016). Through ubiquitous computing students can advance inquiry-based mobile learning at their convenient time. Furthermore, Tsybulsky and Levin (2016) motivate that ubiquitous computing find root on the fact that technology power is contained in the environment that supports the user's necessities. Ubiquitous learning is informal learning that is everywhere, learning that is in and outside the classroom. In light of ideas pertaining to ubiquitous learning, this study motivate that to spread ubiquitous learning through usage of a smartphone, practice need to start in the classroom. How the teacher emphasises the use of mobile devices, for example, smartphone in the classroom, equips students with skills to utilise the smartphone for other learning purposes including mathematical inquiry at diverse contexts. Tsybulsky & Levin, (2016) state examples of technologies that comprise ubiquitous computing as for example, wireless networks, smart objects, mobile-based technologies and many more.

Applying SAMR model to analyse the utilisation of smartphones technology

The role of mobile technology in the classroom is gaining strength as students are glued to diverse digital devices most of their time. However, the essence of these devices in the geometry classroom should be defined in terms of the capability of the resources to enhance students' understanding of geometrical concepts and transformation in learning brought about by mobile technologies. Therefore, a model of technology integration developed by Puentedura (2006) applies in this study. According to Tsybulsky and Levin (2016), Puentedura (2006) developed the SAMR model as an approach to study transformations in education as initiated by integrated computer technology or ICT. This study considers a smartphone as a mobile means of computing, therefore, an integrated computer technology.

The Substitution, Augmentation, Modification and Redefinition (SAMR) model developed by Puentedura (2006) is regarded as a framework through which educators can evaluate technology used in the classroom and how technology is used in the classroom. Furthermore, the SAMR model can assist teachers to realise the impact of technology on teaching and learning. In substitution, smartphone technology in this study substitutes other resources without effecting any alteration of their actual function, that is, geometric concepts are accessed through a smartphone, much as a textbook could be utilised. For example, mobile devices can still be used as search tools to retrieve more knowledge about diverse concepts. The same would apply if a textbook was a tool used for reference. However, retrieving concepts through smartphones can provide access to more than one source of information, for example diverse authors giving information from diverse points of reference. In this sense, smartphones as the available digital technology are substitute tools with functional

improvement signalling an augmented role. Teachers and students can redesign tasks using technology, in order to align to the modification stage of the SAMR model. Redesigning in a way enhances inquiry through conjecturing. Aligned with the redefinition stage of the SAMR model, digital technology as an essential tool in advancing inquiry-based learning allow teachers to facilitate new tasks encouraging students to think creatively and critically. In learning geometry, the usage of tools including digital technology is of essence. Aligned with the Van Hiele's theory of knowledge and understanding, lower levels of geometric understanding such as pre-visualisation, visualisation and analysis require much reference in order to establish basic knowledge and conceptual understanding (Clements & Battista, 1992). Foundational concrete knowledge is essential in handling higher abstract levels such as informal and formal deduction including rigour. In this study, mobile learning is viewed as essential for accessing geometric knowledge in teaching and learning. Mobile devices are viewed as necessary resources in substituting and supplementing other resources, transform teaching and learning and further enhance learning by inquiry.

Methodology and research process

The usage of smartphones to enhance learning in geometry departs from a qualitative case study in research design, analysis and interpretation. A case was constructed where development of a group of Grade 11 learners was monitored and studied over a period of two weeks. Purposively sampled 97 students from three schools participated in student-centred inquiry-based learning lessons. Before the lessons commenced, students participated in the pre-task. The main objective of the pre and post tasks was to test cognition in series of questions that were designed in an open-ended system. The open-ended way of designing the tasks was to enable students to apply cognition through inquiry. The pre-task revealed the students' low level of geometric knowledge before their engagement in inquiry-based learning. The pre-task results warranted an intervention. Therefore, intervention was executed by the researcher who played a teacher role and performed participatory observation to facilitate and monitor inquiry-based learning through the usage of smartphone for inquiry. The distinguished inquiry trades performed through usage of smartphones include search for geometry concepts for clearer understanding and a quest for detailed information on every concept posed to students by the facilitator. The main activity that students were involved in pertains to learning through inquiry utilising diverse material including their smartphones. However, this study reports mainly on how effective the smartphones were used to retrieve geometric concepts for inquiry purposes. Conceptual understanding was measured across the levels of geometric understanding, that is, pre-visualisation, visualization, analysis, formal and informal deduction including rigour as explained in the Van Hiele theory of geometric knowledge and understanding (Clements & Battista, 1992). These levels drawn from the Van Hiele theory of geometric knowledge and understanding, specifically the lower levels focused more on students' concrete and basic knowledge that entail conceptual knowledge acquired through perception, visual and analytic connotations. A post- task was conducted after intervention.

Analysis and discussion

Students possess smartphones, however, they are not allowed by their everyday teachers to switch on and use them during lessons, specifically at schools that participated in this study. Out of the three schools that participated, in one of the schools the class teacher collects students' phones and securely save for students' collection and usage after lessons. However, the researcher requested students to carry their smartphones during the lesson. The usage of smartphones in a formal classroom situation is associated with a chaotic learning environment where students will not be able to learn while they keep on accessing social

communication like messages. Inquiry based learning encourages both formal and informal setting in a classroom. Therefore, it is of essence that students engage in informal sessions to acquire knowledge. The most prominent skill that emanated from usage of smartphones during learning is that students learned to focus more on the task rather than on other matters that are not associated with what the facilitator has asked them to look for. Students learned discipline in terms of prioritising task over social concerns when operating a smartphone for learning purpose. The initiation of smartphone usage has been of great advantage to students for inquiry purposes. Inquiry-based mobile learning was viable as 90% of students brought their smartphones to classroom as requested and they had access to free roaming Wi-Fi in the school premises. Further, through the facilitator's guidance, students utilised phones effectively. Among others, students used the phones to, (1) discover the concepts in order to define space and shape; (2) explore properties of figures; (3) establish relations among figures including learning more about inscribed and circumscribed figures; (4) formulate conjectures, validate conjectures through reference from relevant axioms and theorems.

The facilitator conducted the learning of cyclic quadrilaterals through probing, that is, through asking questions, explaining procedures, demonstrating and guiding students on how to use their smartphones to search for relevant geometric concepts and information. For every concept that the student could not explain during facilitator-student interaction, the facilitator encouraged students to 'ask google' using their smartphones. Thereafter, students would evaluate answers obtained from google and create meaning for classroom practices. As students were in groups, each group would present their interpretation and understanding of concepts and share with other groups to reach common consensus on the concept in question. Co-operative learning afforded every student a chance to acquire better understanding of concepts for individual competency.

The pre-task displayed a high level of errors in connotations of most of the concepts. Connotations refer to mathematical meanings, implications and associations of diverse geometric concepts. Common errors committed in the pre task included (1) geometric language errors, for example, vertices referred to as corners and circle spelled as cycle. (2) Incorrect association of properties to figures, for example "*opposite sides are equal*" for a hexagon; and (3) incorrect application of possessed vocabulary, for example, instead of writing "*a quadrilateral is inscribed in a circle, therefore, the figure is named a cyclic quadrilateral*" one student wrote, "*a theorem is inscribed in a rider; therefore, a figure is named geometrical*". The student appeared to have written the same statement correctly in the post-test. However, comparing the pre and post-task, the post task has shown great improvement in terms of geometric language errors, comprehension and application of terms or geometrical vocabulary; and the correct location and association of properties with right geometric figures. It is evident that students in Grade 11 acquired some vocabulary from lower grades; however, the concepts possessed as vocabulary were not clearly understood and correctly applied. Through a thorough inquiry, student located the meaning of concepts as well as correct geometrical names of figures. A smartphone is the most liked and available tool to students. Therefore, searching for concepts and their meanings through a smartphone enabled students to gain more vocabulary and understanding of geometric concepts. Further, findings revealed that the usage of smartphones in connection to the internet roaming around the school premises prompted inquiry-based learning skills such as meta-cognition, self-regulated learning and student-centred learning. Such inquiry-based learning skills supported students through inquiry that initiated cognition of diverse geometric concepts.

The development of digitisation skills is essential to stimulate the thinking of a technologically oriented 21st century mathematics student. The availability of internet at schools and students having advanced cellular phones (smartphones) became an advantage to inquiry-based facilitation (IBF) that enhanced the development of digitisation skills in geometrical contexts. Chao, Murray and Star (2016) affirm that students operate smartphones on daily basis. In light of the view by Chao et al., (2016) this study found that the use of smartphones contributed to transformation in learning where students learned through IBL in order to acquire a transformed mind through cognition of geometric concepts. Drawn from the SAMR model, this study contributes that the teacher applying inquiry-based facilitation should refer to utilisation of mobile technology at students' exposure. The reference should be sustained as a means to guide students to apply self-regulated learning in order to access more information in order to enhance geometrical conceptual understanding. Furthermore, the understanding of concepts envisaged to instill transformation in learning is evident. In addition, competency in conceptualisation and application of knowledge for problem solving is also evident. Figure 1 defines the visual model that emanated as IBF focused on utilisation of mobile smartphone technology to enhance geometric inquiry.

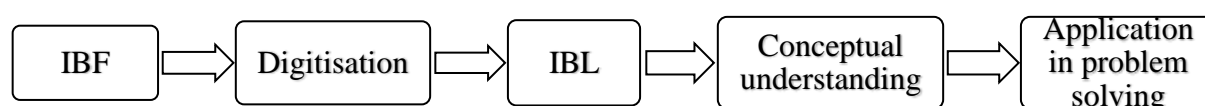


Figure 1: Visual model for geometric inquiry

Furthermore, students adapted easily to ubiquitous computing and learning skills. Secondly, smartphone technology is simple because access to video, images, and text is not linked to a particular operating system and access to information is immediate. Lastly, smartphones in this study were a form of mobile technology used to instill mobile learning in a form of inquiry, particularly in learning geometry. In addition, this study asserts that mathematics classroom practice that prioritises mobile learning causes learning skills such as metacognition, self-regulated and student-centred learning. The acquired metacognition enabled students to apply procedural and declarative metacognitive knowledge in perceiving how, why and when to strategically utilise mobile devices in learning geometry. This study emphasises that teachers need to be equipped to take advantage of students' hand-held mobile devices and engage students in utilising the devices during lessons. Regular teachers of these participating group could not perceive the intensity of mobile learning at their and students' exposure. However, the facilitator in this study effectively supported students and encouraged them to use their smartphones and available internet in learning. Lingefjard and Holmquist (2001) highlight that mathematics teachers in the 21st century should not confine themselves to teaching only applying algorithmic methods of teaching, but should be conversant with the role of technology in pedagogy in order to exploit technology of the 21st century and align well with the digital natives. In light of this, teachers should support the digitally orientated students in order to encourage ubiquitous learning in geometry.

Conclusion

This study explored the utilisation of smartphone to advance inquiry-based mobile learning. Furthermore, this study has deduced that inquiry-based mobile learning enhances skills such as metacognition, self-regulated learning and student-centred learning. Such skills prompt inquiry into geometric concepts that initiates cognition across the levels of geometric knowledge and understanding. Therefore, mobile learning needs to be prioritised in mathematics classrooms in order to afford students a chance to apply ubiquitous learning in

mathematics through the smartphone and other hand-held devices as the devices are easily accessible to most students.

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AN ANALYSIS OF THE 'QUALITY' OF A JUNIOR CERTIFICATE HISTORY TEXTBOOK IN LESOTHO

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Abstract

Education is considered universally as one of the most critical services that countries strive to offer their citizens. In line with this valorization of knowledge, Lesotho has since the dawn of her independence in 1966, initiated several curriculum initiatives with varying outcomes and implications. The Ministry of Education and Training of Lesotho motivates that its curriculum reform aims at dispensing quality, relevant and efficient education that can contribute to sustainable development. However, for these initiatives to attain the desired effects, suitable instructional resources such as textbooks have to be effected. Conversely, textbooks do not have the reputation of serving only neutral educational functions; they perform multifarious roles amongst which are political and ideological. Given this background, this small scale case study set out to understand the extent to which a purposively selected Form A (equivalent of Grade 8 in the South African Education structure) history textbook used in Lesotho schools can be described as a quality resource for the teaching of the subject. The need for the study arose over concerns of the consistently poor performance of history students at public examinations, particularly the Junior Certificate, and a general lack of public interest in the study of History in Lesotho. It was, therefore, essential to examine the role of the prescribed history textbook in this dilemma. The research is qualitative and was approached from the interpretive lens. A framework for evaluating quality textbooks was adapted and applied as the analytical tool. The findings from the study revealed that the book analysed is to a considerable extent, not quality enough for teaching the subject at the prescribed class. Amongst some of the explanations are the fact that there is lack of depth of substantive historical knowledge, there is no alignment between content covered and syllabus prescription, there is evidence of content bias, and there is the absence of explicit application of the language of History. This study, therefore, concludes that the lack of quality of the textbook has a significant role in the poor performance of students in public examinations. The study recommends a more robust process of evaluation and review of textbooks in Lesotho both before they are prescribed and regularly.

Introduction

Education is considered universally as one of the essential services that countries strive to offer their citizens. In line with this valorization of knowledge, Lesotho has since the dawn of independence in 1966, initiated several curriculum initiatives with varying outcomes and implications. Apart from ensuring that education is made accessible to all and sundry (MoET, 2005), another pivotal objective of the post-independence education reforms in Lesotho was to make sure that the quality of education dispensed to Basotho (Citizens from Lesotho are called Basotho; Singular is Mosotho) was relevant, efficient, and a tool for sustainable development as opposed to the simplistic ability to read and write like in the colonial days (Seotsanyana & Muzvidziwa, 2002). The most recent curriculum initiative in respect of the above endeavor is the Curriculum and Assessment Policy Framework (CAP). MoET (2009) states that the CAP is a guide towards the transformation of teaching and learning as well as assessment at the primary and secondary level.

However, for these educational and curriculum initiatives to attain the desired effects, suitable instructional resources have to be effected. It is in this regard that the textbooks inclusive of history textbooks come in as essential tools or instructional materials for classroom situations to support lecturers, teachers, and learners in following a specific curriculum and achieving the desired curricular objectives. Teachers and students around the world rely on textbooks as a source of content for the subject (Romanowski, 1996; Sewall, 2004). Arthur Graham Down submits that:

Textbooks, for better or for worse, dominate what students learn. They set the curriculum, and often, the facts learned, in most subjects. For many students, textbooks are their first and sometimes only early exposure to books and reading. The public regards textbooks as authoritative, accurate, and necessary. And teachers rely on them to organize lessons and structure subject matter (Down, 1988, p. viii)

This primary and authoritative role of the textbook in education is however only one side of the dilemma as another dimension suggest that in performing their core pedagogic functions, textbooks are not neutral (Engelbrecht, 2006 & 2008; Nicholls, 2006). Apple and Christian-Smith put this across very clearly when they state that:

... Texts are not simply delivery systems of facts. They are at once the result of political, economic, and cultural activities, battles, and compromises. They are conceived, designed, and authored by people with real interest. They are published within the political and economic constraints of markets, resources, and power (Apple and Christian-Smith, 1991, p. 3).

In South Africa, for example, a study of apartheid-era textbooks reports the presence of master symbols that justified Afrikaner domination (du Preez, 1983; Engelbrecht, 2006). Other studies now indicate of contemporary South African history textbooks presenting new stereotypes to counter apartheid stereotypes at the expense of the heritage of the white minority population in what is termed role reversal (Engelbrecht, 2008). Bertram and Wassermann (2015) support the position that the production of textbooks to its distribution and use is a politically and educationally contentious activity.

Consequently in order for these resources to remain relevant to their core function of supporting teachers and pupils in following the curriculum (Johanesson, 2002; Schoeman, 2009) or as materials for gaining information and knowledge and providing a solid basis for learning, constant analysis of their quality is a matter of necessity. The need is more evident in developing countries like Lesotho where lack of other resources of teaching makes such countries heavily reliant on the textbooks.

Given this background, it is essential to examine the discourse of quality in textbooks. The framework used to conceptualize quality and evaluate its application to the sampled textbook is an adaptation from Mahmood (2009). His framework draws mostly from the work of Garvin (1980) on the evaluation of quality products generally. This study, therefore, examines the extent to which the selected history textbooks can be considered as quality resources for the teaching and learning of the subject in Lesotho. Three primary considerations motivated the study: Firstly is the nature of textbooks generally, as explained in the preceding paragraph. The multifarious nature of textbooks requires that evaluations be done to ascertain that the

textbooks, especially those prescribed for teaching and learning, can serve the purposes for which they are expected to serve. Secondly, Stearns (1998) notes that:

Historians do not perform heart transplants, improve highway design, or arrest criminals. In a society that quite correctly expects education to serve useful purposes, the functions of History can seem more difficult to define than those of engineering or medicine. History is in fact very useful, actually indispensable, but the products of historical study are less tangible, sometimes less immediate, than those that stem from some other disciplines.

Although the values of history education for civilized societies are many and well documented (Amaazee, 2001; Carl, 2009; Fru, 2015; Schoeman, 2006; Stearns, 1998), many, especially developing countries, and Lesotho as the case-in-point here have continued to undermine the discipline through explicit unfavorable education policy decisions and curricula initiative (Fru, 2015; Ntabeni, 2010; Raseliom & Mahao, 2015). Ntabeni (2007) is categorical that History is the most unpopular subject in the Social Science group of subjects in Lesotho. This group, according to the CAP, also includes Development Studies, Geography, and Religious Knowledge (MoET, 2009). Employing example, Ntabeni (2007, p. 218) explains that “the number of schools teaching History dwindled so much that in 2006 - out of 230 and more Lesotho Secondary and High Schools – only 17 were still offering the subject mainly because their Principals have a major in History”. The third motivating factor is a spill over effect of the above point and refers to the fact that History has been consistent amongst the worst performing subjects at the Junior Certificate examinations over recent years (Ntabeni, 2007). These three factors motivated this study with the hope that the role of the history textbooks in amplifying the declining situation of history education in Lesotho will be unpacked.

Conceptual Framework for Quality Textbooks

The principal concept underpinning this study is 'quality.' Like any other concept, quality presents many definitions all dependant on the ontological inclinations of its proponent. An operational understanding of quality will, therefore, enhance the rigor of this study.

As earlier mentioned, the framework of quality used in this study is derived from the indicators of quality formulated by Mahmood (2009). According to the author, his indicators and framework were primarily inspired by Garvin's (1987) work on quality products. The difference between the works of Garvin and Mahmood concerning quality is that, while the former examines and applies quality to products generically, the latter contextualises its application to textbooks as products. It is therefore vital as a point of departure for this study and for the application of this framework that a textbook is considered to be a product. The explanation being that a product is generally considered to be the output of a process and a textbook is the result of a multi-phase process that includes authorship, publication, and distribution.

Garvin's (1987) framework for product quality consists of eight dimensions. These are Performance; Features; Reliability; Conformance; Durability; Serviceability; Aesthetic; Perceived Value. From these eight indicators, I identified four which, in my view, is manageable in a study of this scale. I then detailed out the descriptors of those four indicators drawing from the explanatory descriptors of Mahmood (1997). The four indicators and their specific descriptors constituted the conceptual framework and analytical tool for this study. The framework is presented in Table 1 below.

Table 1. Conceptual Framework for Evaluating Textbooks (Adapted from Mahmood, 1997)

	QUALITY CONCEPTS	DETAILED DESCRIPTORS
1	The Performance (Quality Content)	<ul style="list-style-type: none"> ➤ alignment of content with the subject objectives/syllabus ➤ content coverage (adequate/inadequate) ➤ language/vocabulary used (appropriate for learners' age/level/grade) ➤ appropriate content balance ➤ coherent arrangement of themes ➤ biased free content
2	The Features of the Textbook	<ul style="list-style-type: none"> ➤ presence of various activities that promote thinking skills ➤ interdisciplinary activities ➤ activities apply to the diversity of learners' abilities, interests and learning styles ➤ activities include guiding questions which encourage the development of high-level thinking skills ➤ incorporation of teaching guide, Kit, ICT materials and assessment questions
3	The Aesthetic of the Textbook	<ul style="list-style-type: none"> ➤ presence of non-text content/visuals is well designed and integrated into the text ➤ illustrations and graphics are meaningful ➤ provision of a usable table of content, glossary, and index ➤ consistent layout/format of presentation (title, introduction and font size)
4	A durable Textbook	<ul style="list-style-type: none"> ➤ technical and physical nature of the textbooks ➤ quality of paper and binding (life span) ➤ the jacket (appealing/interesting)

Methodology

This was a small scale qualitative case study whose focus was on revealing the extent to which a Form A history textbooks in Lesotho can be described as quality resource for the teaching and learning of the subject. I, therefore, worked in the interpretive paradigm because I acknowledge that my interpretation of the data has a high degree of subjectivity and that the knowledge produced from the study will be done inductively (Stevens et al., 1993). I employed the interpretivist paradigm for this study with the aim of deconstructing and unpacking versions of reality in the textbook to explore the meanings and realities of the nature of the textbook. The methodology that I employed was the qualitative document analysis. Atkinson and Coffey (1997) define to document as social facts, which are produced, shared and used in socially organised ways and document analysis is a systematic procedure (Neuman, 2003; Sarantakos, 2005) for reviewing or evaluating documents.

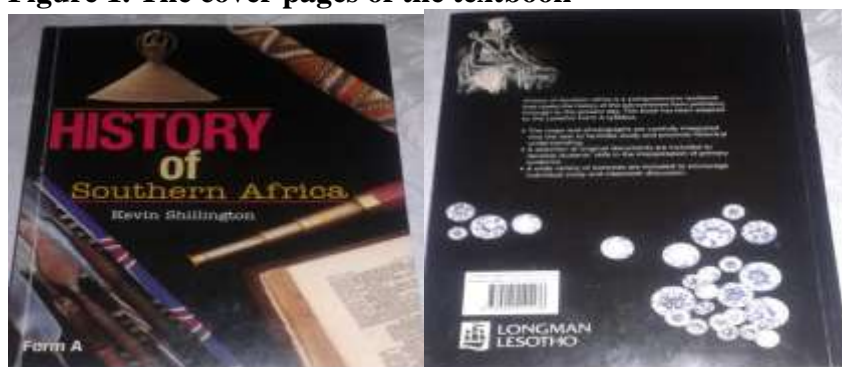
The data for the study are textbooks themselves, which is pre-generated by the authors and the publishers. The sample is a prescribed history textbooks used for History teaching at

Junior Certificate Level. In making a decision on the sample size, I considered the position of Patton (2002) that there is no universal rule for sample size in qualitative studies. It depends on what the researcher wants to know, the purpose of the study, what is at stake and what can be done in the available time for the research. The procedure for analysis involved a selection of chapters from the textbook and the use of the conceptual framework to make sense of the data. The data consisted of the verbal and non-verbal (drawing, photographs) elements of the text.

Table 2. The textbook sample

Code	Title of the book	Author(s)	Date of publication	Publisher
Form A	<i>History of Southern Africa</i>	Shillington, Kevin	2004	Longman: Lesotho

Figure 1. The cover pages of the textbook



The sampling continues with specific chapters of the book for the manageability of the study. Each chapter was analysed against the four indicators of quality explained in table 1.

Table 3. The Chapters sample

Chapters	The peopling of Southern Africa	Pages
1	From Stone Age to Iron Age in Southern Africa	1-14
2	The Later Iron Age in Southern Africa	15-29
3	Dutch colonisation of the Cape	30-43

Findings

The performance of the textbook

Chapter 1

The content in this chapter is not fully aligned with the syllabus objectives. It lacks information on the social way of life of the San and the Khoikhoi. For instance, there is no explanation on the issue of marriage and entertainment of the San. The religion of the San is also inadequate when looking at the demand of the syllabus. This part of religion usually

demands learners to discuss five points which make up a paragraph, and it is assessed as a short essay question of about five to ten lines long. There is also an issue about puberty stage among the Khoisan, which is indicated as end of level objective on page 7, but in the text, there is no content about puberty. There is no history content on the political life of the San and some of the points of which are of social appear under the social organisation of the San. There is more content on the economic life of the San than on other aspects of life.

Furthermore, the sub-topic which talks about *the importance of Iron and Agriculture*, pg10 is not part of the syllabus demand. There is no precise sequence on how the content for specific sub-topics is presented. In other words, there is no logic and coherence in displaying the content.

There is no introduction to the chapter, and also the end of learning objectives is not stated in the textbook. The learning objectives stated in the syllabus for form A, page 8, is indicated that, at the end of learning, learners should be able to “describe the social, economic and political way of life of the Khoisan.” The content should discuss or address the following issues as social life – Puberty, Marriage, Religion, and Entertainment. But when looking in the textbook content, there is a lot of missing information about the social life of the Khoisan. This indicates that the achievement of learning objectives is not fulfilled.

Chapter 2

There is inadequate content provided in this chapter to describe the economic and political life of the Bantu-speaking peoples. The content about religion, chieftaincy, marriage, and initiation should be treated separately to help learners to understand each mode of living among the Bantu speaking people better. In the History syllabus, on page 8, it is indicated that; at the end of level objectives, learners should be able to describe the social way of life of the Bantu speaking people in Southern Africa. The content to be covered includes the clan, lineage and homesteads, marriage, religion, and initiation. But in the textbook content, some of the mentioned issues are not fully described. For instance, religion and initiation practices among the Bantu-speaking people.

Furthermore, Bantu-speaking people are made up of different states such as; the states on the Highveld south of the Limpopo, the south-east: the Nguni and the Tsonga states of southern Mozambique. These different states perform their tradition differently from each other. The syllabus does not guide teachers as to what it is expected from the textbook content. There is a lack of content alignment with the syllabus demand.

Chapter 3

There is a lack of cohesion on how the Dutch came to know about the indigenous people of Southern Africa and why the Dutch decided to travel around Africa when going to India. The syllabus objectives clearly state that learners should list the reasons why the Dutch established a half-way station at the Cape and the instructions given to Jan Van Riebeeck under Dutch East India Company (DEIC). In the textbook, there are no clear reasons why the Dutch occupied the Cape. The content is on the instructions given to Jan van Riebeeck to perform at the Cape. Again the chapters in the syllabus are arranged differently from the textbook chapters. The Dutch colonisation of the Cape follows the topic Bantu-speaking people in the textbook while in the syllabus the Bantu-speaking people is supported by the formation of chiefdoms and kingdoms in southern Africa up to European penetration, page 9.

Looking at the sub-topic on frontier wars, the content clearly explains which wars were fought with which groups, but there are no reasons for the causes and the results of the

frontier wars. There is no content about the causes and the consequences of the Boer trek in chapter 3, as indicated in the syllabus objectives. There is very little content on the Tsonga states of Mozambique and the peoples of Namibia compared to the other nations of Bantu-speaking people.

The features of the textbook

Chapter 1

There is only a Teachers' Guide as a course package. The Teachers' Guide has an introduction for the chapter and the notes on lessons and activities as part of learning. It provides guidelines for the teachers on cross-curricular integration, suggesting teaching aids/resources, teaching methods, and assessment objectives guidelines based on this chapter. It also expands where necessary on the content of the student's book. There are also exercises which require learners to think, discuss, understand, and write after the completion of this topic.

There are no activities at the end of the sub-topics to enhance the teaching process before the completion of the topic. The assessment tools are questions which require learners to think, discuss, and understand. They are written at the end of the chapter. There are no possible/suggested answers provided for the questions to guide both the teacher and the learners. Some of the questions are outside the scope of the subject objectives. For example, how was the Iron Age brought to Southern Africa? Why has there been disagreement among historians about this topic in the past?

Chapter 2

There are no objectives stated and the introduction at the beginning of the chapter. There are no activities at the end of the sub-topics. However, there are questions at the end of the chapter, even though possible answers are not provided to guide both the teacher and the learners. Some of the questions are far beyond assessing within the scope of the syllabus demand. For example, the question about; the origins of Great Zimbabwe and why building in stones was important. Furthermore, there is no incorporation of ICT resources such as videotapes or slides, to watch the movies about these important states and how they look like.

Chapter 3

The photographs, maps, and pictures are dull in colour. In *Fig. 3.1 Khoekhoe at the Cape selling livestock to visiting European traders*. The image does not portray the barter system which existed between the Khoisan and the Dutch. The map on page 31, Map 3.1 The south-western Cape, 1650-60 only shows the groups of clans in the region of Table Bay and the Cape Peninsula instead of showing two areas thus Netherlands and Southern part of Africa and the journey taken by the Dutch to the Cape. There are no questions at the end of the sub-headings. There are general questions at the end of the chapter, and most of the questions require higher-order thinking. Teacher's Guide does not have any suggestions on the use of different teaching methods for this topic. It is worth mentioning that the pictures used in this chapter are colourless, and this by itself is an impediment in advancing definite gen that a coloured image would have depicted.

The Aesthetic of the textbook

Chapter 1

The chapter has sub-headings written in bold to make the teacher aware that it possesses the main objective of the content. The font size is appropriate for the learners. There are also paragraphs, and most of them have a maximum of ten lines, which is an acceptable layout.

There are illustrations such as pictures and maps, but they are dark coloured. Some photographs are not clear and do not convey the message to learners. For instance, a photo of fig.1.2 Stone tools of the Later Stone Age from the Orange Free state, c.4 000 years old: scrapers and the broken half of a bored stone is not bright, and also the tools are not labeled. Again, Fig. 1.3 A modern camp in the Kalahari on page 5 does not have features of an advanced camp. Looking at the map on page 7, Map 1.1 the spread of Pastoralism and farming in Southern Africa, the map is too crowded for the age of the learners. The key shows three arrows with different information. The pictures are dull and not bright. This is an example of an image of Great Zimbabwe in the textbook. The image is dark, small, and not clear to portray history meaning.

Figure 2. Great Zimbabwe



Chapter 2

The pictures and photographs are dull and not well designed to portray the message behind them. The image on page 26, fig.2.5, Nguni style village, the method of house construction and central cattle kraal where the central cattle kraal does not appear to be at central because the picture is tiny partly captured.

Durable content

Chapter 1

The content is appropriate since it is the happenings of the past, starting from the Stone Age period to the Iron Age period in Southern Africa. The content describes the way of life of the Stone Age people. These people who lived in that period were known as hunter-gatherers (San and the Khoikhoi). It also provides a brief introduction about the coming of the Iron Age people and the impact of Iron on the way of life of the people on agricultural activities and the use of iron tools.

Chapter 2

The content is appropriate in terms of time and space. It is responding to the syllabus demands. The material on the origins and growth of later Iron Age states, namely the eastern and north-western Botswana is not specified in the syllabus objectives.

Chapter 3

The content in this chapter is appropriate with the syllabus demand. However, this chapter should have been preceded by chapter 4 – State building, colonialism & resistance in pre-industrial southern Africa because this is where colonisation started in Southern Africa. This is also indicated in the syllabus that the topic to be dealt with after chapter 2 on page 9 should be: Formation of chiefdoms and Kingdoms in Southern Africa up to European penetration. This will provide logic for learners about the Europeans coming to Southern Africa and occupying some part of the land just like the Dutch occupying the Cape in 1652.

From the descriptors of the durable textbook in terms of physical make-up, the size of the textbook is suitable for the learners' age. It is not a heavy book. The binding is acceptable even though it does not last long because the textbooks are used by different learners under the textbooks rental scheme initiative. The cover page is appealing with colourful pictures that have historical information.

Discussion of findings

The analysis indicated that the textbook, to a more considerable extent, does not conform to the requirements of its performance. Five key points of discussion can be extrapolated from the findings presented above. The first one inadequate substantive historical knowledge and a lack of alignment between content displayed in the textbook with the expectations of the syllabus. This finding is disturbing in light of the literature revelation that teachers, especially in developing countries, mostly rely on textbooks as the sole source of information on the subject (Romanowski, 1996; Sewall, 2004). The question, therefore, is how teachers get the missing substantive content to supplement the inadequate historical material in the textbook? This inadequacy also surely accounts for the reported poor history performance at Junior Certificate examinations in Lesotho (Ntabeni, 2007).

The second discussion point is that of content bias. The case is with the topic of the formation of chiefdoms and kingdoms in southern Africa. The content on the Basotho nation is inadequate. The policies which Moshoeshoe used in building the Basotho society are not in in the textbook, and yet the syllabus objectives demand learners to have acquired knowledge about these policies. But looking at other nations like Zulu, there is a lot of content elaborated on how Shaka build the Kingdom and on the Ndebele. This bias conforms to the view of Apple and Christian-Smith (1991) that real people with real interest author textbooks. They are never neutral or simple delivery systems of objective knowledge but rather content certain attitudes and ways of looking at the world (Engelbrecht, 2006; Nicholls 2006). Therefore, the silence of the policies of Moshoeshoe in the textbook in spite of syllabus recommendation cannot be taken as an innocent oversight but rather as an ideological battle and compromise. This is the same situation that prevailed in apartheid South Africa where studies have revealed that the textbooks carried master symbols that undermined the cultural heritage of the blacks (Engelbrecht, 2008; du Preez, 1983) or contemporary history textbooks that have reversed the role by deliberately presenting new stereotypes to counter apartheid stereotypes (Engelbrecht, 2008). Bertram & Wassermann (2015) further specify that the production of textbooks, from conception to distribution to use, is a politically and educationally contentious activity.

The third point is that of the language used in the text. The finding reveals that the language is above the cognitive level of the learners. There is also the absence of explicit use of historical terminology of language. Taylor (2003) in Maposa & Wassermann (2009) argues that History has its unique language as with other specialisations. Maposa & Wassermann (2009) further opine that understanding and dealing with the language of the past is a distinguishing attribute of a historically literate learner and teacher. A historically literate learner should be aware of the fact that language in History can have multiple meanings, and how language shapes History and how History, in turn, shapes language. Aggarwal (2012) also claimed that the content language of a History textbook should be written in a clear and straightforward language.

Conclusion

This small scale case study set out to understand the extent to which a Form A history textbook used in Lesotho schools can be described as a quality resource for the teaching of the subject. The need for the study arose over concerns of the consistently poor performance of history students at public examinations, the general lack of public interest in the study of History in Lesotho and the multifarious role of history textbooks. The findings reveal that the textbook analysed is to a considerable extent, not quality enough for teaching the subject at the prescribed class. Amongst some of the explanations are the fact that there is a lack of depth of substantive historical knowledge, there is no alignment between content covered and syllabus prescription, and historical language is absent. I conclude that there is a dire need for a more robust process of evaluation and review of textbooks in Lesotho both before they are prescribed and periodically.

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IMPLEMENTATION OF NATIONAL SCHOOL SAFETY FRAMEWORK TO CURB GANGSTERISM IN THREE TOWNSHIP HIGH SCHOOLS IN THE CHRIS HANI WEST EDUCATION DISTRICT

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Abstract

The prevalence of violence and gangsterism acts in schools necessitated this study. The prevailing violent acts in schools instil fear and insecurity among learners and teachers as learners witness fights, stabbing and death of some learners. Despite numerous attempts made through Regulations for Safety Schools and National School Safety Framework (NSSF) to ensure that schools are safety centres, the violence in schools is rife. Hence, the paper examines the implementation of NSSF in schools to curb gangsterism. The social norms theory and theory of implementation underpin this study. This paper adopted qualitative interpretive approach where case study design of three selected high schools from Chris Hani West Education District were studied. Through semi-structured and focus group interviews, the implementation of NSSF was examined. Sample comprised of two departmental officials, three principals, three teachers and eighteen learners from Chris Hani West Education District was purposively selected. The findings reveal that schools are aware of NSSF and the different strategies used when implementing. The schools are getting enough support from the South African Police Service (SAPS) through awareness campaigns and random searches conducted by police officials; however, the inadequate support from Department of Education (DoE) remain a concern.

Keywords: Code of conduct, Gangsterism, Implementation, National Schools Safety Framework, Policy, School safety, Social norms theory, Stakeholders, Violence

INTRODUCTION

Gangsterism is the development of an urban identity that is determined along ethnic and economic lines (Mncube & Madikizela-Madiya, 2014). In addition, gangsterism is perceived as a disruptive manner of life where people become faithful to the gang as against being loyal to institutions of civilised society such as schools, household, religious organisations and judiciary (Standing, 2005). Gangsterism often comprises the establishment of groups with the purpose of engaging in violence and crime and such acts subject communities to the risks (Mncube & Madikizela-Madiya, 2014). Gangsterism encourages the exhibition of undesirable behaviour that is against socially approved standards and this affects schools as the community centre. It is for that reason that the Department of Basic Education (2015) introduced National Schools Safety Framework which serves as a guideline towards ensuring safe environment in South African schools. When the framework was introduced, it aimed at guiding schools, Districts and Provinces on how to maintain safe and healthy school environment. Despite the guidelines provided by the framework, schools continue to become unsafe spaces due to gangsterism. This paper was necessitated by the fact that once safety standards are compromised in schools, there is likely to be delinquency, truancy and absenteeism (Zeblon, Areba, Monga're, Rael & Robert, 2014).

Studies have shown that gangsterism is a global phenomenon and in the United States the violent gang acts are prevalent (Howel, 2010; Mncube & Madikizela-Madiya, 2014). There have been reports that gang presence is a frightening problem for teachers, justice system,

and so on. In addition, there is evidence that schools are seen as convenient spaces for gangsters to recruit and get initiates. Some efforts to address the issue of gangsterism where the Boys and Girls Club of America together with United States office of Juvenile Justice and Delinquency Prevention (OJJDP) established the Gang Intervention through Targeted Outreach (GETTO) initiative (Arbreton & McClanahan, 2002) have been made. This GETTO programme generated prospects for young people through afterschool activities to expedite their acceptance in Boys and Girls clubs.

In Jamaica, in schools there are regulations that the school principals should follow. Such regulations encourage school principals to identify anti-social gangs and cliques and develop a programme of special duties, tasks and responsibilities that will utilise students' free time during and after school. In addition, the use surveillance cameras to monitor movements and gatherings of students was endorsed, and these surveillance cameras were perceived as effective tools in controlling how students behave when they are gathered as a group (Ministry of Education (MoE), 2008). Gangsterism seems to be a huge problem that negatively affects the African region's social development (Abanyam, 2012). Even in Kenya, the Minister of Education facilitated the development of School's Safety Standard Manual (2008) for all schools. This manual states that no meaningful teaching and learning that can take place in an environment that is unsafe and insecure to both learners and staff. This manual recommended the establishment of school's safety committee to oversee and enhance safety in schools. From the manual, an emphasis around safety is encouraged starting from school grounds to safe teaching and learning environment.

In South Africa, most township schools are not safe schools as violence through gangsterism prevails (Prinsloo, 2005). Violent gangs disrupt peace and safety in communities and schools (Geldenhuys, 2016). This is despite the stipulation made in the South African Schools Act 84 (1996) that no one should bring hazardous weapons and prohibited drugs in school. In addition, the Act indicates that there should be random searches conducted in schools where if learners found guilty of serious misconducts can be either suspended or expelled from school (South African Schools Act 84, 1996). In addition, the safety framework recommends the development of safer school programmes by SAPS where officials are encouraged to visit schools regularly and assist the school management team and learners regarding school safety issues (Department of Basic Education (DBE), 2015). When young people do not have activities that empower them, they often engage in increased risk of gang involvement (Gottfredson, 2013). Therefore, schools should establish school's safety committees and school's safety policy to ensure that the implementation of NSSF is a success (Makota & Leoschut, 2016). As suggested by Xaba (2014), this should be coupled with continuous monitoring and evaluation to make sure that a complete implementation drive is achieved to ensure the effectiveness of the implementation process. According to DBE (2015), the NSSF aims to maintain schools as safe centres. However, despite these collaborations, the problem of gangsterism still remains rampant in township schools and the objective of this paper is to examine the implementation of NSSF in township high schools to curb gangsterism.

THEORETICAL FRAMEWORK

This paper is underpinned by the social norms theory (Berkowitz, 2005) and the theory of implementation (May, 2013). The social norms theory observes how one's character and principles determine conduct and suggests information on how to alter such influences. In addition, this theory provides a clear description on how people falsely identify their peers' attitudes and behaviours from their own. This phenomenon is pluralistic ignorance. Social

norms theory envisages that interventions to rectify misunderstandings by revealing the authentic, improved standards will have a favourable influence on most individuals. This may result in the reduction of their participation in risky behaviours or be encouraged to engage in protective and healthy behaviours. This theory provides tools for increasing perceived support to take action in addressing violent behaviours. For the implementation of the National Schools Safety Framework in schools, the researcher adopted a general theory of implementation (May, 2013). This theory outlines a set of four constructs that describe the process of implementation. The first construct is capability, and it suggests that implementation may be complex and may involve complex interventions. The second construct is capacity, which involves making the framework popular to the relevant stakeholders through diffusion of information. The third construct is potential, and it involves the individual's readiness to translate individual's beliefs and attitudes into behaviours. The fourth construct is contribution because the implementation of the National Schools' Safety Framework depends on the agent's continuous contributions that relevant stakeholders make to ensure that their contribution towards the implementation of the National School Safety Framework is continuous.

Aims / Objectives

This paper aims to investigate the implementation of National School Safety Framework to curb gangsterism in township high schools.

Research questions

1. What strategies are in place in schools to implement National Schools Safety Framework (NSSF) to curb gangsterism?
2. How are schools supported and monitored to ensure proper implementation of the National Schools Safety Framework (NSSF) to curb gangsterism?
3. What challenges do schools experience in implementing National Schools Safety Framework (NSSF) to curb gangsterism?

METHODS

The study adopted an interpretive paradigm. An interpretive researcher believes that one accesses reality by interacting with other people through language, perception and shared meanings (Myers, 2009). In interpretive paradigm, data collected is through socialising and having conversations with the research participants to get their insight about the studied phenomenon. It is for that reason that qualitative approach is the best for this study because it studies the meaning of people's lives and their experiences in real life situations (Yin, 2016). Qualitative approach encourages a research that is conducted in the participants' natural setting, in this case the school. Sample size of twenty-six research participants was purposively selected (Creswell, 2013) based on having typical characteristics of the population. The sample included two district officials from two clusters in the Chris Hani West Education District, two teachers (Principal and a teacher) and six learners (SGB/ RCL members) from each of the three township high schools. Data collection was through semi-structured and focus group interviews (Creswell, 2013). Semi-structured interviews collected data from two Departmental officials and two teachers from each school, while focus group interviews gathered data from learners between the ages of 15 years and 22 years. From each school, one group consists of six learners. This paper adopted thematic analysis that encourages data arrangement and its categorisation into themes based on the views and experiences of the participants (Giles, 2008). The researcher received the permission to collect data from the District office and from schools. Parents consented that their children

participate in the study. For vulnerability reasons, assent was attained from all learners where they were asked about their feelings regarding participation.

FINDINGS

The data was collected through the pre-determined themes using semi-structured and focus group interviews. The themes used for collecting data are; strategies used to implement NSSF, challenges experienced when implementing NSSF and monitoring and support mechanisms provided to schools to implement NSSF.

Strategies used to implement the National Schools Safety Framework

From the data collected, it is evident that there are strategies in place to ensure the effective implementation of NSSF in schools. The data show that some schools have the safety committees for the school representation in the meetings/ training workshops that are called, however, they are not as active as per NSSF requirements. For example, one teacher said:

In school, we have a committee but it is not functional because I was elected as a Life Orientation teacher to attend the workshop on NSSF in August 2018. From my school, two teachers and a learner attended a workshop. Now, we are in the process of electing fully-fledged school safety committee.

The problem of inactive safety committee seem to be problem for most schools, one principal indicated that;

The absence of safety committees in schools exacerbates the situation of gangsterism in schools. In addition, there is no clear protocol that can be followed should some learners engage in acts of gangsterism.

With regards to school safety policy, the research findings indicated that most schools do not have a school safety policy. Even the schools that have safety policy it is only for compliance purposes because learners and parents are not part of constructing it. Hence, the responses received from Focus Group 1 interviews indicated that:

We have never seen that policy of school safety here at school but when the learners are called for disciplinary issues, we only hear the principal and teachers talking about it.

While focus group 3, participants on the other hand were also surprised when asked about school safety policy. In their response they pointed out that: *We never heard of the safety policy here at school, we do not know if there are other policies here.*

The study found that most schools do have school code of conduct in place; however, the study revealed that incorrect procedures followed when making the code of conduct. Learners and teachers mentioned that they are against the contents of the school code of conduct, as they were not invited when discussed. From Focus Group 2, participants argued that:

We do have code of conduct for learners here at school but we were not part of what is written there. We even toy-toyed over the issue of uniform because the code of conduct says it's a navy trouser, it does not specify the type of trouser and here at school the teachers were returning learners wearing Dickies and other navy informal trousers home saying it is not acceptable as a school uniform.

Another problem is the type of hairstyle that is outlined in the learner code of conduct which is not what we as learners would like to put.

With the Focus Group 3, the slight view about the school code of conduct emerged because participants responded that:

Yes, there is a school code of conduct but it has never been reviewed ever since we came to this school. As learners, there are things that we would like to amend in the code of conduct. As for safety policy, we have never seen it, we only hear about it when the principal is reprimanding learners with offences.

Some of the responses that research participants gave in different focus groups are in line with some teachers' views, for example, Teacher 2 mentioned that;

There is a school code of conduct that existed before I even came here; however, this has never been reviewed.

However, Teacher 3 indicated that;

Yes, the school has a learner code of conduct that existed back in 2010 when I arrived here. For all the years, we have been using it and the learners did not have a problem with it.

From the data collected, it is evident that NSSF has some guidelines that can be followed in ensuring the effective implementation of NSSF to curb gangsterism in schools. Despite the outlined strategies, the research participants are not happy that in theory things seem to be going well while in practice it becomes a different ball game. This is evident in instances where stakeholders were not involved when crafting school code of conduct.

Challenges experienced when implementing NSSF

It was evident from the responses of the participants that there are many challenges experienced by schools when implementing NSSF. Such challenges are not experienced by the schools only, however, the district experiences challenges regarding the implementation of the NSSF. From the data collected, the District Official 2 reported that:

The implementation of NSSF has challenges because from the district there is no full time designated official that deals with school safety. This section in the department has a caretaker person that has other responsibilities, and this in my view challenges the implementation. On the other hand, schools always complain about inadequate staff and envisaged time constraints to implement the framework. Another challenge is the limited budget that compromised the planned events on school safety.

The District Official 1 raised other challenges that are experienced when implementing NSSF as he mentioned that:

The major challenge that contributes to the implementation of NSSF is the taverns that are closer to the school. Sometimes, youth community issues spill over to schools that makes it difficult to fully combat safety problems in schools.

When the principals' shared their views about the challenges of implementing NSSF, their responses were different. As with the Principal 1, he mentioned that;

I can say, we are about to overcome the challenges now because the cases of violent acts are gradually dropping. Our school with time may become a safety space for effective learning and teaching.

However, Principal 3 had a different view in terms of the challenges they experienced as reported that,

In our case, we have not properly implemented NSSF as a result safety issues such as vandalism and gangsterism persist in my school and sometimes the parents do not get involved even when we report these cases to them as a school.

Principal 2, in his response mentioned that:

One of the challenges we have as a school is the fact that we still have over aged learners who influence other learners to engage in violent acts. Another problem is that our learners are generally not involved in sporting activities thus indulging in social ills like drunkenness, sexual intercourse, gangsterism and drug abuse, and so on.

From the responses given by the participants, it was evident that there are challenges faced by all the stakeholders at school when implementing NSSF.

Monitoring and support mechanisms in implementing NSSF

Although NSSF states that monitoring helps school to keep track of its progress towards creating conducive learning environment, the data collected revealed that this is not the case as no support is available for the implementation of NSSF in schools. When the participants responded to questions asked about monitoring mechanism used to monitor the implementation of NSSF, District Official 1 answered:

As the district, we do not have adequate personnel to monitor whether schools implement the NSSF properly. However, there are monitoring tools meant for monitoring the progress although now they underutilised due to capacity.

The District Official 2 was not explicit in terms of explaining whether there are monitoring mechanisms in place when implementing NSSF, instead in his response; the District Official 2 indicated that;

There are safety patrollers that should give feedback to the department every Fridays about the matters related to school safety.

From the school level, different views emerged about the monitoring of NSSF implementation. The Principal 1 responded that;

There is monitoring done through thorough control of registers and visitors' books and meetings held with stakeholders to discuss the progress made in implementing NSSF.

A different view from the school C emerged when Teacher 3 indicated that;

I have not heard of any monitoring done by the department with regard to safety issues.

It was clear from all the responses that although the monitoring procedures are outlined in NSSF, schools and the department do not adhere to those and this compromises monitoring. However, when it comes to support, the responses of participants acknowledged the support received from different stakeholders regarding safety in schools. During the focus group interview sessions, the Focus group 1 reported that:

We receive support from the local police, because the police officials randomly come for searching the school; they confiscate drugs, knives, sharpened half scissors, small axes and all sorts of dangerous weapons sometimes hidden in the ceiling at school. We also get support from parents, councillors and there is NGO which is called as support centre that usually send a social worker to talk to us about social, safety and health issues.

Even with the Focus Group 2 the support received is acknowledged as they mentioned that;

Police officials are giving us a lot of support as learners; they come and search us without telling the students. In addition, there are days where the police officials come and do awareness campaigns.

The research participants from the Focus Group 3 expressed similar opinions about the support as they mentioned that;

We do get support from the local police station because sometimes we see police officers doing random searches here at school.

The teachers have their views about getting support when implementing the NSSF, this is evident in the Principal 1 response that;

As a school, we get a lot of support from parents and police. We are the only school in this area that still has evening studies up to 24h00 and nobody feels unsafe because the parents are supporting the school and the police are visible throughout the study time. Safety issues are always in our agenda during parents' meetings. We do get support from the Department of Education although I feel it is not enough, because we report these safety incidents such as gang fights, bullism and vandalism by learners to them but they do nothing to support us. However, the department has supplied us with a safety patroller who cannot deal with safety issues in school because he is not trained.

Just as the Principal 1 alluded to the support received, Principal 2 also mentioned that;

We get lot of support from the local police station because they come regularly to conduct random searches and awareness talks sometimes at school. Parents do not support the school, whenever called to school the police confiscate drugs and/or dangerous object from their children, they do not come.

Principal 3 echoed the previous responses made by other principals about the support received, as he indicated that:

SAPS do safety patrols around the school to ensure visibility throughout especially when we have extra classes. We also work together with the local correctional services where offenders come and have talks with learners. With the department, their support is not consistent, they sometimes come when we report incidences that took place in school and, however, we hardly receive feedback from them in terms of what we can do to address the situation. The department at times conducts random workshops that are not informed by the needs of the schools. Hence, the support from them does not often address the school needs.

With regards to the support received Teacher 1 stated that:

The social workers support the school through giving counselling to those learners who have family challenges such as domestic violence, abuse, and so on.

While on the other hand, Teacher 2 mentioned that:

We are not getting support from the department instead, the department at district level criticises the decisions taken by school to learners who commit misconduct.

When the researcher asked the district official how they support schools to ensure the implementation of NSSF, District Official 1 mentioned that:

As a department, we supply schools with drug testing devices and the literature about school safety. We also organise workshops for teachers and learners on school safety although sometimes there is poor attendance from school.

Just as mentioned by the District Official 1, the District Official 2 also indicated that;

We support schools through resuscitating debate societies, reviving speech competitions, drawing sporting programmes and making physical training mandatory.

From the data collected, it is evident that there is support that the schools get from the other stakeholders in implementing NSSF. Although the department does support, there is evidence from the data that the support received is inadequate, as it does not help the schools in curbing gangsterism in schools. The lack of parental involvement is another challenge identified by other schools where parents do not come to school when called for their children's conduct.

DISCUSSION OF FINDINGS

This section discusses the findings of the data collected starting with the strategies used to implement NSSF, followed by challenges experienced when implementing NSSF and monitoring and support mechanisms provided to schools to implement NSSF to curb gangsterism.

As stated by Makota and Leoschut (2016) schools should establish school safety teams or committees that are functional and take responsibility in the development of a comprehensive school safety and violence prevention plan. However, the data indicates that some schools have the safety committees for compliance purpose, as committees are dysfunctional. In addition, schools should ensure that once the school policy is developed, its implementation is enforced (Makota & Leoschut, 2016). The school's safety policy should include learner's code of conduct, teacher's code of conduct and disciplinary procedures where all the stakeholders should be aware of the contents of these policies and consequences should they fail to adhere to the policy and practices. All schools should adopt a code of conduct to improve and maintain the quality of the learning process as stipulated in the South African Schools Act (No. 84 of 1996). Most schools do adhere to this regulation as they do have the code of conduct in place; however, the study revealed the incorrect procedures followed when making the code of conduct, as there are no discussions made with other stakeholders. This is despite that the theory of implementation (May, 2013) points out the importance of relational pathways between agents (learners, teachers, parents, department officials, other

stakeholders such as police officers, social workers and groups of agents (SGBs, SMTs, school safety committees, disciplinary committees, and so on) when implementing the policy.

From the responses of the participants, many challenges experienced by schools when implementing the NSSF are evident. As stated by Gottfredson (2013), lack of supervision during the implementation of programmes is a huge challenge identified as the department is understaffed. According to DBE (2015), the Department of Education have entered into partnership with the South African Police Services with the aim to reduce crime and violence in schools. UNICEF (2008) suggests that support through consultation, training and capacity development on safety issues in the school and the management of the school is essential.

With monitoring mechanisms, the framework emphasizes that officials from the Department of Education are responsible for monitoring the implementation of policies (DBE, 2015). However, the study revealed that there is lack of monitoring by the Department of Education to ensure the effective implementation of NSSF in schools to curb gangsterism. Hence, Xaba (2014) advocate for mechanisms that ensure constant monitoring and evaluation to make sure that the implementation process is effective.

CONCLUSION

There seem to be gaps in the implementation of NSSF in schools due to numerous challenges identified by the participants. Training workshops organised by the department without looking at the needs of the schools are not helping the implementation of NSSF. Inadequate support from the department is a challenge and even when cases are reported, there is no feedback received from the department. In some instances, the safety committees, policies and code of conducts are available in some schools although they are for compliance and not serving the intended purpose. There is no consultation done with stakeholders when such policies are drawn, let alone the absence of regular reviews done for such policies. The identified challenges are the ones that make schools unsafe spaces.

RECOMMENDATIONS

The study recommends a dire need for close monitoring and evaluation of the implementation of NSSF by the Department of Education to obtain results and to improve school safety. All stakeholders should be responsible for the implementation of NSSF in schools. The school management teams should ensure that school safety committees are in place, and they receive proper trainings to capacitate them with new ideas of how they should implement the framework to curb gangsterism in schools. The department should ensure the appointment of relevant personnel at district level to support schools and monitor progress of implementing NSSF in schools.

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TRANSFORMING PEDAGOGY THROUGH IMPLEMENTING SMALL GROUP TEACHING STRATEGY IN THE INTERMEDIATE PHASE CLASSES OF CAPRICORN EDUCATION DISTRICT

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Abstract

Small group teaching strategy plays a vital role in keeping learners focused, active and collaborating with their peers. These enable them to have better skills such as teamwork, leadership, problem solving, decision-making, goal setting and time management. Despite the benefits associated with small group teaching strategy, the challenges of learners who cannot take responsibility for their learning prevails. The challenges that prevailed influenced the researcher to carry out the investigation. This paper adopted educational change model with three phases of change; namely, initiation, implementation and institutionalization. This theory states that when implementing change one has to look for the characteristics of change. The implementation of a programme should be relevant to intended people with clear goals and objectives. Interpretive qualitative research was adopted where intermediate phase were classes were studied from the Capricorn Education District. The sample of nine teachers from three selected schools was purposively selected. Semi-structured interviews and observations were the tools used for data collection. Anonymity and confidentiality were maintained throughout the study. The findings reveal that teachers experience challenges with implementing small group teaching strategy. In addition, overcrowded classes, lack of resources when implementing small group teaching strategy worsen the situation. Therefore, the study recommends training for teachers focussing on transformed teaching strategies that are learner-centred. The training can enable teachers to implement small group teaching strategy. In addition, the departmental officials should visit schools regularly to support teachers and improve the implementation of small group teaching strategy.

Keywords: Intermediate phase, Monitoring, Overcrowded classroom, Pedagogy, Small group teaching, Support, Strategy, Transformation

INTRODUCTION

Teachers are the key contributors to the transformation of education in South Africa (Department of Education (DoE), 2003). It is important for teachers to have a better understanding of different strategies that teachers can use when teaching to transform their pedagogies and engage learners. For example, small group teaching strategy is a strategy that teachers can use when attempting transform their pedagogies with the aim to encourage learner engagement. Group teaching strategy is a teaching strategy that aims to transform the pedagogy as it encourages dialogue and collaboration within the group where the teacher assumes the role of being the facilitator (Mills & Alexander, 2013). Teachers have to create a suitable and conducive learning atmosphere for learners to interact freely with other group members to achieve common goals (Lazarovitz, 2007; Brindley, Walti & Blaschke, 2009; Erten, 2011). This is important for small group teaching as learners have opportunities to engage and share ideas with each other (Otienoh, 2015).

When learners are working in their small groups, they are able to work as a team, retain knowledge acquired, learning enthusiasm, self-directed learning and critical skills increase. Learners benefit from small group teaching as they can test their thinking and encourage

accountability during learning process. According to Meo (2013), during the small group teaching, learners acquire leadership, teamwork, problem solving, decision-making, goal setting and time management skills. When implementing small group teaching strategy, a teacher must ensure that the approach matches the objective and the structure for the benefit of the learners. When implementing the teaching strategy, teachers have to talk less and become facilitators while learners are taking responsibility for their learning (DoE, 2009). Once teachers fail to facilitate teaching during small group teaching, learners struggle and lack understanding (Legault, Green-Demers & Pelletier, 2006). In addition, another factor that compromises the implementation of small group teaching strategy is overcrowded classes where at times teachers have difficulty with managing classes and maintain discipline among group members. The challenges with implementing small group teaching influenced the researcher to carry out this investigation.

There are numerous benefits associated with transformed pedagogies in any class. For example, teaching and learning processes can be effectively organised when learners are active in classes and when they socialize with their classmates (Erten, 2011). When learners attend to teaching activities in class, they can learn more effectively and enjoy learning more as they learn together with their classmates. Hence, Chiriac and Frykedal (2011) suggest that small group teaching enhance learners' learning and socialization skills. Learners benefit more from groups through the information shared than when studying alone. When learners learn in groups the experiences brought by the variety of backgrounds and experiences of group members widens the knowledge of the subject matter (Surgenor, 2010). Teacher should group learners in the beginning of the lesson and ensure that the learners have responsibilities during the learning process (Burke, 2011; Hodges, 2017). Even though small group teaching strategy benefits learners more when they are learning, there are noticeable challenges that about this teaching strategy (Edmunds & Brown, 2010). Teacher training provide a vital role in a proper implementation of small group teaching strategy. Although there is evidence that teachers received training, the teacher training seems to be generic, of poor quality, and inadequate in providing real support for curriculum delivery (DoE, 2009). This is despite what Nkambule and Amsterdam (2018) suggest that teachers need support to implement small group teaching strategy in their intermediate phase classes. In addition, literature suggests that most teachers experience challenges due to lack of support from subject advisors in implementing transformed strategies that enhance effective teaching and learning in schools (McKenzie, Bantwini & Bogan, 2013).

The increasing numbers of learners in classes contribute to the effective implementation of small group teaching strategy (Azizinezhad, Hashemi & Darvishi, 2012; Nur, Shamsidar & Mawar, 2013). Nowadays classes are overcrowded and this creates an inconvenient classroom environment for learners and teachers, hence, teachers need to be prepared to implement such strategies in their classes to ensure that they adopt transformed pedagogies to benefit learners.

THEORETICAL FRAMEWORK

This paper is guided by educational change model that is based on three phases of change: initiation, implementation and institutionalization (Fullan, 1989). These phases influence each other. With the initiation phase, the important factors are relevance, readiness and resources (Fullan, 1989). Relevance refers to the recognition of teachers that are going to form part of the innovation of some of the things in the education system, for example the introduction of small group as one of the teaching strategy. Readiness involves teacher's ability to initiate small group teaching in their classes and how best are they prepared for that.

While with resources, physical equipment, finance and time are core in the implementation of small group teaching. Any development that takes place in the initiation stage should be put into practice (implementation) phase. Implementation phase is affected by three main factors; namely, characteristics of the innovation, local characteristics and external factors (Fullan, 1989). The last phase is institutional which refers to the relationship between the school system, school, and teachers (Fullan, 1989). This theory is relevant for this paper because transformed pedagogies are as a result of change when education system was transformed in South Africa. In addition, the theory explores the important elements of change that people should observe and understand for any implementation.

Aims /Objectives

This paper aims to examine how pedagogy is transformed when implementing small group teaching strategy in the intermediate phase classes of Capricorn Education District.

Research questions

- How do teachers implement small group teaching strategy?
- What challenges do teachers encounter when implementing small group teaching strategy?
- How are teachers supported to implement small group teaching strategy?

METHODS

This paper followed the interpretive paradigm and adopted qualitative approach. Interpretive paradigm's focus is on observation and interpretation, make meaning of the information by judging the match between the information and abstract pattern (Antwi & Hamza, 2015). With the interpretive paradigm, subjective experiences of individuals through employing meaning oriented methodologies, such as interviewing, participant observation and subjective relationship between the researcher and subjects are important. The research chose interpretive paradigm to explore the implementation of small group teaching strategy. Qualitative research approach is a way of knowing in which a researcher gathers, organizes and interprets information obtained (Lichtman, 2010). Qualitative research tends to be holistic as it attempts to provide comprehensive descriptions of peoples' experiences and the meaning they construct from interactions with other people and things in their environment (Springer, 2010). This may allow teachers to give their views about how they implement small group teaching as a teaching strategy. A case study design is the appropriate design for this paper because case study design advocates for studies undertaken in a naturalistic setting and can give information on both relationships and processes (Denscombe, 2010). In addition, case study design allows the researcher to gather a detailed information with narrow focus (Mukherji & Albon, 2015). For this study, the research participants were selected purposively where data was collected through non-participant observation (Bertram & Christiansen, 2014) and semi-structured interviews (Maree, 2010). Through purposive sampling, the researcher ensures that the participants selected have particular characteristics and knowledge required for the study being investigated (Cohen, Manion & Morrison, 2007). Data collection was through semi-structured interviews conducted with all the nine teachers selected from the three primary schools and the classroom observation for two lessons per school. Trustworthiness and credibility through data triangulation and member checks were maintained to ensure quality of the data collected (Guba & Lincoln, 2001). The raw data from the interview and observation were transcribed, coded and categorized into themes used for collecting data. All ethical considerations are adhered to as the researcher ensured the safety of all the participants (Wisker, 2018).

FINDINGS

The findings of the study are based on the priori-themes used to collect data for the study about the implementation of small group teaching strategy in intermediate phase classes. The priori-themes include the implementation of small group teaching strategy, challenges of implementing small group teaching strategy and the support provided for teachers to implement small group teaching strategy.

Implementing small group teaching strategy

From the data collected, teachers gave different views about implementing small group teaching strategy. School 1 Teacher 1 (S1T1) indicated that;

When implementing small group teaching strategy in my class I manage and facilitate the discussions in small groups and ensure that all learners are actively involved throughout the process.

While School 1 Teacher 2 (S1T2) responded by saying;

I make sure that I facilitate all the discussions and make sure that all the groups are functional when learning takes place in class.

Teacher 3 from the School 1 (S1T3) indicated that;

I always make sure when implementing small group teaching strategy I maintain order, discipline throughout the teaching and learning process to ensure that learners understand the task and their roles to play during the learning process.

From school 2, three teachers interviewed came with different views about their implementation of small group teaching strategy. Teacher 1 (S2T1) responded that;

When implementing small group teaching, I make sure that I understand learners that are in the group knowing that each learner is unique and needs different treatment.

While S2T2 from the same school mentioned that;

As a teacher, I manage the group, manage group activities, leading discussions and building communication skills.

Teacher 3 from School 2 (S2T3) acknowledges learners with difficulties and pointed out that;

I always make sure that I facilitate in order to identify learners with different learning needs.

When teachers from school 3 were interviewed, S3T1 mentioned that;

When implementing small group teaching strategy, I often encourage participation of learners. In addition, I also observe whether learners adhere to the rules of the group discussions e.g. respecting one another's ideas, listening and not interrupting the discussions.

In addition, S3T2 said;

I usually manage the groups, supervise and maintain discipline in all groups. Teachers also check if the roles given to learners help them do the work.

From the same school, S3T3 mentioned that;

As the teacher I explain and guide the group on what is expected of them and clarify the concepts where necessary. Teachers also enable group members to explore the tasks given and come up with solutions.

It is evident from the data collected that teachers from these schools have an understanding of what teachers need to do when implementing small group teaching strategy. Some teachers understand that when this strategy is used, the teacher need to become a facilitator than the teacher who dominates and be at the centre of teaching and learning environment. Another important revelation is for the teacher to provide clear guidelines to the learners before they engage as groups, monitor learners' progress as they work with peers and ensuring that learners have grasped the necessary instructions. This in a way enables the teacher to identify the learners who are bullies. Despite that, teachers have an understanding of how to implement small group teaching strategy, there are identified challenges that affect the implementation.

Challenges of implementing small group teaching strategy

Although, from the previous section the research participants show understanding in implementing small group teaching strategy, there are challenges identified. With school 1, teachers faced numerous challenges as a result S1T1 reported that;

Most of the learners do not participate fully they hold back their ideas. Some learners withdraw themselves from participating in the groups.

From the same school, S1T3 outlined the challenges that they experience when implementing small group teaching strategy and indicated that;

The arrangement of learners in groups is a challenge, as I do not know the criterion to use in grouping learners based on learners' different understanding. In addition, lack of facilities and some learners are not cooperative and are impatient with those who have learning difficulties.

From School 2, teachers experience challenges with implementing small group teaching strategy. The School 2 Teacher 2 (S2T2) mentioned that;

Lack of learner participation in small group is a challenge because learners are misbehaving in the groups and some of the learners take advantage of other learners in the group and end up discussing something different from the given task.

Teacher 3 (S2T3) pointed out that;

Large number of learners in the classrooms challenge the implementation of small group teaching strategy. In my class, I have more than 70 learners and maintaining the stance of a facilitator is challenging as it becomes difficult at

times to effectively monitor what learners do when in groups. In addition, the shortage of learner support materials challenges the implementation, as learners do not focus when working in their small groups.

Teachers from school 3 also share the challenges they experience when implementing small group teaching strategy. School 3 Teacher 1 (S3T1) responded that;

The challenges that I come across in my class are discipline, minimal commitment and participation from learners towards the group.

Just like T3 from School 2, S3T2 also mentioned that;

Lack of teaching resources is a challenge when implementing small group teaching strategy and this makes it difficult, as groups have to take turns to share resources with other groups.

S3T3 revealed that;

We have bullies in the classrooms who are destructive to other learners from participating in the groups. In addition, talkative learners overpower the less talkative learners as a result those learners withdraw from being active in class and makes them to relax when they have a task to do.

From the data collected, it is evident that teachers experience challenges when implementing small group teaching strategy. Although they have challenges, they revealed numerous challenges from overcrowded classes resulting in the inability to monitor what learners do when in groups, inability to group learners according to their abilities, unavailability of resources, managing talkative learners from dominating the group, etc.

Supporting teachers to implement small group teaching strategy

The implementation of small group teaching strategy is important for any teaching and learning. For teachers to transform pedagogies they require support to overcome the challenges. During the data collection phase from schools, the data suggest that teachers never received any support or training to implement small group teaching strategy. From school 1, teacher 1 (S1T1) indicated that;

The knowledge I have for small group teaching is through theory during my undergraduate years. The teacher education training was useful but there was no enough time for practical.

In support of what teacher 1 (S1T1), S1T2 also pointed out that;

The understanding of small group teaching strategy I got it from the university during my study through theory and practical. The training was useful, because it helped me to know that this teaching strategy can help me to reach out to all learners with different abilities in my class.

In addition, S1T3 indicated that,

I have never received any training on how to implement small group teaching strategy. I believe that if I had received any training, this might have helped me a lot in the implementation of small group teaching strategy.

From the data, it is clear that the research participants never received any support in implementing small group teaching strategy. It also emerged from the data that through their teacher development programme they gained knowledge about small group teaching strategy. This gap contributes to the implementation challenges.

DISCUSSION OF FINDINGS

The data revealed that teachers are aware of what is entailed in the implementation of small group teaching strategy even though they are unable to execute them practically when teaching in the intermediate phase classes. On the other hand, literature suggests that teachers are key people in mediating the dynamics of the group and in establishing the appropriate tone within a group (Mills & Alexander, 2013). When small group teaching strategy is implemented, the teacher must group learners before the lesson commences for learners to set ground rules for productive conversation when doing the task (Burke, 2011; Hodges, 2017). In addition, the teacher as a facilitator needs to create an environment that allows learners in groups to learn and share their ideas with others with no fear. Hence, Brindley, et al. (2009) argue that learning environment must be supportive and empowering to encourage the implementation of small group teaching strategy. According to Otienoh (2015) the effectiveness of implementing small group teaching elevates interaction amongst learners, promote learning and understanding amongst learners. When small group teaching is adopted, it is easier to monitor and control learners when in groups than when doing individual work (Otienoh, 2015). Moreover, when learners work in their small groups, they learn more from their peers through social interaction (Otienoh, 2015). This is because when learners are in groups they learn fast with their peers than when taught by the teacher. However, implementing small group teaching is a challenging task.

According to Edmunds and Brown (2010), teachers experience challenges with enhancing learners' participation when implementing small group teaching strategy. At times, handling misbehaving learners when working in groups is another daunting task for teachers. This results to inefficiency when it comes to implementation of small group teaching strategy. The increasing numbers of learners in classes contribute to the effective implementation of small group teaching strategy (Nur, Shamsidar & Mawar, 2013). For example, nowadays classes are overcrowded and this creates an inconvenient classroom environment for learners and teachers. The literature reveals that the size of the classroom has more impact on the management of the classroom (Azizinezhad, et al., 2012). This is because some learners may not speak in a group with more than 10 participants. In addition, this challenges teachers when it comes to assessing learners' participation (Surgenor, 2010). This situation is exacerbated by the departmental officials who are invisible in schools to support teachers to implement small group teaching strategy properly. According to Nkambule and Amsterdam (2018), in South Africa teachers require more support to adjust their pedagogies for the benefit of the learners in their classes. As stated by McKenzie, et al. (2013), Nkambule, and Amsterdam (2018), for teachers to transform their pedagogies to cater learners' different learning styles, teachers require support to implement small group teaching strategy successfully.

CONCLUSION

In conclusion, it is evident from the data collected that teachers understand the benefits of implementing small group teaching strategy and the roles that teachers need to assume in class when learners work in groups. Most teachers received training while they enrolled for their undergraduate qualifications, however, they still experience challenges with implementing small group teaching strategy. This is worsened by unavailability of in-service training organized for teacher to implement small group teaching strategy. In addition, overcrowded classes is another challenge that affects the implementation of small group teaching strategy. This contributes to teachers' ability to monitor learners as they work in groups, hence, teachers need training on how to implement small group teaching strategy in intermediate phase classes.

RECOMMENDATIONS

The study recommends training of teachers to implement small group teaching strategy to transform pedagogies in their intermediate phase classes. Regular school visit by departmental officials to enable teachers implement small group teaching strategy. Departmental officials need to conduct needs analysis in order to understand the schools' needs. Through regular visits and needs analysis by department, a schedule of monitoring and supporting endeavors for teachers should drafted and shared with schools.

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DISTRICT SUPPORT IN THE IMPLEMENTATION OF INCLUSIVE EDUCATION POLICY IN SELECTED MAINSTREAM PRIMARY SCHOOLS OF CHRIS HANI WEST EDUCATION DISTRICT

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Abstract

Inclusive education (IE) as a vehicle for quality education is gaining a global momentum. Central to IE is equitable access to education, which accommodates the learner diversity including those learners who experience learning difficulties and who experience exclusion when having to attend same schools with their peers. In responding to this gap, most African countries such as South Africa introduced inclusive education policy. The policy was spearheaded by the Department of Education with the aim to support learners who experience learning barriers and for them to be accommodated in the mainstream provision. This transformation affected teaching and learning, teachers had to adopt pedagogies and diverse assessment strategies that accommodate all learners in their classes. This paper aims to examine the district support in the implementation of inclusive education policy in selected mainstream primary schools. The theory of implementation by Rogan and Greyson was adopted for this paper as it builds on the strengths of different educational stakeholders, such as teachers, parents, learners and the district officials. The theory looks at what constitutes a good practice, monitoring system, resources, professional development and support provided by the outside agencies to facilitate innovation in schools. This paper adopted an interpretive qualitative research and semi structured interviews were used to collect data from twelve purposively selected research participants. The results revealed inadequate visitation of schools through classroom-based visits and follow-up by the members of DBST. In addition, limited teacher monitoring and support challenge effective implementation of inclusive education. Inadequate support for teachers and infrastructural problems worsen the situation. This paper recommends that teachers receive adequate training on implementation of inclusive education at school level. This paper also recommends strengthened collaboration of all stakeholders to support each other in implementing inclusive education.

Keywords: District Based Support Teams, Implementation, Inclusive education, Learning difficulties, Mainstream school, Stakeholders

INTRODUCTION

Disability is a global and national phenomenon and is estimated to have affected 93 million children at different levels of severity. Most of the children with learning difficulties are out of school (Lewis & Bagree, 2013). The segregation of learners with learning difficulties culminated in the Salamanca Declaration of 1994 that advocates for accommodation of learners with special needs through inclusive education (Engelbrecht, Nel, Smith & Van Deventer, 2016; UNESCO, 2005). The aim was to create communities that are more open, welcoming and inclusive to all learners regardless of their difficulties. Despite the efforts made to ensure that learners remain in school, the prevalence of learner exclusion prevails. This is also the case with South Africa, hence in 2001 South African Department of Education introduced the White Paper 6, Special Needs Education, Building an Inclusive Education and Training System (2001). Inclusive education policy aims was to transform the

nature of support provided to with learning barriers, particularly those with learning difficulties.

One of the significant support structures in accomplishing the goal of inclusive education was the formation of District-Based Support Teams (DBSTs) which consist psychologists, remedial/learning support teachers, therapists and other health and welfare workers employed by the DoE (Makhalemele & Nel, 2016). The primary role of DBSTs is to conduct on-site training workshops, classroom support visit, monitor implementation of inclusive education, give feedback, do follow-up and provide necessary resources (Department of Education [DoE], 2001; DoE, 2005). Their key role amongst other things is to promote effective teaching and learning, provide administrative support and deal with inclusive education implementation challenges. DBSTs need to make sure that teachers know, understand, interpret and implement inclusive education policy effectively. DBSTs have to conduct a needs analysis to find gaps in the implementation of inclusive education and support teachers based on their needs. As stated by Department of Basic Education (DBE), 2011), teachers need to mediate learning in their classrooms and cater for learners with varied needs. In addition, a deeper understanding of the differentiated instruction as responsive teaching remains a challenge for the teachers. Similarly, the lack of an empirically based, resource pool of differentiated instructional strategies as reference for teachers still exist. Consequently, teachers often feel ill prepared in implementing inclusive education in their classes (Engelbrecht & Green, 2007). The identified challenges triggered the researcher's interest to investigate this phenomenon.

As stated in PCG (2006), one of the roles of DBST is to offer support to teachers to ensure that they implement policies successfully. The support provided is informed by the schools and teachers' needs; hence, needs analysis is done before providing any support. Needs analysis ensures that the support provided addresses the needs of the schools and teachers. However, Bantwini (2016) reported teachers do not get adequate support from the school heads and school communities when implementing inclusive education. Seemingly, adapting the curricula to meet various learning needs remain a challenge (Kanjere & Mafumo, 2017). This has implications for education as learners with learning difficulties continue to be excluded in the mainstream schools. However, with inclusive education teachers should provide instructional adaptations and modifications to support learners with learning difficulties. The scarcity of literature on teacher support for effective implementation of IE misinforms the decision makers on the best teacher support strategies that can meet the local needs. These knowledge and information gaps further hinder effective monitoring and support of IE.

Monitoring and support provision for teachers

Luning (2015) indicated that despite the training meant to support teachers, more efforts are needed for an intensive training for teachers to confidently face inclusive education settings. This is because once-off training workshops do not adequately prepare teachers to implement the programme successfully (Luning, 2015). Henceforth, teachers suffer from inadequate information and skills to improve and develop suitable learning-teaching events; an impediment towards embracing diverse learner inclusion in their classrooms (Mullick, Deppeler, & Sharma, 2012). On the other hand, Deku and Vanderpuye (2017) lament that, training workshops are almost non-existent and when exist; areas covered are insufficient, and teachers are left unequipped in teaching learners with learning difficulties in inclusive classrooms. Hence, teachers perceive them as inadequately equipped for the implementation of inclusive education and they experience challenges when implementing inclusive

education. This has repercussions for inclusive education as learners with learning difficulties remain excluded, as teachers are not supported adequately. This challenges teachers when implementing inclusive education.

International and local researchers recognized some challenges that continue to obstruct progress worldwide in implementing inclusive education. The challenges encountered include but not limited to inadequate teacher support, poor resource allocation, parental involvement, and so on (Bantwini & Diko, 2011; Al-Dababneh, 2016; Page, Boyle, McKay & Mavropoulou, 2018). The identified challenges also affect the implementation of inclusive education.

THEORETICAL FRAMEWORK

Theory of implementation founded by Rogan and Greyson in 2003 was adopted for this paper as it builds on the strengths of different educational stakeholders. The theory looks at what constitutes a good practice in the implementation of the policy. The theory has three major constructs, namely; profile of implementation; capacity to support innovation and support by outside agencies. The three constructs enabled the researcher to examine how DBST's provide support to teachers when implementing inclusive education in mainstream primary schools.

Profile of implementation looks at the role played by DBST's in the implementation of inclusive education in mainstream primary schools and the nature of support provided to teachers by DBSTs and how adequate is the support provided. Capacity to support innovation appreciates and elaborates on factors that either support or hinder the implementation of new ideas and practices in a system such as a school. Poor resources can limit the performance of best teachers. For the purpose of this paper, teacher capacity refers to the teachers' qualification and specialisation while learner factor refers to the parental involvement. School ecology and management factors talk to the quality of leadership.

Aims / Objectives

This paper examines the district support in the implementation of Inclusive Education Policy in selected mainstream primary schools.

Research questions

- How do teachers perceive the on-site support rendered by DBST's in implementing inclusive education?
- How are teachers monitored and supported in implementing inclusive education?
- What challenges do teachers experience when implementing inclusive education?

METHODS

The paper adopted qualitative research approach for the researcher to comprehend the participants' perceptions about the district support in implementing inclusive education in mainstream primary schools. The researcher chose case study design. According to Leedy and Ormrod (2010) case study is a unit of human activity entrenched in the real world. This design allows researchers to preserve the universal and significant features of actual life events (Yin, 2014). The researcher sampled the research participants using purposive sampling. The sample comprised of three DBST's, six teachers and three principals of the three selected primary schools. The research participants chosen are the relevant people to shed the light about the district support in implementing inclusive education.

Data collection

The data gathered from chosen sample was through semi-structured interviews. The researcher chose semi-structured interviews with the aim to obtain specific information about the phenomenon under study (Creswell, 2014). The researcher conducted face-to-face interviews with DBSTs, SMTs and teachers. The permission sought was granted by the district office and schools to conduct the research. The researcher requested the participants to complete and sign informed consent. Ethical considerations were adhered to where confidentiality, anonymity, prevention from harm are guaranteed (De Vos, Strydom, Fouche & Delport, 2011). Participation in this research was voluntary, hence, participants had the right to withdraw from participation at any point if they wished to do so (Koshy, 2010). To ensure accuracy of the data, the researcher used tape recorder to capture the information during the data collection stage.

Data analysis

Data analysis makes sense of the collected data to identify the common trends that emerged from the participants' responses (Merriam, 2009). In addition, during the data analysis, information is categorised, interpreted in terms of common themes and synthesised into an overall portrait of the cases (Patton, 2015). However, for this paper, the research used priori-themes to collect data. These are the themes used to collect data as influenced by the research questions. The researcher ensured that the principles of trustworthiness and credibility throughout the research were adhered to through triangulation, participant verbatim language accounts and member checking outlined in qualitative research. After the data was organized, a brief summary of the themes from the interviews sent to each participant to further establish credibility and enhance authenticity of the findings. For the identified schools and participants, the researcher used pseudonyms to ensure anonymity. For example, for DBST officials, in this paper they are DBST1, DBST2 and DBST3. With principal or SMT members, the researcher used SMT1, SMT2 and SMT3. Lastly, for six teachers, for this paper they are T1, T2, T3, T4, T5, and T6

FINDINGS

The data was collected through pre-determined themes and no themes emerged from the data as the research instruments designed according the themes. The findings of the study to be analysed are; required on-site support visit, provision of monitoring and classroom based support and challenges of implementing inclusive education.

Required on-site support visit

The findings revealed that all the teachers who were interviewed identified lack of support as the main barrier for effective implementation of IE. When asked about support received from DBST in implementing inclusive education, all teachers including SMTs from mainstream schools indicated that no inclusive education training workshops were conducted in schools. For instance, T1 revealed that;

We never received support from the DBST members, they come to school for other businesses not for the inclusive education training.

Similarly, T4 indicated that;

It is not that they come to schools and show/help us with IE. They have not come to our school.

Member of SMT 2 confirmed that;

Let me be frank, currently, there is no support.

The results are clear that no support teachers get in implementing inclusive education. While the participants lamented on lack of support on implementing inclusive education at school level, the DBSTs had different views. DBST2 stated that;

When we visit schools as the department, we mainly focus on administrative work where we check or monitor the SBST minute book. We do verification on capturing of Learners with Special Education Needs (LSEN) on SA-School Administration and Management System (SA-SAMS). We also check the functionality of School Based Support Team (SBST).

This is an indication that there was on-site support visit has not taken place in the schools where the study was conducted. The researcher noticed that the DBST's school visits are administrative not technical.

Provision of monitoring and classroom based support by DBST

Most participants expected DBST to monitor the implementation of inclusive education in schools and demonstrate how to teach learners with learning difficulties. The workshops conducted were inadequate due to absence of proper and scheduled follow-up visits. During the data collection process, T4 indicated that:

After once off training held by the department, no follow done and suffer in silence and this frustrates us.

Just like T4, T5 emphasized that;

We do not see DBST coming to school for follow up. In addition, even in Integrated Quality Management System (IQMS) we mentioned these challenges, however, no follow up from the district.

Most teachers had challenges of support, and T3 mentioned that;

When learners with challenges are referred, nothing is done. We really need support from DBST because the support we are offering these learners is so limited.

From the responses given by teacher, it is evident that teachers do not receive the anticipated support from the department and this may affect the implementation of inclusive education. There is evidence from the data collected that teachers are inadequately supported nor monitored when implementing inclusive education. There is no doubt that this situation may challenge the implementation of inclusive education in mainstream primary schools.

Challenges of implementing inclusive education

From the previous section teachers mentioned inadequate support and no monitoring done by district officials as among the problems that may affect the implementation of inclusive education policy in mainstream primary schools. Teachers mentioned some challenges with regard to the implementation of inclusive education, for example, no formal training received to teach learners with learning difficulties in their mainstream classrooms. T1 said;

Mainstreaming of learners with learning difficulties was not part teacher training.

T3 shared similar sentiments:

I never received any training on IE in my initial training. Now the training is one day only and is inadequate, there is a need for further training.

From this excerpt, teachers lack the important skills and knowledge needed to support learners with learning difficulties in their classrooms. This means that their qualification did not include any of the special skills to accommodate learners with learning difficulties in their instructions. T4 asserted that:

Although, I did Advanced Certificate in Education (ACE): Special Needs, I have challenges with implementation because of support from DBST. The issue of mainstreaming learners with difficulties is challenging when it comes to supporting them.

T6 echoed;

Limited skills in dealing with learners with difficulties is a challenge. Another challenge is inadequate resources that facilitate the implementation of inclusive education. I think if we can have teaching aids like audio-visuals in our classes, learners with barriers can improve and can participate better if we have resources.

SMT2 supported;

Resources that we are having do not cater for teachers to teach learners with difficulties. We use similar textbooks for all learners in our classes with no differentiation.

The above excerpts suggest that teachers have challenges when implementing inclusive education. Most of them never received training in their initial teacher training and inadequate infrastructure and equipment is another worrying factor as it may affect the provisioning of educational support services when implementing inclusive education. While teachers shared their concerns, DBSTs' have challenges too. DBST3 indicated that;

Human resource is a challenge that makes it difficult for regular school visit.

DBST1 supported;

We do not have capacity due to shortage of human resource, we are few and the official assigned to those circuits retired. Now, we help where we can as we have our circuits.

Similarly, SMT2 affirmed the shortage;

The challenge we have with the district office is the one of inadequate personnel to support schools. At times, unavailability of transport prevents them from visiting schools.

From the above excerpts, DBST's have identified transport and inadequate human resources as challenging the implementation of inclusive education in mainstream primary schools. It also means that they cannot visit the schools regularly or attend to all the reported problems adequately and in time.

DISCUSSION OF FINDINGS

This section discusses the key findings of the study and identifies the knowledge gaps and the implications for the study towards addressing those gaps. The findings discussed are required on-site support visit, provision of monitoring and classroom based support and challenges of implementing inclusive education. Although the on-site support visit is what teachers in schools looked up to when implementing inclusive education, some schools were visited once for administrative routines while some have not been visited at all. From the PCG (2007) DBSTs are to visit schools at the beginning of the year for school readiness where the focus is mainly on auditing of curriculum structures, curriculum documents, and LTSM and workshop attendance. This implies that what teachers and SMT's expect from the DBST's is not their line of duty as stated in PGC (2007) document. The teachers' expectations are in line with Nel, Müller and Rheeders (2011) that, DBST's have to follow up referred cases and provide teachers with feedback. However, teachers indicated that no classroom-based and follow-up support received from DBSTs and this may affect the support of learners with learning difficulties in their classrooms.

The participants expressed the concern about the training given as inadequate. They believe that it would be much better if the DBSTs showed them practically how to teach learners with learning difficulties. They are not happy with including learners with learning difficulties in their planning without proper training. Just as stated by Luningo (2015) inadequate training may influence the implementation of any planned programme. This may result in teachers' inability to support learners with learning difficulties in their classrooms.

Studies indicate that since the launch of inclusive education, teachers have struggled with implementation issues in their respective contexts (Bantwini, 2010; Bantwini & King-McKenzie, 2011). In addition, teachers indicated a lack of skills and competence to accommodate learners with learning difficulties in their classes is the major challenge; hence, support is crucial in order to implement inclusive education. When inclusive education was introduced, the aim was to ensure that learners with learning difficulties are in mainstream classes with their peers and not be excluded from their peers. Although inclusive education advocated for differentiated curriculum, this may be difficult to achieve in schools because of the challenges that teachers encounter in implementing inclusive education. This paper wished to encourage the district officials to support teachers through structured training with follow-up sessions meant to monitor how teachers implement inclusive education. On the other hand, shortages of human and physical resources are other challenges identified. Bantwini and Diko (2011) reported that one of the critical issues facing school districts is the deficit of human and physical capacity and this may affect officials from effectively servicing schools and the teachers. This may affect teachers in schools when implementing inclusive education.

CONCLUSION

In conclusion, as the study investigated the district support in implementing inclusive education in mainstream primary schools, teachers did not receive adequate support and this affected the implementation of inclusive education in schools. The training workshops conducted were inadequate and the duration was short making teachers to experience challenges when implementing inclusive education. In addition, numerous implementation challenges emerged from data, for example, inadequate resources including human and physical resources. The identified challenges contributed to the implementation of inclusive education in mainstream schools. From this paper, it is evident that the DBST's support to

teachers in implementing inclusive education is inadequate and this may be due to inadequate resources and human resources at departmental level.

RECOMMENDATIONS

Based on the findings of this study, there seems to be a gap between the policy and the implementation. Hence, this paper recommends for teachers be re-orientated and thoroughly trained on implementing inclusive education in mainstream primary schools. After the training, the DBSTs need follow-up sessions with schools to ensure that teachers implement inclusive education in class. In addition, more capacity from the DBSTs to provide teachers with necessary skills and support to address the implementation and infrastructural challenges. This paper also recommends strengthened collaboration for all stakeholders to support each other in implementing inclusive education in mainstream classrooms.

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PERFORMANCE APPRAISAL AS PART OF INSTRUCTIONAL SUPERVISION: THE CASE OF TWO AFRICAN UNIVERSITIES

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Abstract

As part of instructional leadership line managers or chairs of departments are responsible for appraising the performance of academic employees in their respective departments. The purpose of performance appraisal is to find out the strengths and gaps or weaknesses in employees' performance of their duties with the view of either rewarding or taking remedial measures to improve their skills and knowledge for increased productivity. Conducting appraisal of employees who perceive the exercise as an opportunity to obtain monetary rewards can be arduous, contentious, frustrating and intimidating. The primary aim of the study was to explore the experiences of heads of departments and the perceptions of their subordinates regarding performance appraisal in two African Universities. The seemingly different aims of instructional leaders and supervisees in the two universities required investigation. The research design was exploratory as the study explored the experiences and perceptions of line managers and their subordinates regarding performance appraisals. The study employed the qualitative research method of interview to collect data from twenty-four randomly selected university employees and six purposively selected instructional leaders to participate in the study. The results of the study indicated that many of the university employees are less informed about the purpose of performance appraisal and this has serious implications for management of employee performance and productivity. The conclusion drawn from the results was that for performance appraisal to serve its purpose the universities need to educate their employees about its rationale.

Keywords: Financial incentives, instructional supervision, performance appraisal, strengths, supervisee, weakness

Introduction and Background to the Study

Instructional supervision is an important aspect of educational leadership in higher education institutions. In institutions such as universities educational leaders like line managers and chairs of department perform instructional supervision to ensure quality teaching, learning, research and community engagement. As part of supervision of instruction educational leaders or line managers often appraise the quality of the work, skills, knowledge of their subordinates. In the terminology of human resources practices this activity is referred to as performance appraisal. The output of any organisation depends on the performance of its individual employees hence the need for appraisal to ensure higher and quality productivity. As Abbas, Iqbal, Waheed & Riaz (2012) transformative leadership involves inspirational motivation and intellectual stimulation of subordinates. Walton (2010) adds that outstanding leaders go out of their way to boost the self-esteem of their personnel. If people believe in themselves, it is amazing what they can accomplish. The onus is therefore on instructional leaders to use performance appraisal to motivate their subordinates to work harder for the achievement of organisational goals. The individual's performance in an organisation such as the university may be enhanced through the feedback from performance appraisal. The assessment of performance of employees in any organisation should be from the grassroots

i.e. from the last labourer to the Chief Executive Officer (CEO). Every organisation needs quality and skilled employees to enable it increase production, deliver on its mandate, achieve its goals, attract more clients and remain relevant to its customers. To do this they must identify the strength and weaknesses in their employees to enable the organisations to provide their non-performing staff with relevant interventions to enable them function optimally higher productivity.

The Value of Performance Appraisal to Organisations

Park & Kim (2017) posit that performance management is being used throughout all governmental entities in the public sector and as a result, consideration is given to how a newly established policy relates to job functions and performance. The term performance management or appraisal can mean different things in different situations. In this article appraisal refers to the monitoring and management of employees' performance to increase productivity. Cohen & King (2017) intimate that all organisations are increasingly facing question around their sustainability. The need to remain relevant and sustainable therefore motivates organisations to manage the performance of their employees. Performance appraisal is not only for compliance to the demands and rules of organisations but most importantly for good governance to ensure sustainability of organisations. To ensure organisational sustainability human resource defines strategies to communicate and execute plans and support employees through a life-changing event that can make a critical difference to individuals and families within the community. One way of changing or improving the conditions of work and production is to find out how employees perform and what can be done to assist them work better and harder. Performance appraisal can be broadly categorised as developmental appraisals focusing on both training to address short-term issues and on long-term career needs and evaluative approach; focuses on managerial control and judgement. This is echoed by Groesch's (2003) suggesting that the basic concept of the appraisal process identifies the improvement and development of people; and the key purpose of appraisal is to identify people's performance. In addition, Rudman (2003) refers to performance appraisal as "performance planning and review". He sees performance appraisal as a process of planning an employee's future work, goals and objectives, reviewing job performance and work behaviours, assessing progress towards the predetermined work goals, and discussing the employee's training and development (Rudman, 2003). Wong and Low (2018) contend that performance appraisal is necessary for managers to identify employees of high and low self-efficacies as workers with high self-efficacies are more likely to choose difficult (high) goals than those with low self-efficacy. By so doing management will be able to assign the goals to right people, which will result in better overall performance. Rudman (2003) agree that an organisation's performance appraisal system helps to meet its short-term and long-term goals and objectives by helping managers and employees do their jobs more efficiently and effectively.

Performance appraisal can be traced back to the third century China, and it is still being used today as a special form of evaluation which assists organisations to compare employees' actual performance against set expected outcomes. In fact, it is a process which assesses an employee's performance over a period of time (Raed, Teir & Zhang 2015). It is also a plan for the future and to discuss ways to do the tasks efficiently and effectively. Performance appraisal should however not be used as a tool to catch the lazy employee for punishment. In as much as possible, the outcome of individual performance during appraisal cannot be used as a way to punish an employee. However, mechanism could be put in place by management to curtail what seems to be the problem by the employee to be improved. For both the manager and the subordinate the process of appraisal should involve in an interview

where a performance agreement is signed between the two. At the end of the year the individual's job performance during the year is assessed and where there are gaps the manager prepares an action plan and provides remedial measures to ensure improved performance. Raed, Teir and Zhang (2015) attest that the capacities, competencies, skills and quality of human resources define the educational institution results. Universities as organisations therefore require quality human capital to accomplish their objectives. Since the major purpose of educational institution is to deliver quality education services the key factor in achieving this purpose to manage the performance of its employees. Raed et al (2015) intimate that developing human resources is an essential complex, continuous and high responsibility process for any organisation, which involves actions and activities to select and train new staff and to retain existing one. Human resource is therefore an essential asset to universities as organisations because it advances the competencies of the workforce for increased productivity. The emphasis of performance appraisal and management is on continuous improvement of organisational performance and this is achieved through improved individual employee's performance which is why constant appraisal is necessary to support employees. For effective management of employees' performance the University as an organisation should communicate its mission, vision, and strategies to its employees. It must also set performance targets for each employee as a strategy to meet the its own objectives and those of the employees. The results of performance appraisal are therefore used to identify development needs of employees, for administrative decisions and the continual review of the performance management system to ensure that it continues to contribute to the overall performance of the organisation.

Rudman (2003) intimates that performance appraisal techniques can be categorised into either a people approach, whereby high performance can only be achieved through the right people, or into a process approach, whereby the best procedural system is determined and adopted; but in reality, there is cross-over between the two approaches. He adds that for either approach to succeed, it must fit with the organisation's culture. Rudman (2003), points out that performance must be synchronised with the organisation's strategic plan and developed in harmony with each staff member's position or job description, but in practice this is not always so and therefore the process is often seen as a pointless chore. In relation to this study, the establishment of performance standards, performance appraisals, career planning for the employees, and discussing their development needs are part of an organisation's performance management. The assumption of the researchers is that money incentive can defeat the purpose of the appraisal system as a mechanism to identify talent and weaknesses for intervention. Intimidation, hatred and threats on the lives of instructional leaders who do the appraisals cannot make the results of performance management reflect the true performance or ability of the employee. This different aims of the organisation, instructional leaders and the supervisees can often lead to tension and conflict between supervisors and supervisees.

Problem Statement

Organisations and their instructional leaders see performance appraisal differently from employees. The perceived differences might create some challenges for the achievement of goals of organisations such as universities. The perceived challenges need to be identified and investigated for organisations' sustainable growth.

Objective(s) of the Study

This study was setup to explore employees' perceptions of performance appraisal in two African universities and how to make the exercise more meaningful and less stressful for both supervisors and supervisees.

Research Questions

The researchers formulated following research questions to guide the study:

- How do employees perceive or understand the performance appraisal system?
- To what extent is performance appraisal system used as part of instructional supervision in universities?
- What implementable measures can be taken to enhance overall job performance through performance appraisal in universities?

Theoretical Framework

This paper is underpinned by the Goal-setting and Expectancy theories. The two theories and their implications for the study are briefly discussed below.

Goal-setting Theory

The Goal-setting theory which was propounded by Latham and Locke (1979) highlights four mechanisms that connect goals to performance outcomes, as follows:

- directs attention to priorities;
- stimulates effort;
- challenges people to bring their knowledge and skills to bear to increase their chances of success; and,
- the more challenging the goal, the more people will draw on their full repertoire of skills.

This theory puts emphasis on performance management in setting and agreeing on objectives against which performance can be measured and managed. Goal-setting theory supports the agreement in setting objectives, feedback and the review aspects of performance management. The idea of setting a goal is underscored by a motive to get something done. It is a reason underlying a behaviour (Vahidnia & Fatemi, 2015) or what gets people going and keeps going till the accomplish important tasks. The theory asserts that people with specific and challenging goals perform better than those with vague goals, such as 'do your best', specific easy goals or no goals at all. Thus, the theory assumes that there is a direct relation between the definition of specific and measurable goals and performance. Wong and Low (2018) point out that leaders can introduce their ideas with the help of SMAR (Specific, Measurable, Achievable, Realistic and Time-based) goals and convince employees to achieve them so as to achieve higher performance and productivity. In short, managers know what they are aiming at because they are motivated to exert more effort on employees to increase performance. Challenging goals are usually implemented in terms of specific levels of output to be attained (Locke & Latham, 2008). It may be argued that goal-setting theory is associated with individual task performance rather than organisational performance (Verbeeten, 2008), although individual task performance can lead the overall organisational performance.

The effects of goal-setting are applicable to individuals as well as to organisational units (Maiga & Jacobs, 2005) and entire organisations (Locke & Latham, 2013a). A number of researchers including Locke & Latham, (2013a) and Wong & Low (2018) suggest a positive relationship between clear and measurable goals and performance. Compared to Maslow's need theory, Locke's goal-setting theory is considered to be more comprehensive in that it places emphasis on human intentional behaviour regarding motivation to work. Goal-setting theory can be useful in predicting job satisfaction, which is an important attribute for employee productivity and commitment to the organisation. Goal setting is not an easy task that can be done without careful analysis of employee's self-efficacy aligned with the task difficulty. It is not surprising therefore, that Rynes earlier (2007) reported that the positive effects of goal-setting was among the top five established findings in human resource management literature. Over 90% of the empirical studies on the topic have shown the positive effects of goal-setting on an employee's or a team's performance (Locke & Latham, 2013a). Some researchers have also experimented with the effects of goal-setting on performance outcomes. Goal-setting has a positive effect on performance because of its focus on specific high goal effect choice, effort and persistence. In other words, a specific goal or target increases a person's focus on what is to be accomplished as opposed to putting it off until a later time or date. Commitment to a specific high goal also leads to persistence until the goal is achieved (Latham & Locke, 2008). Goal pursuit encompasses the grandiose and the mundane, the deliberate and the subconscious. Goals include biological and social needs that are met through routine decision making as well as more abstract values and ambitions that drive an individual's personal projects (Camp, 2017). Goals are usually performance outcomes that individuals use for self-evaluation, criteria against which to assess, monitor and guide cognition. Indeed, they are aspirational, orienting the individual toward a desirable future state of affairs. The goal-setting theory has been acclaimed as among the most valid and practical theories of employee motivation (Camp, 2017). Wong & Low (2018) attest that motivation is always considered largely related to job performance and productivity. The more motivated the employee, the better performance they will have. Theories of motivation are believed to be practical in helping leaders to give a positive influence in productivity of the organisation.

Expectancy Theory

The expectancy theory, propounded by Vroom (1964) is also known as the *valence, instrumentality and expectancy* (VIE) theory. Vroom realised that an employee's performance is based on individual level factors, such as personality, skills, knowledge, experiences and abilities. The theory suggests that, although individuals may have different sets of goals, they can be motivated if they believe that there is a positive correlation between effort and performance, and that favourable performance may result in a desirable reward. The reward will eventually satisfy the need and the desire to satisfy the need is strong enough to make the effort worthwhile (Vroom, 1964). The theory is based on three aspects, *valence, instrumentality and expectancy*.

'Valence' refers to the emotional orientations people hold with respect to outcomes (rewards). It also means the depth of the needs of an employee for extrinsic reward (such as money, promotion, time-off, benefits, etc.) or intrinsic reward (such as Job satisfaction). For this reason management of organisations must make efforts to discover the value of their employees. The theory also suggests that employees have different expectations and levels of confidence about what they are capable of doing. Management should therefore discover the type of resources, training or supervision employees need to function optimally.

‘Instrumentality’ on the other hand refers to the perception of employees as to whether they will actually get what they desire, even if it has been promised by management. The onus is therefore on management to ensure that promises of rewards to employees are fulfilled and that all employees know about them. Vroom (1964) argues that an employee's beliefs about expectancy, instrumentality, and valence interact psychologically to create a motivational force such that the employee acts in ways that bring pleasure and avoid pain. Expectancy theory is generally supported by empirical evidence Hellriegel & Slocum (2011) and Lunenburg (2011) and is one of the most commonly used theories of motivation in the workplace (Park & Kim 2017).

The two theories therefore are relevant for this study on the challenges of performance appraisal in organisations. Park & Kim (2017) attest that changes to a performance-oriented managerial tool may result in employee uncertainty regarding roles and goals and this can make it difficult to have conscious expectations of what will happen if employees do certain things. Job satisfaction of employees in an organisation is meaningful to examine because it results in positive impacts to the organisation as well as the individuals. Park & Kim (2017) adds that it is related to an individual's well-being and dissatisfaction leads to discontent in personal life. Dissatisfaction also leads to higher turnover of employees. As opined by Saari & Judge, (2004) the higher the level of job satisfaction, the more workers are likely to have positive attitude toward their job. Cook (2008) also affirms that job satisfaction is considered to possess both a cognitive (thought) and affective (feelings) character. For example, emotions at work by employees may have some reference to job satisfaction or dissatisfaction. For this reason, management of organisations must at all times ensure that their employees are satisfied in order to achieve organisational goals. A number of studies including (Hellriegel & Slocum, (2011) and Lunenburg (2011) have shown that expectancy formulations are very useful for predicting work motivation in organisational settings. The expectancy theory is used as a framework for an organisational model because the theory can explain job satisfaction from cognitive oriented assumptions by emphasising workers' expectations and perceptions regarding organisational performance(Park & Kim, 2017).

Research Design and Methodology

This exploratory study employed the qualitative research methods of interviews in data collection. The study sought to explore the experiences of the participants in order to bring out meanings they gave on specific issues (Creswell, 2007). The use of exploratory research encompassed dialogue where the participants talked openly, freely and candidly about their lived experiences. This approach enriched the data collected for the investigation.

The Research Design

The study was exploratory and therefore followed the interpretivist paradigm which intimates that truth is negotiated through dialogue or discussion with participants. In this study the researchers employed the interpretivist paradigm which is in line with the theoretical framework (i.e. goal-setting and expectancy theories). The goal-setting and expectancy theories are aligned to the interpretivist paradigm in that reality is constructed through meanings and understanding developed through interaction with people. In this particular case the interaction through dialogue, was between line managers as supervisors and employees as supervisees in universities. The most important element of qualitative research is an attempt to discover the inner feelings of participants through interaction and dialogue between the researcher and the participants. In the view of Wiersma and Jurs, (2005) qualitative design requires flexibility and tolerance for adjustment as the research progresses. As pointed out by Zikmund, Babin, Carr and Griffin (2013) qualitative research addresses

objectives through techniques that permit the researcher to provide elaborate interpretation of the experiences of the participants without depending on numerical measurement. It attempts to discover the true meaning and insights provided by participants in their natural setting rather than quantifying results. This exploratory research entailed how individuals as participants make meaning and understanding of issues from their own perspectives. The approach therefore enabled an in-depth investigation into, both the description and interpretation of participants' lived experiences to obtain accurate data hence the approach was adopted for this study.

Population and Sample

The population for the study comprised thirty (30) employees including academics and administrative staff from two African universities. The number included 6 supervisors who conducted performance appraisals in their respective departments and 24 supervisees. The participants had worked for the universities for over five (5) years. The researchers used random sampling techniques to select two (2) African universities as the study sites and employed purposive sampling techniques to select three (3) supervisors as participants from each of the two (2) universities. Random sampling technique was also used to select 12 employees from each of the two universities. This was done to ensure that every employee stood the chance of being selected.

The eligibility criteria were:

- participant should have been employed at the African university for at least five (5) years.
- participant should be an academic or administrative employee of the institution.
- participant should have the experience of performance appraisal

Data Collection

The researchers employed a semi-structured interview schedule comprising 3 items in collecting the data. The face to face interview provided the researchers with the opportunity to follow up questions for clarification where necessary. As affirmed by Tustin, Lightelm, Martins and Van Wyk (2005) primary data is the original data collected specifically for solving the problem at hand. The interview covered important issues related to perceptions of performance appraisal. For example how employees perceive and understand the performance appraisal system; the extent to which performance appraisal system is used as part of instructional supervision in universities; and the implementable measures that can enhance overall job performance through performance appraisal in universities.

Data Analysis

The interpretive approach was used by the researchers to analyse the data who first pruned and arranged the interview texts under various themes. The researchers chose this approach to make the information manageable, easy to discuss and report on. In doing the analysis the researchers read through all the interview transcripts and wrote down the responses from the participants that emerged from the information. The data were then analysed manually. Citing Mouton (2004) Quan-Baffour (2015) intimates that this approach to data analysis makes the various constitutive elements in the data clear through an inspection of relationships between concepts, constructs and variables and to see whether there are any patterns or trends.

Results and Discussion

The study was set up to investigate the challenges of performance appraisal as part of instructional supervision in two African Universities. To obtain the views of the participants,

twelve (12) employees made up of academics and administrative staff and three (3) supervisors from each of the universities were recruited to participate in the study. In each of the two universities the three (3) supervisor participants were responsible for conducting the performance appraisals. The responses of the participants were arranged, analysed and interpreted under the following themes:

Theme 1: Employee's perception and understanding of the performance appraisal system

Regarding how employees perceive or understand the performance appraisal system twenty (20) of the thirty (30) participants agreed in their responses that it is a structured formal interaction between a subordinate and supervisor, that usually takes the form of a periodic discussion in which the work performance of the subordinate is assessed or evaluated, with a view to identifying strengths and weaknesses as well as opportunities for improvement through continuous professional development. To the above participants, performance appraisal borders on accountability where employees provide evidence of their stewardship. Eight (8) of the participants however agreed in their responses that performance appraisal provides them with monetary rewards. Two other participants also agreed with the twenty (20) that;

promotion is linked to the outcome of performance appraisal. They added that where individuals are due for promotion the university authorities look at the performance record of the particular employee e.g. teaching performance, research etc. before the employee is recommended for promotion.

Again, out of the thirty (30) respondents from the two universities, 12 of them, mainly lecturers, were of the view that although performance appraisal is meant to identify weaknesses or gaps in employees' performance for training interventions, they do not see weak employees being selected for training. Training opportunities in the university, they agreed, are for every employee and this may not let the employees see the importance of the exercise in identifying weaknesses. There were eight (8) participants who regard performance appraisal as punitive whilst ten (10) others see it as important to reward hardwork and motivation for others to improve their performance. Twenty-two (22) of the participants added that the exercise should be more transparent to reduce the stress on both supervisors and supervisees. The eight (8) who have negative perception about performance appraisal added that they felt unsafe because in the wake of retrenchment those regarded as non-performing might lose their jobs. From the above responses it can be inferred that the non-performing employees could often context performance appraisal results and cause tension between them and their supervisors. On the other hand the hardworking employees are more likely to support performance appraisal because it assists them to improve their performances.

Theme 2: The extent to which performance appraisal system can be used as part of instructional supervision in universities

The performance of employees are assessed twice a year (mid and end of year) and the results forwarded to management for moderation and to decide which employees should be rewarded or provided with specific training. The individual employees evaluate themselves and send their evaluations scores to the various heads of department for discussion and negotiation on the scores. This aspect is very important because it would give the employees, first the opportunity to assess themselves before the interview with their supervisors. It also gives management the opportunity to organize workshops, training and seminars the non performing employees in the following year.

All the participants agreed in their responses that the exercise gives the instructional leaders the opportunity to assist the subordinate employees to identify their own weaknesses and then advise them to work towards improving such areas in their work schedule. In addition to this, both the supervisor and the supervisee have to agree on the results of the performance appraisal of the employee before final recommendations are made to the employer. Thus it usually takes two parties to conduct the employee appraisal i.e. supervisors and supervisees. The appraisees contribute to the exercise by providing evidence to support their performance.

Twelve (12) of the participants represent employees who are persistently dissatisfied with the outcome of performance appraisal and would always find excuses to be indifferent. The six (6) instructional leaders and twelve (12) employees agreed that most employees who are non-performing are those who have no evidence to support their claims and often argue or disagree with their evaluation results. The eighteen (18) participants view the performance appraisal exercise as necessary tool to motivate employees to work harder.

Theme 3: *Implementable measures to enhance job performance through performance appraisal in universities*

The thirty (30) participants were interviewed individually at different sites but their responses corroborated. For example sixteen (16) of the participants said that appraisal systems have not been implemented effectively by their various universities whilst fourteen (14) believe the systems have been effectively implemented. The finding above is a clear indication that the exercise, though very essential to enhance productivity, its implementation is not well executed in the eyes of many employees in the universities. The majority of respondents sixteen (16) were of the view that, university managements do not use the results of performance appraisal system effectively to achieve its aims in the two institutions studied i.e. the results are not often acted on to improve the skills and knowledge of staff who require specific training to improve their performance.

The participants were of the view that the final results of performance appraisal should be made known to employees to enable them improve on their work performance. The fourteen (14) participants added that in their view the performance appraisal is on track in the universities despite some challenges in its implementation. This suggests that the implementation of performance appraisal should be improved in the universities to serve the needs of both the employer and the employees. The participants emphasised that the result of performance appraisal in the universities should be communicated to employees for them to know their strengths and weaknesses and what might be done to improve the situation. Majority of the participants twenty-five (25) agreed in their responses that the employer should organise specific short learning or continuous professional development programmes to fill the gaps in the non-performing employees. They added that performance appraisal has a good purpose hence it must be implemented properly. One human resources practitioner who took part in the study summed it up thus (reproduced verbatim):

.....performance appraisal assists employers to identify both strengths and weaknesses in employees. It keeps employees on their toes. Training to improve performance should be organised for employees whose performance have gaps. Those who do better should be rewarded to motivate them to work harder. I do not think it is good to offer employees financial rewards. That can create problems for supervisors. Those who come to the appraisal with the aim to get

more marks for more money might have conflict with supervisors who are objective, fair and firm in the evaluation exercise.

Twenty-three (23) out of the thirty (30) participants suggested a review of performance appraisal instruments and processes to make them more transparent and fair. They added that mechanisms should be put in place to eliminate conflicts between supervisors and supervisees who are involved in appraisal exercises. The participants were of the view that institutions that offer monetary rewards for good performance should engage neutral external evaluators to avoid conflicts between supervisors and supervisees who are at the coal phase of the process and management of the appraisal system.

Conclusion

This study has made it clear that performance appraisal is imperfect in the contemporary organisations. It is nevertheless valuable in the achievement of organisational goals. Both public and private universities may have to use performance appraisal as at the moment there is no better alternative available to measure employee's performance. Again performance appraisal has the potential capacity to improve individual performance and drive institutional productivity. This study found that employees lack education about the rationale for performance appraisal and incentives in the form of money should be removed from performance management system to make the exercise serve its main purpose. It is clear from the findings that performance appraisal is an important human resource issue but not without challenges. The monetary rewards for better performance results create conflict around the implementation of performance appraisal system. The paper therefore concludes that as the best way to identify strengths and weaknesses among employees for further training or rewards, universities should revisit their processes and approaches to performance appraisal in order to create positive perception among employees.

Recommendations

Based on the findings of the study the following recommendations were made for the management of employee performance in African universities:

- Performance appraisal should assist the universities to retain staff, and influence employees' attitude. Management of the universities should use the process to assist employees to progress through their career by setting (career) goals.
- The universities should use the results of performance appraisal to the benefit of both the employer and employees. E.g. increased productivity and better conditions of service.
- Universities should avoid monetary rewards based on the results of performance appraisal in order to minimise conflicts between employees and instructional supervisors. The employer should find other ways of rewarding employees other than monetary rewards. E.g. opportunity for training, conferences and promotion.

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PRINCIPALS' UTILIZATION OF ICT RESOURCES IN PUBLIC AND PRIVATE SENIOR SECONDARY SCHOOLS IN FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA

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Abstract

The study examined the principals' utilization of information and communication technology (ICT) resources in public and private senior secondary schools in Federal Capital Territory (FCT), Abuja, Nigeria. In this study, two research questions were answered while one null hypothesis was formulated. Descriptive survey research design was adopted. ICT model was presented in this study as a conceptual framework. A sample of 60 principals in both FCT public and private senior secondary schools was used. Stratified sampling technique was used to select 30 principals in public senior secondary schools and 30 principals in private senior secondary schools in FCT. The data for the study were gathered through a questionnaire, which were administered to the principals in the selected FCT public and private senior secondary schools. To ascertain the validity of the instrument, content validity was adopted. The questionnaire was pilot-tested and reliability coefficient of 0.81 was obtained. The mean and standard deviation were used to answer the research questions while t-test was used to test the hypothesis at 0.05 level of significance. This study revealed that there was a significant difference between principals' utilization of ICT in public and private senior secondary schools in FCT because the principals in the private senior secondary schools utilized ICT resources more than the principals in the public senior secondary schools. The findings of this study have led the researcher to conclude that, the utilization of ICT resources could enhance effective management of public and private senior secondary schools in FCT. It was therefore recommended that, efforts should be made by the principals to upgrade their knowledge of ICT utilization for their daily tasks for effective management.

Keywords: Principals, Utilization, Information and Communication Technology (ICT), Public and Private Senior Secondary Schools.

Introduction

In Nigeria, the increasing development in the management of secondary education brings greater demands on principals to utilize ICT for effective management. The educational system in Nigeria is structured into different levels as: pre-primary, primary, secondary and tertiary levels (Federal Republic of Nigeria [FRN], 2013). The secondary level occupies a critical position in the educational system because it is the education children receive after primary education and before the tertiary stage. The achievement of the secondary education goals is dependent on the extent to which the principals in public and private senior secondary schools are able to apply the appropriate administrative processes in the school operations.

The need for ICT in the management of the Nigerian public and private senior secondary schools cannot therefore, be overemphasized. Over the years, the administrative work of the principal has been paper-based, and various documents are kept in the form of records (Ogunshola & Udeozor, 2016). A principal cannot perform his/her administrative duties without accurate, timely, sufficient and relevant information (Asiabaka, 2010). According to Ogunshola and Udeozor, the challenges associated with storage, preservation and presentation of large volumes of information in paper form have made managerial processes

in the schools very cumbersome, thus, alternative methods provided by ICT have become imperative. The use of ICT can improve education quality, expand learning opportunities and make education accessible (Adeyemi & Olaleye, 2010).

However, principals need training not only in computer literacy but also in the utilization of various kind of computer based educational software in school management (Ogunshola, 2015). The principals in FCT public and private senior secondary schools, Nigeria need to be well informed in the use of ICT resources for effective management. Ogunshola (2015) reported that, ICT resources were moderately utilized by the principals in the management of FCT senior secondary schools. Principals' utilization of ICT in the management of public and private senior secondary schools is imperative for sustainable national development. ICT utilization will prove beneficial in improving Nigeria's educational system and giving students a better secondary education. Therefore, the study examined the principals' utilization of ICT resources in public and private senior secondary schools in FCT, Abuja, Nigeria.

Statement of the Problem

There are developments in the Nigerian education sector which indicate some level of ICT utilization in the secondary schools. The Federal Government of Nigeria, in the National Policy on Education (FRN, 2013), recognizes the prominent role of ICTs in the modern world and the need to integrate ICT into education in Nigeria but ICT is yet to be fully integrated into education in Nigeria. Mac-Ikemenpma (2005) opined that in a complex society like Nigeria, many factors affect its information and communication technologies use and integration, an interdisciplinary and integrated approach is very necessary to ensure the successful development of Nigeria's economy and society. According to Ogunshola and Udeozor (2016), some of the challenges of ICT utilization in senior secondary schools are the lack of/weak electricity supply, inadequate telecommunications infrastructure and limited internet access in substantial parts of the country. Therefore, the study examined the principals' utilization of ICT resources in public and private senior secondary schools in FCT, Abuja, Nigeria.

Purpose of the Study

Specifically, the study sought to achieve the following objectives:

1. Examine the level of ICT utilization by principals in the management of public senior secondary schools in FCT.
2. Determine the level of ICT utilization by principals in the management of private senior secondary schools in FCT.
3. Ascertain whether there is any significant difference between principals' ICT utilization in the management of public and private senior secondary schools in FCT.

Research Questions

In specific terms, attempt was made by this study to provide answers to the following research questions:

- i. What is the level of ICT utilization by principals in the management of public senior secondary schools in FCT?
- ii. What is the level of ICT utilization by principals in the management of private senior secondary schools in FCT?

Hypothesis

The following null hypothesis was formulated to guide this study:

Ho₁: There is no significant difference between principals' ICT utilization in the management of public and private senior secondary schools in FCT.

Concept of Information and Communication Technology

The term ICT covers a whole range of applications, techniques and systems (Clarke, 2006). Lallana and Margaret (2003) opined that, ICT “refers to a broad field encompassing computers, communications equipment and the services associated with them” (p. 7). United Nations Education, Scientific and Cultural Organization [UNESCO] (2002) defined ICT as the combination of informatics technology with others, related technologies, specifically communication technology. ICT includes all tools that we use to communicate or dissipate information such as the radio, television, telephones, mobile phones, overhead projectors, video cameras and players, computers and so on (Ogunshola and Udeozor, 2016). ICTs are the means for providing an access to and engaging in the continuous learning that becomes necessary for successful participation in the society development of all social groups of the population (UNESCO, 2004).

ICT Utilization in Nigerian Secondary Schools

Presently, education at all levels in Nigeria requires ICT to facilitate large-scale learning needs for national development. The increasing developments in the Nigerian education sector indicate some level of ICT utilization in the secondary schools. The Federal Republic of Nigeria, in the National Policy on Education recognizes the prominent role of ICTs in the modern world and the need to integrate ICT into education in Nigeria (FRN, 2013). To actualize this goal, the document states that computer education will be a vocational elective at the secondary schools. It is also the intention of government to provide necessary infrastructure and training for the utilization of ICTs in the secondary school system. The Federal Ministry of Education launched an ICT-driven project know as School Net (Federal Government of Nigeria [FGN], 2006), which was intended to equip all schools in Nigeria with computers and communications technologies. In June 2003, at the African Summit of the World Economic Forum held in Durban, South Africa, the New Partnership for African Development (NEPAD) launched the e-Schools Initiative, intended to equip all African high schools with ICT equipments including computers, radio and television sets, phones and fax machines, communication equipment, scanners, digital cameras, and copiers, among other things (Adomi, 2010). The aim of the initiative is to impart ICT skills to young Africans in primary and secondary schools, and to harness ICT to improve, enrich, and expand education in African countries (Aginam, 2006).

Achievement in the utilization of ICT resources in Nigerian secondary schools is dependent on the recognition of the importance of ICT application to education for sustainable development. However, Atsu (2014) noted that the use of ICT facilities for record-keeping assisted the school administrator to meet the task of school management in the areas of curriculum and instruction, school community relationship and school business operations. For example, the use of the computer which could store many files in its memory could make the daily tasks of the principals easier in the school management. With the diffusion of ICT innovations in educational institutions which has radically changed how work is done, ICTs have offered tremendous possibilities in improving and developing principals' professional capability (Njoku, 2006).

Conceptual Framework

ICT model by UNESCO (2002) is presented in this study to provide a framework for ICT development in secondary school. This model conceives ICT development as a continuum along which an education system or an individual school can pinpoint the approach that relates to the growth of ICT for their particular context. This model is referred to as a continuum to approaches to ICT development. These approaches are emerging, applying, infusing, and transforming which are depicted as the model in Figure 1.

Emerging	Applying	Infusing	Transforming
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Figure 1: Model depicting a continuum of approaches to ICT development in schools
UNESCO (2002, p.15)

The emerging approach

Schools at the beginning stages of ICT development demonstrate the emerging approach. Such schools begin to purchase computing equipment and software. In this initial phase, administrators are starting to explore the possibilities and consequences of using ICT for school management and adding ICT to the curriculum.

The applying approach

Those schools in which a new understanding of the contribution of ICT to learning has developed exemplify the applying approach. In this secondary phase, administrators use ICT for tasks already carried out in school management and in the curriculum.

The infusing approach

At the next stage, the infusing approach involves integrating or embedding ICT across the curriculum, and is seen in those schools that now employ a range of computer-based technologies in laboratories, classrooms, and administrative offices.

The transforming approach

Schools that use ICT to rethink and renew school organization in creative ways are at the transforming approach. ICT becomes an integral though invisible part of daily personal productivity and professional practice. The focus of the curriculum is now learner-centred.

Methods/Techniques

The study adopted the descriptive survey research design. This method was used to elicit responses from a sample of principals in FCT senior secondary schools. The population of this study consisted of all the 187 senior secondary schools (public and private) in FCT. The sample of the study was made up of 60 senior secondary schools in FCT, representing 32 % of the population. Stratified sampling technique was used to select the 60 senior secondary schools on the basis of 30 public senior secondary schools and 30 private senior secondary schools. Thus, a total number of 60 principals were randomly selected from the FCT senior secondary schools as sample for the study, that is, 30 principals in public senior secondary schools and 30 principals in private senior secondary schools.

Instrument

In this study, a questionnaire designed by the researcher to elicit information from the respondents. The questionnaire was tagged “Principal’s Utilization of Information and Communication Technology Questionnaire (PUICTQ)”, which was administered to principals. The PUICTQ comprised of two sections (A and B). Section A covered personal

information of the respondents while section B was used to obtain information on the level of principals' ICT utilization. The respondents were required to answer the items on a 4 point Likert rating scale, ranging from 4 to 1 as follows: To very large extent is 4 points, moderately is 3 points, rarely is 2 points and never is 1 point. PUICTQ was pilot-tested and reliability coefficient of 0.83 was obtained. Thus, 100 % of the copies of the instrument was returned and used for data analysis.

Data Analysis techniques

In this study, Statistical Package for Social Science (SPSS) was used for data analysis. The mean and standard deviation (SD) were used to answer the research questions while t-test was used to test hypothesis at 0.05 level of significance. The decision rule for the interpretation of the results of the data analysis was that a mean score of 2.50 and above was considered as a positive response (moderately), and less than 2.50 was considered as a negative response (rarely). The calculated probability (p-value) that was greater than the significance level of 0.05 was accepted while the p-value that was less than the significance level of 0.05 was not accepted.

Results

Research Question One

What is the level of ICT utilization by principals in the management of public senior secondary schools in FCT?

Table 1: Analysis of the level of ICT Utilization by Principals in the Management of Public Senior Secondary Schools in FCT

S/N	Items	Mean	SD	Remarks
The Principal:				
1	uses a desktop computer for typing, processing and storage of Information on the school, the students, the staff and so on.	3.13	0.76	Moderately
2	uses laptop computers at home or outside the school to finished the unfinished office work.	1.73	1.08	Rarely
3	ensures that computer laboratory is used by the teachers and the students for teaching and learning.	3.10	0.81	Moderately
4	ensures that television sets are used by the teachers and the students to watch educational programmes and current affairs	3.07	0.87	Moderately
5	ensures that radio/tape recorders are used by the students to learn relevant languages.	2.77	0.76	Moderately
6	uses mobile phones/ handsets to call and send text messages to the staff and the parents.	3.40	0.74	Moderately
7	uses internet facilities to receive and send an email to parents on their children's information, staff, other principals, external examining bodies, the ministry of education officials and so on.	3.27	0.78	Moderately
8	encourages the use of video machine for educational programmes and purpose.	2.48	1.43	Rarely
9	uses generating set for the school when there is power supply shortage.	3.07	0.63	Moderately

10	uses intercom gadgets to communicate with the staff and the students in the school premise	2.17	1.28	Rarely
11	ensures that photocopier machine is used for reproduction of documents.	3.00	0.79	Moderately
12	uses printer machine for printing of documents.	3.33	0.85	Moderately
13	encourages the use of the electronic library and books for teachers to see new teaching methods and research	1.87	1.05	Rarely
14	encourages the use of overhead projectors for teaching and learning	2.10	1.25	Rarely
15	uses scanning machine to scan documents.	2.42	1.49	Rarely
16	ensures that camera is used to cover school events when necessary e.g. sports, seminars, workshops and so on.	2.93	0.75	Moderately
17	uses microphone/ public address system to communicate with the staff and the students during meetings and assemblies.	3.06	0.88	Moderately
18	encourages the use of the electronic board (smart or star board) for teaching and learning.	1.75	1.91	Rarely
19	uses the board (white, black, notice and bulletin board) to pass information on meetings, examination timetables and so on.	3.67	0.79	To very large extent
20	encourages the students to use library for reading and studying.	3.40	0.81	Moderately
Overall assessment		2.79	0.80	Moderately

The result in table 1 shows that the overall mean score for the level of ICT utilization by principal in the management of public senior secondary schools in FCT was 2.87, which is greater than the 2.50 cut-off point. This study showed that the level of ICT utilization by principals in the management of public senior secondary schools in FCT was moderate.

Research Question Two

What is the level of ICT utilization by principals in the management of private senior secondary schools in FCT?

Table 2: Analysis of ICT Utilization by Principals in the Management of Private Senior Secondary Schools in FCT

S/N	Items	Mean	SD	Remarks
The Principal:				
1	uses a desktop computer for typing, processing and storage of Information on the school, the students, the staff and so on.	3.33	0.82	Moderately
2	uses laptop computers at home or outside the school to finish the unfinished office work.	3.53	0.84	To very large extent
3	ensures that computer laboratory is used by the teachers and the students for teaching and learning.	3.54	0.90	To very large extent
4	ensures that television sets are used by the teachers and the students to watch educational programmes and current affairs	3.60	0.94	To very large extent

5	ensures that radio/tape recorders are used by the students to learn relevant languages.	3.20	0.85	Moderately
6	uses mobile phones/ handsets to call and send text messages to the staff and the parents.	3.55	0.90	To very large extent
7	uses internet facilities to receive and send an email to parents on their children's information, staff, other principals, external examining bodies, the ministry of education officials and so on.	3.62	0.74	To very large extent
8	encourages the use of video machine for educational programmes and purpose.	3.33	0.96	Moderately
9	uses generating set for the school when there is power supply shortage.	3.47	0.86	Moderately
10	uses intercom gadgets to communicate with the staff and the students in the school premise	3.45	0.85	Moderately
11	ensures that photocopy machine is used for reproduction of documents.	3.80	0.88	To very large extent
12	uses printer machine for printing of documents.	3.53	0.96	To very large extent
13	encourages the use of the electronic library and books for teachers to see new teaching methods and research	3.47	0.95	Moderately
14	encourages the use of overhead projectors for teaching and learning	3.45	0.88	Moderately
15	uses scanning machine to scan documents.	3.48	0.86	Moderately
16	ensures that camera is used to cover school events when necessary e.g. sports, seminars, workshops and so on.	3.47	0.78	Moderately
17	uses microphone/ public address system to communicate with the staff and the students during meetings and assemblies.	3.58	0.93	To very large extent
18	encourages the use of the electronic board (smart or star board) for teaching and learning.	3.46	0.98	Moderately
19	uses the board (white, black, notice and bulletin board) to pass information on meetings, examination timetables and so on.	3.73	0.95	To very large extent
20	encourages the students to use library for reading and studying.	3.39	0.92	Moderately
Overall assessment		3.50	0.89	To very large Extent

The result in table 2 shows that the overall mean score for the level of ICT utilization by principal in the management of private senior secondary schools in FCT was 3.50, which is greater than the 2.50 cut-off point. This study revealed that the level of ICT utilization by

principals in the management of private senior secondary schools in FCT was to a very large extent.

Hypothesis One

Ho₁: There is no significant difference between principals' ICT utilization in the management of public and private senior secondary schools in FCT.

Table 3: Analysis of Principals' ICT Utilization in the Management of Public and Private Senior Secondary Schools in FCT

Group	N	Mean	SD	df	p-value	Decision
Public	30	2.79	0.80	57	0.00	Ho ₁
Private	30	3.50	0.89			Not Accepted

Table 3 shows the t-test analysis of principals' ICT utilization in the management of public and private senior secondary schools in FCT. The p-value of 0.00 is less than 0.05(5%) significance level, which means that there is a significant difference between principals' ICT utilization in the management of public and private senior secondary schools in FCT.

Discussion of Findings

From the result of the data analysis, the findings of this study showed that the level of ICT utilization by principals in the management of public senior secondary schools was moderate in FCT. The findings of this study supported the findings of Adeyemi and Olaleye (2010) that concluded that, government is not fully ready to imbibe ICT for the effective management of secondary schools. On the other hand, the findings of this study contradict the findings of Adeyemi and Olaleye (2010) who reported that, the usage of ICT equipment in the secondary schools was at a low level in Ekiti State, Nigeria. Furthermore, the findings of this study revealed that, the level of ICT utilization by principals in the management of private senior secondary schools was to a very large extent in FCT. The findings of this study supported the findings of Nwosu (2003), who reported that ICT assists the school administrators to meet the task of school management in the areas of curriculum and instruction, school community relationship and school business operations. In support of this, Mohammed (2006) stated that the introduction of ICT in schools enhances the daily school routine, programme, updating the evaluation of school programmes, solving individuals' or groups' as well as staff development.

Lastly, the study found out that there was a significant difference between principals' ICT utilization in the management of public and private senior secondary schools in FCT. From the results, the principals in the private senior secondary schools utilized ICT resources more than the principals in the public senior secondary schools because most of the ICT resources were provided in private senior secondary schools than in public senior secondary schools. The finding is in agreement with Ogunshola (2015) who postulated that, the ICT utilization in the management of school is determined by the provision of ICT resources by the owners of these schools.

Conclusion

Achievement in the utilization of ICT resources in Nigerian secondary schools by principals is dependent on the recognition of the importance of ICT application to education for sustainable national development. The principals in public and private senior secondary schools in FCT should actively initiate practical actions for relevant educational changes and

innovations such as the utilization of ICT in their managerial functions for better quality education. The findings of this study have led the researcher to conclude that, the utilization of ICT resources could enhance effective management of public and private senior secondary schools in FCT, Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Efforts should be made by the principals to upgrade their knowledge of ICT utilization for their daily tasks for effective management.
2. Ministry of Education and Secondary Education Board should encourage the use of ICT in senior secondary schools by organising training, seminar and workshop for the principals to help them improve on their ICT utilization.

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THE IMPACT OF NON-ACADEMIC PROBLEMS OF LEARNERS ON THE STRESS SITUATION OF TOWNSHIP SCHOOL TEACHERS

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Abstract

The professional responsibility of teachers is to create conditions in which effective teaching and learning occur. However, certain behaviours of learners may hinder effective teaching and learning. While some of the behavioural problems of learners may originate from the teaching and learning process (academic problems), other behavioural problems of learners may not originate from the teaching and learning process (non-academic problems). The purpose of this paper is to report on the impact of learners' non-academic problems on the stress situation of secondary school teachers. A study was conducted among 368 teachers (female =202) from 36 township secondary schools in the Free State Province of South Africa. A questionnaire was used to collect data. Data was analysed quantitatively. The mean, standard deviation and reliability coefficient of the items dealing with non-academic problems of learners were calculated. Factor loading was used to determine which factors were accepted and which ones were rejected. The following five factors were found to contribute to the teachers' stress situation: no proper uniforms, learners abusing alcohol and drugs, poor parental control, learners using foul language and learners arguing and fighting with each other. It was recommended that teachers should devise strategies of involving parents and community members in dealing with the disciplinary problems of learners.

Keywords: Teacher stress, Township schools, Disadvantaged areas, non-academic stressors.

Introduction and background

Stress is a serious problem among teachers, and it may have a negative impact on the quality of their work, and the quality of their interactions with learners (Jennings & Greenberg, 2009; Newberry & Allsop, 2017). The main stressors for teachers include ill-discipline among learners, changes in the curriculum, work overload, poor support from parents and pressure to produce good results (Harmsen, Helms-Lorenz, Maulana & van Veen, 2017; Klassen & Chiu, 2010; Ozer & Beycioglu, 2010). These problems afflict developing countries more than developed countries (Emetere, 2014; Van der Horst, 2016). For instance, funding for education has continuously declined in many developing countries, leading to insufficient provision of resources, increase in class sizes and higher workload for teachers (Van der Horst, 2016). Pietarinen, Pyhältö, Soini, Salmela-Aro (2013) state that the working environment, and especially the social interactions among colleagues, also plays a vital role in the stress situation of teachers. Cinamon and Rich (2005) found that teachers who are overloaded often take work home so as to do it in between the household chores, family responsibilities and their personal engagements. Taking work home implies that these teachers deprive themselves of the opportunity to socialise and to engage with family, thus worsening their stress situation – since the home, which should help the stressed teachers to regroup or recover, also becomes a place of stress (just like the school). Due to the stressors experienced at home and at school, the teachers' performance may decline, and they may experience psychological and health problems, such as anxiety, sleep disorder, hopelessness, headache, indigestion and heartburn (Gholamitooranposhti, 2012; Mampane & Bouwer,

2011; Maluleke, 2009). These psychological and health problems may contribute to high rates of teacher absenteeism (Mampane & Bouwer, 2011).

Research has shown that although teachers generally experience stress, teachers who teach in deprived schools or schools situated in poor areas are more likely to experience higher stress levels than teachers who teach in the middle-class schools (Emetere, 2014; Goldhaber, Destler & Player, 2010). The majority of parents in the middle-class schools have obtained higher levels of education, afford to pay school fees (which enable the school to buy extra resources), help their children with homework and school projects, and support teachers with extra-mural activities (McNeal, 2014). The involvement of middle-class parents in the education of their children relieves teachers of certain responsibilities, and this may dramatically reduce teacher stress. However, the majority of parents in the schools that are situated in the deprived areas are generally illiterate or semi-literate and unemployed or earn very little salaries if employed – thus making it difficult for them to help their children with school work and to make any financial contribution towards the purchasing of teaching and learning material (Malone, 2017).

The lack of parental support may be stressful for teachers who work in the deprived schools. Hence Goldhaber, Destler and Player (2010) advocate for extra pay or additional incentives for teachers who work in the schools situated in low-income groups – since such teachers require extra motivation to work without adequate resources, and to deal with the many psychological problems that their learners experience.

The children are members of families and the broader community, and the influence that these entities have on the behaviour of these children is remarkable. For instance, children who come from enriching and supportive environments develop behaviours and attitudes that promote their scholastic development and that prepare them to be responsible adults (Wang & Sheikh-Khalil 2014). On the contrary, children who have adverse childhood experiences are associated with unhealthy lifestyles, poor physical and mental health, low educational achievement and low economic productivity in adulthood (Lomanowska, Boivin, Hertzman & Fleming, 2017; McDonald, Madigan, Racine, Benzies, Tomfohr & Tough, 2019). Seedat, Van Niekerk, Jewkes, Suffla and Ratele (2009) found that communities that are characterised by high rates of poverty and unemployment experience high incidents of violence among its members. Gultig (2010) found that community problems may render a school dysfunctional and not allow it to operate as a learning institution, while teachers may be disorderly and fail to share their problems. Although the community plays an important role in influencing the behaviour of children, the family and particularly the parents, play a more important role due to their proximity to the children. The middle-class parents, because of their higher level of education, become actively involved in the education of their children by helping them with school work and meeting teachers to discuss the children's performance (Wang & Sheikh-Khalil 2014). However, the poor parents, because of their low level of education, do not easily become involved in the education of their children – since they are unable to help their children with school work and they are reluctant to meet with the teachers of their children for purposes of discussing their behaviour and performance (Cook & Jennings, 2016; Hornby & Lafaele, 2011). The rates of illiteracy, unemployment and poverty are very high in the townships (Nicolson, 2015), and this situation could have a negative impact on the behaviour of township school learners.

The teaching experience that individual teachers possess, as well as their professional training, may play an important role in determining the extent to which school situations

stress the individual teacher. The teachers who received adequate professional training may use various teaching methods to manage overcrowded classes, such as using group work, nominating class monitors/captains, establishing ground rules and knowing learners well (Johnson & Christensen, 2010; Thompson 2012). Conversely, inadequate professional training and a lack of teaching experience may lead to poor management of school or classroom situations, which may negatively contribute to the teachers' stress situation. Goodwin, Low, Cai and Yeung (2019) found that older and more experienced teachers were less likely to quit the profession, since they had developed positive attitudes about the teaching profession – as compared to their younger and less experienced colleagues. Goodwin, Low, Cai and Yeung (2019) also found that teachers in pre-service training and in early career phase showed a decline in teacher efficacy and in retention intention. It could be that the older and more experienced teachers had accumulated, over the years, adequate experience in managing ill-discipline among learners, teaching workload and relationships with parents – thus they experience these issues as less stressful.

The purpose of this study was to investigate the impact of non-academic problems of learners on the stress situation of township school teachers. This study was part of a bigger study that investigated the causes of stress for township secondary schools in the Free State Province of South Africa. This paper intends to address the following question: To what extent do non-academic problems of learners contribute to the stress situation of teachers in the township secondary schools?

Theoretical Framework

The study is influenced by the Attribution Theory (Heider, 1958; Weiner, 1970). Attribution Theory is centered on causes, and it seeks to attach the results of certain actions to certain factors (Weiner, 1970). The Attribution theory also accounts for the cause individuals ascribe to an event or action (Weiner, 2010). The causes are invoked to explain outcomes or end results, such as success and failure (Weiner, 2010). Heider (1958) distinguished between internal and external attributions. The internal attributions occur when an event or action is ascribed to a person and his or her disposition, while external attributions occur when an event or action is ascribed to the environment or the situational context (Piszczeck & Berg, 2019). For instance, ability or aptitude and effort are internal since they reflect characteristics of the person, whereas task difficulty and luck are the external or environmental determinants of outcomes (Graham, 1991). It has repeatedly been shown that people have a tendency to take credit for success (i.e. attribute positive outcomes to internal factors) and to blame others for failure (i.e. attribute negative outcomes to external factors) (Weary, 1978).

In this study, the teachers view their working environment (environmental determinants or external factors), particularly, the behaviour of learners, as the main cause of their stress. The factors such as their young age and their lack of teaching experience (internal factors) as factors contributing negatively to their stress situation.

Methodology

A questionnaire was used to collect data. The questionnaire had 115 items that dealt with the stressors of African high school teachers. The participants had to rate, on a Likert scale, the extent to which certain factors contributed to their stress. In addition, participants had to indicate their biographical information. The questionnaire had closed questions, and the participants had to choose the most appropriate answer to their situation.

A questionnaire, the **Teacher Stress Identification Test – TSIT**, was administered on 368 teachers randomly selected from 36 township secondary schools. All the schools were situated in the Free State Province of South Africa. The teachers who volunteered to participate in the study were met after school and briefed about the study. The questionnaires were left with the participants, and the completed questionnaires were collected after a week.

Data was analysed quantitatively. Factor analysis was used to reduce the 115 items to 22 factors – a way of using factor analysis as a form of data reduction (Ellis, 2013). These factors were named. This paper focused on one factor, viz. out-of-school or non-academic influences. The factor loading varied between -1,00 and +1,00. The loadings above 0,25 were viewed as acceptable, and those below 0,25 were viewed as unacceptable and were not considered for further analysis ((Ten Holt, Van Duijn & Boomsma, 2010). The mean, standard deviation and reliability coefficient of the items were also calculated.

Permission for the study was granted by the Provincial office of the Department of Basic Education. The various school principals also gave permission for the study. Participants individually consented to the study, and the necessary consent forms were completed by the participants.

Results

A total of 368 teachers were randomly selected from 36 township secondary schools that were situated in the Free State Province of South Africa. Of the 368 participants, 202 were female. The age distribution of the participants was as follows; 51% (188) were between 30 and 39 years old; 36% (132) were between 20 and 29 years old; 10% (37) were between 40 and 49 years old. 2.4% (9) were between 50 and 59 years old, and 0.5% (2) were above 60 years old. The teaching experience of the participants was as follows: 44% (162) had one year teaching experience; 41% (151) had 2 years; 14% (55) had 3 years; 5% (18) had 4 years and 6% (22) had 4 years or more teaching experience. The majority of the participants 58,5% (215) were married; 37% (136) single and 3% (11) were divorced, 1% (4) were widowed. All the participants were properly qualified to teach at the secondary school.

This paper focused on one factor, viz. out-of-school influences. This factor is comprised of items whose origins were not found within the school premises, but outside the school. The items making up this factor were as follows (with the number of the item in the questionnaire):

- 96 Learners coming to school with no proper uniforms.
- 97 Learners experimenting with and using of alcohol and drugs.
- 98 Parents' lack of control over their children.
- 114 Learners fighting and arguing with each other.
- 115 Learners using foul language or being impolite.

The table below shows the mean, standard deviation and reliability coefficient of the items.

TABLE 1: ITEM ANALYSIS OF FACTOR 7: OUT-OF-SCHOOL INFLUENCES

Number of items:	5
Alpha reliability coefficient:	0,8734

Mean:	23,3644			
Standard deviation:	6,0648			
Variance:	36,7818			
Item	Mean if item is deleted	S ² if item is deleted	Correlation with total	Alpha if item is deleted
96	18,6836	24,3189	0,6588	0,8573
97	18,4746	23,8025	0,7136	0,8435
98	18,2401	24,9365	0,7520	0,8367
114	19,3446	24,1812	0,6472	0,8609
115	18,7147	24,1875	0,7509	0,8350

The items were found to have the highest loading towards the factor out of school influences. The reliability coefficient of the items was also found to be high. The reliability coefficient ranged between 0,8350 and 0,8573. It was also found that the contribution of each item to the factor was significant. Therefore, all the items were retained since their deletion would significantly lower the reliability of the factor. Thus, all five factors were recognised as significant contributors to the stress situation of the African teachers who work in the township high schools.

Discussion

The results have shown that the majority of the participants were younger than 40 years of age, with a teaching experience of less than five years. Of the 368 participants, 87% (320) were aged below 40 years, and 85% had a teaching experience of less than two years. This implies that the majority of the participants were young people who still had a lot to learn about teaching, disciplining learners and managing relationships with parents and the community. Research found that young couples, due to many family responsibilities, experience marital stressors or external influences that challenge or threaten the early stages of a marriage (Lasode & Awote, 2014; Nation Online, 2013). Therefore, the participants, while they were still trying to manage their young families, also had to learn to manage teenagers who displayed serious signs of ill-discipline, such as abusing drugs, swearing and fighting. This situation had a potential to contribute negatively to the stress situation of these teachers.

The normal procedure in cases of serious ill-discipline by learners is for the school to involve the parents of the ill-disciplined learners. However, the results indicate parents' lack of control over their children as one of the high stressors of the township school teachers. The parents' lack of control over their children could be a result of their children's involvement in gangsterism and drug abuse. The children who are involved in gangsterism and drug abuse are known for demanding money from their parents, or for stealing items from their homes in order to sell them and support their drug addiction (Macupe, 2017). Drug use, cigarette smoking and alcohol drinking may temporarily reduce tension and frustration, and help adolescents to escape the harsh realities of their world – problems that constantly confront learners from impoverished background (Madu & Matla, 2003). Due to the continued use of these drugs, these children display signs of stubbornness, being impolite, using foul language and fighting (Madu & Matla, 2003). Drug abuse could be the reason why township schools have high rates of violent crimes and gangsterism. These behaviours are very difficult for teachers to manage, especially the surges of exhilaration, or prolonged heightened sensation

emanating from drug abuse. The behaviour of such learners is unpredictable. Hence the situation may be potentially dangerous for teachers.

Apart from the parents' lack of control over their children, the township school parents, because of poverty and their low level of education, do not readily become involved in the education of their children, nor in helping teachers with disciplining their children. The process of disciplining learners is intensive, and may require the parents to monitor the children at home, to visit the school several times for follow-up meetings, and (in some instances) to refer the cases to other professionals such as psychologists and social workers. The uneducated township school parents may not have the time to engage in these processes, mainly due to work commitment or the search for basics such as food, clothing and shelter. This implies that the township school teachers cannot rely on parents for assistance with cases of ill-discipline among learners. The situation of dealing with ill-disciplined learners without the support of parents may be stressful for the young and inexperienced teachers.

Poverty may also play a great role in the out-of-school stressors of township school teachers. The township school children may be compelled to come to school without proper uniform, lunch boxes and learning materials due to parents' inability to afford them. Because of poverty and unemployment, the township school parents are unable to make any financial contribution to the school. Since there are no school fees payable in all the township schools, teachers have no funding for teaching and learning materials. The teachers may be enthusiastic and may expect that their learners are neatly dressed, and have all the necessary materials for learning. However, the teachers may be discouraged when learners do not meet their expectations; their enthusiasm may be dampened, and teaching and learning in these schools may become a boring "talk-and-chalk" exercise. This situation could be stressful for teachers in these schools.

Conclusion

The results indicate that issues outside the school made a significant contribution to the stress situation of African teachers in the township schools. The morally deprived environments from which learners come, and over which the teachers have no control, could cause stress for these teachers. This implies that teachers have to deal with learners exposed to drugs, foul language, violence and poor parental discipline. The majority of the teachers who participated in this study were young with less than five years of teaching experience. It should have been difficult for these teachers to manage the serious transgressions of learners. The teachers' inability to manage the ill-disciplined learners could have also contributed negatively to their stress levels. The situation may have called for some support for teachers, such as counselling services, anger management programmes and open discussions with colleagues. In addition, the learners and their parents may also be supported – since their role in addressing the problems could be crucial.

Recommendation

It is recommended that teachers should involve parents and the community members in the discipline of learners, seeing that the bad behaviours discussed here emanated from outside the school premises.

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A BALANCE OF SCALE: TECHNOLOGY TEACHERS' PRACTICE RESPONSE TO CONTINUING PROFESSIONAL DEVELOPMENT

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Abstract

The design-based study reported on in this paper was part of a larger continuing professional development (CPD) project, the main aim of which is to capacitate mathematics, science and technology (MST) teachers through workshops in the province of Mpumalanga, South Africa. The project was initiated because of concerns about unsatisfactory learner performance in the province. CPD is based on the notion that capacitating teachers will make them experts in the subject matter they teach and the methodologies they use, ultimately improving learner performance. The project is a partnership between the University of South Africa (UNISA) and the Mathematics, Science and Technology (MST) Academy. UNISA advises the MST Academy and conducts research as a monitoring strategy that can lead to improvements in the project. Numerous workshops, together with a few studies by the UNISA team, have been conducted to date. This study explored the workshop-based CPD of Grade 7–9 Technology teachers in Mpumalanga. The methodology employed showed the partnership design plan and teachers' views based on their experiences of the workshops, as sourced from focus group interviews held during the workshops and focus group discussions and observations made during school visits by the UNISA team. The study revealed that the teachers benefited from the workshops; their challenges relating to content and teaching methodology were addressed but not fully; and certain barriers at their schools prevented them from implementing what they had learnt effectively. The findings of this study helped the UNISA–MST Academy partnership to fill gaps in the workshops.

Keywords: technology teachers, continuing professional development, workshops, improvement, Mathematics, Science and Technology Academy

1. Introduction

South Africa has been struggling for many years to deliver acceptable results in the MST subjects (Gauteng Department of Education, 2010). The Department of Basic Education (DBE) in Mpumalanga identified insufficient teacher knowledge as the main cause of underperformance the MST subjects in the province. In 2013, the province established an MST Academy under the auspices of the DBE Mpumalanga to provide CPD to MST teachers and to support schools by, for example, providing them with resources, monitoring CPD workshops and broadcasting live lessons from the MST Academy's hub in the town of Middelburg. In 2014, I initiated a community engagement project in the Department of Science and Technology Education (DSTE) at UNISA. The project is a partnership between the DSTE and the MST Academy. UNISA funds the project (limited to the UNISA team) from the community engagement project budget. The UNISA team comprises experts in the MST streams. The main aims of the UNISA team are to advise the MST Academy, to review its training materials, to monitor and evaluate the training workshops it offers and to visit schools to monitor the impact of the workshops and to give support to teachers. This study explores the workshop-based CPD of Grade 7–9 Technology teachers in Mpumalanga. The objectives of the study are as follows:

- To describe the workshops that are conducted for Grade 7–9 Technology teachers as part of their continuing professional development.
- To establish Grade 7–9 Technology teachers' experience of these workshops.
- To identify any improvements, if any, that these workshops make in Grade 7–9 Technology teachers' practice.
- To account for the improvement that the design-based research project makes in the workshops that are conducted for Grade 7–9 Technology teachers.

CPD is the “lifeblood” of a professional’s career – it injects improvement in his/her practice and brings success in the achievement of outcomes. CPD has proven to be a needed intervention for Technology teachers who struggle to teach the subject in South African schools. Well-prepared teachers are needed to meet South Africa’s evolving challenges (South Africa, 2007), which are related to the skills shortage in technology fields (McGregor, 2010; Bremer, 2012), such as artisanry, engineering and architecture. The province of Mpumalanga is responding to these challenges through the MST Academy project. The difference that the CPD project for Technology teachers makes can be comprehensively accounted for by observing the practice of the teachers who have been exposed to CPD and by talking to them.

Since the implementation of Technology as a school subject, concerns have been raised about teachers’ knowledge (Mapotse, 2012) in the sense that many teachers lack subject content knowledge, pedagogical content knowledge (PCK) and the relevant skills (Reitsma & Mentz, 2007; Rohaan, Taconis & Jochems, 2012). The relative newness of the subject in the curriculum might be the main reason why teachers should still be helped to acquire the related content knowledge and skills. It is in this light that Technology teachers should be encouraged “to keep learning new knowledge related to their classroom activities” (Nakambale, 2018, p. 60), especially because technology evolves at a fast rate. CPD will help them to hone their teaching knowledge and skills so that they can facilitate learners’ learning effectively.

2. Conceptual framework

2.1 Continuing professional development

The CPD of teachers can be traced back to the beginning of the twentieth century in the American context (Holy & McLoughlin, 1989). Though the focus of CPD was more on initial teacher training, it became a popular concept and ultimately replaced in-service teacher training (Holy & McLoughlin, 1989). The lack of a shared conceptual base, consistent attention and commitment of resources at in teacher education motivated the concept of CPD (Holy & McLoughlin, 1989). This problem found a strong voice in Shulman’s (1986a; 1986b; 1987) seminal work when he introduced the framework of PCK to address a lack of teacher knowledge in teacher education. Shulman (1986a) defined PCK as a specific form of knowledge for teaching relating to the transformation of subject matter knowledge in the context of facilitating student understanding. Shulman (1986a) identified seven essential elements that every teacher should demonstrate expertise in, namely, knowledge of subject matter; pedagogical content knowledge; general pedagogical knowledge; knowledge of curriculum; knowledge of learners and their characteristics; knowledge of educational contexts; and knowledge of educational aims, purposes and values.

In the context of this paper, CPD is the continuous formal, non-formal or even informal learning that a teacher undergoes throughout his/her career in order to improve his/her performance and, in turn, that of learners. The aim of CDP is to attain a balance between

individual, group, school and national needs, to encourage teachers' commitment to professional and personal growth, and to increase teachers' resilience, self-confidence, job satisfaction and enthusiasm for working with learners and colleagues (UR-CE, 2018, p. 19). Mokhele and Jita argue that CDP should "bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of their students" (2010, pp. 1762–1763). One can only make sense of this change by following up on the practice of and giving on-site support to teachers post their training. CDP may be any or a combination of the following interventions/enrichments in a teacher's career: participation in and contributions to workshops/seminars/conferences (in-house or outdoor); short courses and award-bearing programmes (distance, online or face-to-face); study tours and field visits; specialist expertise; professional development items in meetings; communities of practice; (informal) discussions with colleagues or learners to reflect on practices; action research; case study discussions; lesson study; the keeping of reflective diaries and professional portfolios; (research) projects; coaching; mentoring; team teaching; job shadowing; peer observation; the development and adaptation of teaching and/or learning materials; the rotation of roles/jobs; structured feedback from learners; and self-study (the internet, books, journals, magazines, etc) (UR-CE, 2018, pp. 20–21).

2.2 Technology education

The DBE defines technology as "the use of knowledge, skills, values and resources to meet people's needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration" (2011, p. 13). The content area Technology, Society and Environment includes the impact of technology, bias of technology and indigenous technology. This content area creates a need to entertain indigenous perspectives pertaining to the definition of technology. For instance, indigenous technology is any human-made device that carries cultural connotations, formulations or organisations that are used to produce or create goods or services, and it may include local/traditional knowledge, folk knowledge, people's knowledge and traditional wisdom/traditional science since it exists in tangible/material and intangible/non-material forms (Senabayake, 2006; Ogunbure, 2011; Obikeze, 2011).

3. Methodology

Design-based research, in accordance with the writings of Barab and Squire (2004) and Plomp (2007), formed the impetus for this study. Researchers who aim for developmental goals focus on solving teaching, learning and performance problems in a body of theoretical design principles that can inform future development efforts (Reeves, 2000) and their characteristics, that is, challenges of context, design and enactment (The Design-Based Research Collective, 2003). Such efforts should not bypass the experiences of the people they serve since these people should confirm or disconfirm the benefits that they derive from the efforts and the improvement the efforts are making in their practice. It is in this light that the MST Academy–UNISA partnership designed a CPD plan for Technology teachers as part of the main MST intervention project. Figure 1 depicts the plan in question.

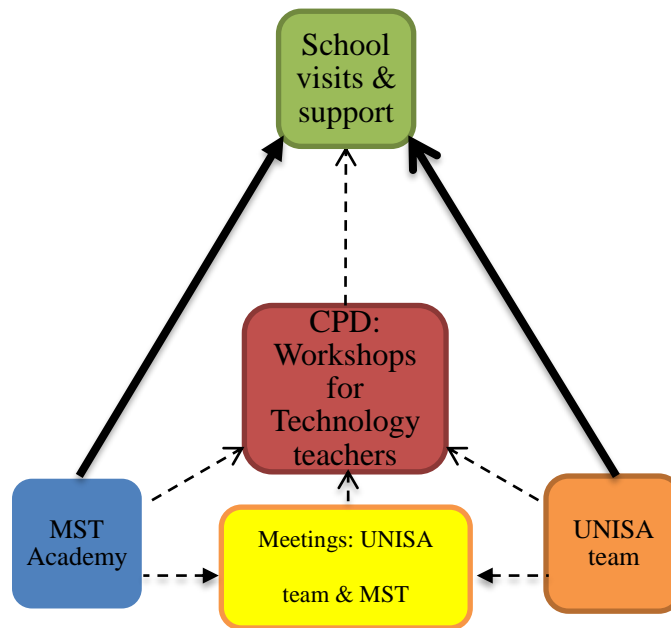


Figure 1: CPD plan for Technology teachers

From 2014 to 2019 the UNISA team and the MST Academy held six meetings to plan the workshops for MST teachers and five meetings to reflect on the workshops (in accordance with the plan in figure 1). During the plenaries the MST Academy presented the plan and the UNISA team mainly advised on it in respect of training manual development and review, activities, targets/goals and dates. At times, the UNISA team offered empowerment workshops such as workshops on facilitation skills to the MST Academy. The workshops for MST teachers represent the main activity in the plan. During the reflective meetings the teams discussed the activities covered and the goals achieved. The teams then assessed the successes and the aspects that needed improvement or those aspects that the workshops had not covered.

The workshops followed a centralised model of training, that is, the training took place at a central venue where the teachers converged for two days. Officials of the MST Academy facilitated the workshops as per the mandate given by the DBE Mpumalanga. The UNISA team made inputs as and when required during the workshops. The UNISA team also gathered data mainly from the teachers during the workshops, the findings of which helped to inject improvements in future workshops. School visits were carried out by both the UNISA team and officials of the MST Academy, but each team followed its own plan. As part of the reflective meetings that were held towards the end of each year, the teams submitted their respective reports on the school visits.

Numerous MST teacher workshops, including four that the UNISA team participated in, were conducted. The UNISA team evaluated the training manuals of three of the four workshops it participated in. The content of the workshops covered the areas that the MST Academy (particularly the Technology Education specialist) regarded as challenging for teachers, such as electronic systems and control (electronic components, simple electric circuits and the impact of electronic devices and usage), processing (preservation of metals through painting, electroplating and galvanising) and the use of a mini-PAT (i.e., a practical assessment task based on the design process). The UNISA team also evaluated three workshops by gathering data through focus group interviews and observations during the workshops, analysing the

data and presenting written reports and the main findings of the evaluations to the MST Academy at the reflective meetings. The focus groups were two Grade 9 groups consisting of twelve and eight participants, respectively, from the two main groups that came from different districts and attended the workshops on two different dates. I employed volunteer or self-selected sampling to select teachers to participate in the study. In volunteer selection, the potential participants qualify and are willing to participate in the study (Murairwa, 2015). The target number of participants for the study was a maximum of twelve, and this target was achieved. The MST Academy carried out several school visits to give support to the teachers concerned. The UNISA team visited one school where it gathered data through focus group discussions with two Grade 8 and 9 teachers. They were the only teachers who taught Technology in these grades. They volunteered to participate in the discussion and observation. Observation helps researchers to observe the interactions and practices of people in their social environments (Fossey, Harvey, McDermott & Davidson, 2002).

I employed thematic analysis (Johnson & Christensen, 2017) to establish patterns in the data, which built up to themes under two main categories, namely, the workshops and the school visits. The data gathered through interviews and observation were triangulated to account for the trustworthiness of the methods employed in the study. I also cross-checked the data collected with the two UNISA team members who are Technology Education experts to account for the credibility of the methods used.

4. Findings

In this section I present the key findings in connection with the evaluation of training manuals, and the focus interviews held with teachers during the workshops and the school visits.

4.1 Profiles of teachers who participated in interviews during the workshops

The teachers had a great deal of general teaching experience but limited experience in teaching Technology. Some of the teachers had just started teaching Technology. Some of them were highly qualified in the subjects that they had taught before they started teaching Technology. When Technology Education was rolled out, there were almost no qualified teachers to teach Technology. Consequently, teachers qualified in the teaching of Science, Mathematics, Consumer Studies and so forth were asked to teach Technology. This explains why many teachers are underqualified in the subject, which creates a need for them to be trained.

4.2 Evaluation of training manuals

The training manuals for the series of workshops did not have a uniform approach and structure at first. Some of the manuals were well structured, had a cover bearing the logo of the DBE Mpumalanga and a contents page that helped the reader find his/her way to the contents. Some manuals lacked this design approach, for example, they did not have an introduction or a background section, they did not stipulate the objectives and assessment criteria of the workshops and they did not have page numbers. The manuals contained learning activities that were designed for learners. They should have been designed in such a way that the teachers would understand how to deliver the content. Concepts were illustrated by means of diagrams or pictures to help the teachers understand them. The font size of the text in some of the manuals was very small, which hampered legibility.

4.3 Findings from focus group interviews during the workshops

4.3.1 Benefits of the workshops for teachers

The teachers felt that they benefited from the workshops. Difficult areas that the teachers battled with were addressed in the workshops. The teachers specifically showed improvement in their understanding of logic gates – they seemed lost at first when this topic was discussed in the workshops but their understanding improved as the facilitator delved deeper into it. They felt that these kinds of topics are more mathematical than technical. One teacher, for example, stated: *I do not have a good understanding of mathematics; the workshop unlocked my mind to understand how logic gates work.*

4.3.2 Duration of the workshops

While the teachers appreciated the training that they received in the main, they expressed certain fundamental reservations. They felt that the training sessions should be much longer and continuous in order to address their PCK gaps effectively. They suggested a duration of four days per week at the beginning of each term or during school holidays. The brevity of the workshops limited the facilitator in terms of coverage of areas that the teachers battled with. One teacher stated that the *facilitators do not have time to explain and engage us as teachers.*

4.3.3 Content covered

The teachers expected to be engaged in making drawings. They felt that they are just as in the dark as their learners when it comes to making drawings in the subject. A mini-PAT is a practical assessment task that engages learners in design projects. It is one of the most problematic areas for teachers. The teachers were concerned that the use of a mini-PAT was only explained and not practically done. In one workshop that was observed, the facilitator explained logic gates on a flip chart. The teachers gave wrong answers to his questions, but later on they understood his explanations when he cited real examples relating to the concept. The training manual explained a mini-PAT in terms of a scenario, investigation, design, making, evaluation and communication but did not contain planned activities. Since Technology requires basic knowledge of physics and mathematics, teachers need to be trained in basic calculations. One teacher observed that *there are calculations of voltage, resistance, current, Ohm's Law, gear ratio, rpm, all of which need basic mathematics background* (sic). Furthermore, it was observed that when the preservation of metals was discussed, a teacher remarked with reference to his indigenous background that, *in the olden days, animal fat was used to preserve metals*, but the facilitator cut him short. This teacher, a Ndebele by culture, wanted to explain the concept of preservation in IsiNdebele, which can be more elaborative than English.

4.3.4 Teaching methods

The workshops were mostly skewed towards presenting content instead of helping the teachers to present lessons to learners. As a result, the teachers wished that they had been given the opportunity to practise presenting lessons. Moreover, the facilitators did not take full advantage of the planned activities in the training manuals.

4.4 Focus group discussions during the school visits

The findings of the focus group discussions that were held with two female teachers from one school who taught Grades 8 and 9, respectively, are reported in this section.

4.4.1 The profile of the teachers

The Grade 8 teacher (here named Teacher Q) was a black Xhosa woman. She had an Advanced Certificate in Education, with specialisation in Technology Education. She also had a BEd (Senior Phase) and had completed a course in Further Education and Training in

Natural Science and Technology. She specialised in graphics and communications technology, which she had studied as part of her degree qualification. She attended two workshops organised and presented by the MST Academy.

The Grade 9 teacher (here named Teacher R) was a black Ndebele woman. She had just started to teach Technology and was only exposed to the workshops organised and presented by the MST Academy once. She did not hold any qualification in Technology Education.

Teacher Q and Teacher R taught six large Technology classes. The ratio of each class was about 1:56.

4.4.2 Drawing courage from each other's expertise and workshops attended

The two teachers stated that they worked as a team. Teacher Q remarked: *I enjoy teaching graphics communication because of the support I have received from the MST Academy through the workshops.* Her qualification in the subject gave her an advantage over Teacher R. Teacher R, who counted on Teacher Q's knowledge of graphics and communications technology, commented: *She helps me a lot teaching this aspect.* Teacher Q and her learners were confident in this content area. Both Teacher Q and Teacher R claimed to have benefited from the MST workshops, especially with regard to challenging areas such as electricity (calculation of resistor colour coding), graphic communication, and mechanical systems and control. They felt that they were now better equipped to teach Technology. The teachers were grateful for the MST Academy's continuous support through the supply of kits to their school.

4.4.3 The teachers' knowledge gap

Teacher Q and Teacher R seemed not to know what indigenous knowledge was despite its inclusion in the CAPS. They did not integrate it in their teaching. As part of the discussion, the UNISA team provided some insights about the meaning of indigenous knowledge and how it could be integrated into the teaching of Technology. The teachers could use locally available resources, such as beadwork, indigenous food processing, paintings and so on. A specific reference was made to the work of the popular designer and artist, Esther Mahlangu, who hails from Mpumalanga. The discussion illuminated the teachers' thinking and they excitedly began to give their own examples. Teacher R remarked: *[W]e are Africans and know these things a lot, but we have neglected them because of the external knowledge that dominates the curriculum.*

4.4.4 On-site challenges

Teacher Q and Teacher R were committed to the teaching of Technology, to the extent that they improvised when it came to consumables such as carbon paper and paper clips. In certain instances, they agreed with the school management to be reimbursed if they used their own money to buy consumables. Teacher R stated on their behalf: *[W]e are demoralised that the school ends up not reimbursing us as it has promised. The school management keeps the Technology resources locked away and we cannot access them.* It was observed that the teachers could not even keep resources and artefacts that learners produced in the storage rooms attached to their classrooms because the storage rooms had been vandalised and were without doors. The teachers therefore kept artefacts in the school's boardroom.

The fact that the use of a mini-PAT was not given the expected attention during the teacher workshops left Teacher Q and Teacher R not knowing much about how to apply it. A mini-PAT (practical assessment task) is a design task that learners must execute. A technological

problem scenario is explained, which the learners are required to investigate. Thereafter, they have to design a solution for it and make an artefact that represents that solution. During the discussion, Teacher Q and Teacher R stated that they merely assigned learners mini-PATs to do at home. They expressed a need for teaching resources, such as laptops and smartboards. Teacher Q remarked: *[T]here is only one smartboard in this school; we battle to have access to it as it is used by other teachers as well.* They mostly relied on textbooks, for example, the textbooks titled *Grade 8 Platinum* and *Grade 9 Top Class*. These circumstances compelled them to rely heavily on the textbooks regarding the teaching of Technology. Technology Education was more a practical subject and the teachers therefore had a need for a techno-lab and storage rooms.

As part of the focus group discussions, the UNISA team gave the teachers support in the form of the following advice:

- **Taking advantage of the richness of local knowledge/technologies:** The teachers should make an effort to audit the locally available knowledge/technologies. They could, for example, invite elders or experts such as Esther Mahlangu, who has artistic knowledge and uses affordable natural resources such as chicken feathers for paint brushes and sticks, to speak to learners.
- **Establishing a partnership with a coal mine in the area:** The teachers should partner with the local mine to contextualise their teaching. They could plan excursions, observe the mechanism of head gears and design solutions to the problems that mining activities might cause, for example, pollution.
- **Applying creativity in following CAPS and teaching Technology:** The teachers were advised that CAPS allows some degree of flexibility and creativity in teaching. From a social constructivist and communal approach, they should let the learners engage in group work as a means of training future teams of engineers, work on case studies, which abound in indigenous environments, and do research from a variety of textbooks and scholarly books. That way they would not follow CAPS as a blueprint.

5. Discussion of findings

The literature points to the importance of CPD in the light of the discovery of gaps in teacher knowledge from the historical development of the concept, according to Holy and McLoughlin (1989). This study shows that Technology teachers do value and benefit from training offered to them. Teachers who had participated in the CPD workshops of the MST Academy and teachers whom the UNISA team had visited expressed this benefit. Hence, CPD addresses gaps in teacher knowledge and teachers' incapacity to teach Technology (Mapotse, 2012; Reitsma & Mentz, 2007; Rohaan et al., 2012). A compelling aspect is that CPD should bring about an improvement in Technology teachers' practice (Mokhele & Jita, 2010). Teacher Q and Teacher R demonstrated a commitment to teaching the subject, which was enhanced by their attendance of the workshops. This means that training teachers at a centralised venue should not be an end in itself. If the training (workshops) is understood as a support project, it should be decentralised. The support should be extended to the practice sites (schools) of teachers. The continuity of the professional development, coupled with the continuous reflections offered by the provider(s) of the training, promises to be effective in addressing those areas in which teachers lack knowledge. Technology Education has the potential to respond to the job market needs of South Africa. Spending energy and resources to support teachers proves to be a good investment since those teachers can then produce professionals who work in technical fields. If learners learn about local technologies in Mpumalanga, they may eventually be absorbed into the tourism industry, which is one of the

main economic activities in the province, as engineers or artists. By including indigenous technological perspectives in teachers' training, they could help learners to identify the opportunities that are available locally and help communities to find solutions to their challenges.

6. Improvements in the workshops

The UNISA–MST Academy partnership revisited the CPD plan for Technology teachers. The changes are illustrated in figure 2.

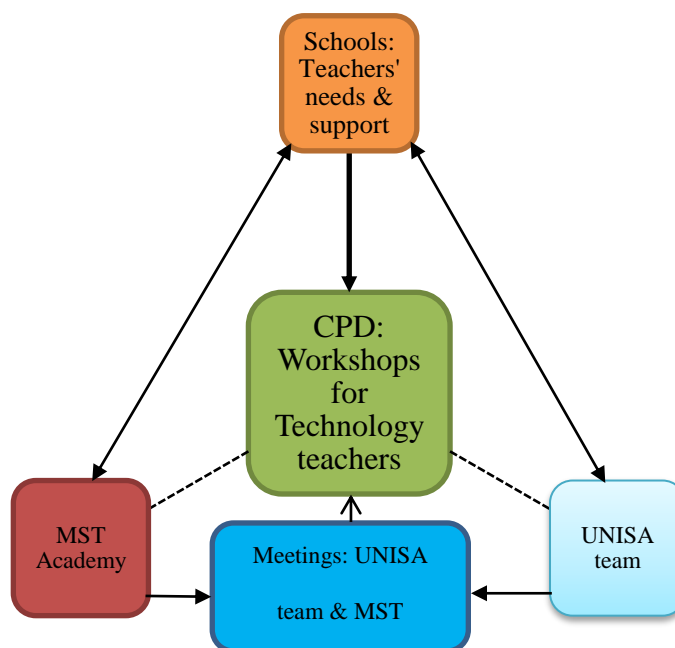


Figure 2: Reviewed CPD plan for Technology teachers

In figure 2, the long lines on the sides (between schools and the MST Academy and between schools and the UNISA team) are two directional, unlike the lines in figure 1. These two-directional lines represent feedback loops – the workshops will be informed by teachers' needs in order to make them (the workshops) more relevant and enriching for the teachers. So, the workshops will be planned in line with teachers' needs. Engagements with teachers will be informed by a needs analysis conducted by means of school visits. The training manuals will have a uniform design and format: a table of contents, learning outcomes, common technicalities, such as a 12-pt font, learning activities on how to present content, and so forth. The topic of how to use a mini-Pat will no longer be left to chance since it is one of the main challenges for teachers. The workshops will span three to five days and the number of workshops will be increased, except in instances where there is a need to target small areas that call for one or two days of training. An effort will be made to integrate indigenous knowledge in the training.

7. Conclusion

The findings of the study show that the CPD of Technology teachers in Mpumalanga mainly takes place in the form of workshops. It is believed that putting energy into the professional development of teachers will translate into better learner performance in Mpumalanga. Between teacher development (workshops) and learner performance lies on-site teacher support and monitoring, which must be attended to. The UNISA-MST Academy partnership reflected on the workshops for Technology teachers and asked the following questions: Do the workshops address teachers' needs? How can this be verified? How can the workshops be

improved given the teachers' feedback as expressed in the research findings? The workshops targeted the areas that teachers struggled with but did not make those areas more understandable for them. In addition, those areas were not confirmed against the teachers' needs. The findings of the research into the workshops for Technology teachers led to improvements in the CPD plan for Technology teachers, as depicted in figure 2. The UNISA team's engagements with teachers during the school visits showed that teachers benefited from the workshops and implemented what they had learnt. However, certain school-based dynamics made it difficult for teachers to achieve their teaching mission, as related in this paper. The two teachers who were interviewed and observed on-site cast light on the difference that the workshops can make in teachers' practice. From the perspective of design-based research, this partnership is committed to continuously reflecting on the design or approach of the workshops to ensure that they respond to teachers' needs. Therefore, it is recommended that 1) teachers' needs be prioritised to ensure the workshops respond to those needs, 2) teachers be engaged more in learning activities during the workshops, that is to say, the workshops should be teacher driven, 3) the content and pedagogical areas that teachers struggle with the most be emphasised and 4) the MST Academy or the DBE Mpumalanga intervene in the management and distribution of resources in schools to ensure that Technology teachers receive the support that they deserve in teaching the subject.

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THE INTEGRATION OF INDIGENOUS GRAPHICS KNOWLEDGE AND SKILLS INTO THE TEACHING OF GRAPHIC DESIGN IN GRADE 9

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Abstract

This single descriptive case study explored the integration of indigenous graphics knowledge and skills in a school at Ehlanzeni District in Mpumalanga Province with a Grade 9 Technology teacher. The integration of indigenous knowledge and skills can help enhance Grade 9 learners' understanding of graphic design which is part of the content taught in Technology Education. The graphics knowledge and skills existent in indigenous contexts in which most of learners come from can make the learning of graphic design relevant and more understandable to learners. Hence, there is a need to research this phenomenon. One Grade 9 Technology teacher was purposively selected for an interview and observed while teaching in class. Seven learners from this teacher's class were also selected to be interviewed – however, analysis in this paper were done on the teacher only. The constructivist theory of learning grounded this study. The findings revealed that though the teacher had some understanding of technology, (i) she battled with the concept of indigenous knowledge; (ii) she was unaware that it is even mentioned in the CAPS; (iii) her limited understanding of the concept made her not to know how she could integrate it in the teaching of graphic design. She also did not capitalise on it as a resource in a resource-hungry teaching situation that she faced. While she acknowledged the importance of the learners' culture, she did not take full advantage thereof in her teaching. Her adoption of demonstration as her predominant teaching approach provided an opportunity for integrating indigenous knowledge and skills but again she did not capitalise on that fully. This study can help transform the teaching of Technology by ensuring the integration of indigenous knowledge, a much-needed approach to education in (South) African context.

Keywords: Indigenous knowledge, integration, graphic design, culture, skills, Technology Education

1. Introduction

Technology Education as a subject in the Curriculum and Assessment Policy Statement (CAPS), is meant to give learners the opportunities to apply the design process to solve civil, electrical and mechanical problems analytically and graphically. The subject created a need to provide learners with an opportunity to solve technological problems through the design process wherein they communicate and solve problems by using illustrations and drawings that form visual representations of ideas and messages. Technology Education therefore aims to introduce learners to the world of engineers and how they apply their skills in solving problems, first through graphics (Department of Basic Education [DBE], 2011).

In contrast, the studies conducted in relation to graphics by Makgato and Khoza (2016) on the integration of the cognitive and manipulative skills used in design, and Chedi (2015) on technical drawing skills acquisition for teaching and learning and challenges in Technology Education, lack the inclusion of indigenous knowledge systems (IKS) issues. These studies are more on the challenges that students face towards technical graphic/drawing skills acquisition. In both studies, the emphasis is on students' difficulties in the understanding of

technical drawings and the background of engineering graphic design (EGD), and lack of understanding sectional drawing and principles. Jones (1997), on the other hand, brings another aspect of the Technology Education curriculum, which is that, too often the impact of technology on society has been considered than different views that people have about technology and the way these are influenced by their beliefs, values and ethics. This claim directly implicates the absence of IKS in EGD.

Despite the above studies, it seems that effort has not been made to steer research towards the importance of integrating IKS in EGD. It is against this backdrop that Grade 9 learners find the learning of graphic design challenging. It was however, noticed in the process that learners' homegrown knowledge is not sufficiently accommodated in teaching them Technology, despite IKS being part of the knowledge forms that learners bring from their homes or their cultural environments. Learners lack an understanding of graphic designs from an indigenous point of view. This lack of understanding is linked to the non-inclusion of IKS and skills in the teaching and learning of the subject.

It therefore becomes important that indigenous graphic designs, which are displayed in contexts such as house architecture, sculpture, textile materials, etc. are explored from the broader context of IKS down to the local context in the Province, and that their educational value and relevance are recognised. This study explored the integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic design from an indigenous perspective. This assisted to provide the technics to mitigate the lack of understanding when learners attempt to express their design ideas. The following objectives were pursued in order to achieve this aim: (i) to explore indigenous graphics knowledge and skills, which can enhance Grade 9 learners' understanding of graphic design, and (ii) to determine ways in which these indigenous graphics knowledge and skills can be used in the learning of graphic design in Grade 9.

2. Theoretical framework

The study was grounded in the constructivist theory of learning (Savery & Duffy, 1995). Constructivism helps learners to construct knowledge for themselves individually and or socially through their daily life experiences. The constructivist theory of learning in this study assisted towards understanding the manner in which indigenous graphics knowledge and skills are integrated in the teaching of graphic design in Grade 9 class as the African way of knowledge construction (Odora Hoppers, 2004, Shava, 2013; Gumbo, 2017). The focus was more on social constructivism as learners are expected to interact and cooperate with each other to present technological solutions analytically and graphically during technological activities (Yilmaz, 2008). Social constructivism gives learners an opportunity to draw their experiences from their social context (Hoover, 1996; Reddy, Ankiewicz & de Swadt, 2005).

3. Research design and methods

An indigenous paradigm was considered in the study as it promotes participatory, active, contextual and co-construction of knowledge, all of which are tenets of social constructivism and undergird the methodology of teaching Technology (Chilisa & Kawulich, 2012). These aspects may also suit the concept of community learning from an ubuntu philosophy in which learners may see themselves as a collective during their learning in support of one another. In order to advance an African indigenous perspective, merging the constructivist and indigenous paradigms should be considered (Mutekwe, Ndofirepi, Maphosa, Wadesango & Machingambi, 2013) in the teaching and learning of Technology.

The study followed a single descriptive case study design. Case studies are chosen when the research requires the “close examination of people, topics, issues, or programs”. This was in order for us to have an in-depth understanding of the participants’ views about indigenous graphics knowledge and the role it can play in the learners’ learning. Descriptive case studies are suitable to present the in-depth understanding of a phenomenon in the real-life context of its occurrence (Baxter & Jack, 2008; Zainal, 2007). This study used a descriptive case study to investigate the integration of indigenous graphics knowledge and skills in Grade 9. That was done in order to enhance Grade 9 Technology learners’ understanding of graphic design from an indigenous perspective in a school at Ehlanzeni district, Mpumalanga Province.

The first author for this paper collected the data. The sampling method used in the study was purposive, in which a Grade 9 teacher was selected based on the good track record of teaching graphic design. This teacher was interviewed using a semi-structured interview method. Semi-structured interviews allow the flexibility and openness that characterise oral communication in African cultures. Additionally, a semi-structured interview is a more flexible version of the structured interview as “it allows depth to be achieved by providing the opportunity on the part of the interviewer to probe and expand the interviewee’s responses” (Rubin & Rubin, 2005). Interviews are particularly useful for getting the story behind the participants’ experiences by concentrating on verbal, non-verbal, spoken and heard words (Cohen, Manion & Morrison, 2007). Harrell and Bradley (2009) claim that interviews can be used as primary data gathering methods to collect information from individuals about their own practices, beliefs or opinions. This teacher was also observed in class. Observational notes details what a researcher sees in the real situation (Chatman, 1992). Hence, observing this teacher in practice helped us to see her attempts, if any, to integrate indigenous knowledge in her teaching. Personal notes were taken as a backup to the interviews. Personal notes are the researcher’s “own feelings during the research process; theoretical notes are “interpretative attempts to attach meaning to observations” (Polit & Hungler, 1999). While interviews are used to record daily conversations or events, field notes are “much broader, more analytic, and more interpretive” (Polit & Hungler, 1999).

Data were thus gathered about this teacher’s practice and views as well as learners who were taught by the teacher. Our interest in gathering data was in relation to her practice, beliefs and views as an African teacher. In addition, our interest was also on how she could demonstrate a constructivist teacher’s expertise in engaging learners and knowledge perspectives. In that sense, interviews can be used to gather background information or to tap into the expert knowledge of an individual (Harrell & Bradley, 2009). The interview questions hovered around the participants’ understanding of indigenous knowledge, the value attached to the indigenous knowledge and skills, attempts to integrate indigenous knowledge and skills in graphic design, and resources used to integrate indigenous graphic design knowledge in her teaching. The interviews were conducted during the normal subject periods as per the agreed arrangements with the participants to ensure minimal disruption of the normal running of the school. The interviews lasted for approximately 20-30 minutes over four weeks. Three lessons were also observed.

The interviews were audio-recorded. The transcripts were used to provide evidence to answers to the questions asked. The study used content analysis to analyse the data collected from personal interviews. Vaismoradi, Jones, Snelgrove and Turunen (2016) indicate that content analysis is the type of research analysis or set of techniques used to analyse textual data and elucidate themes. According to Vaismoradi et al (2016), the key characteristics of content analysis are the systematic process of coding, examination of meaning and provision

of a description of the social reality through the creation of themes. Furthermore, content analysis gives the ability to the researchers to structure the qualitative data collected in a way that satisfies the accomplishment of research objectives. We started by making sense of the interview data during data collection. Also, we checked if we got all that was needed to answer the research questions fully. Then, the interview data were transcribed. The transcriptions were read in order to familiarise ourselves with the data in preparation for coding. This was followed by coding and arranging the data into segments/categories. The analysis continued until themes were identified backed up with carefully selected verbatim statements from the participant.

Trustworthiness of the methods of a study is defined as a methodological (research design, data gathering, data analysis) accuracy (soundness) and adequacy of the research inquiry (Lincoln & Guba, 1985; Holloway & Wheeler, 2002). The common tenets of trustworthiness in a study are credibility, transferability, confirmability and dependability. These tenets safeguarded were through a number of strategies in the approach to data collection down to analysis. Firstly, multi-data collection method was considered to build trust in the study in accordance with Cohen et al. (2007) in that field notes, interviews and observations were used. Secondly, member-checking was used as data verification strategy. In this case the interview transcripts and observation field notes were discussed with the participants for verification of the accuracy of the verbatim extracts and the field notes. Thirdly, data triangulation was employed in the analysis of the interview and observation data. Fourthly, a reflective journal was used for field notes to establish confirmability. The journal helped to reflect on and tentatively interpret the data. An attempt was made to capture all the events during fieldwork in the journal. Fifthly, electronic records (audio-recorded), non-electronic, i.e. field notes were kept in order to crosscheck the data, and for the writing the final report of the study.

4. Findings

Four themes were identified from the analysis which with the understanding about the integration of graphics skills. These were (i) accounting for the indigenous view of technology as integrated in the CAPS, (ii) resourcefulness of indigenous knowledge for teaching graphic skills in Technology Education (iii) learners' culture as a basis for indigenous graphics knowledge and skills (iv) the teaching approach that promotes the integration of indigenous graphics skills.

4.1 Accounting for the indigenous view of technology as integrated in the CAPS

The teacher started by explaining the importance of teaching Technology at school. According to her, technology is something that did not start today. It was long there, just that it was not formalised in the curriculum. She further stated that South Africa is one of the countries where Technology Education was not recognised as a subject but later it became part of the curriculum. She drew the learners' attention to the fact that technology did not start in a vacuum, but that it started long time ago and from there it was developed. In relation to the above, this teacher stated that learners have the understanding of the difference between indigenous technology and modern technology.

This teacher seemed not to know the contents of CAPS as she claimed that *the policy document does not allow expansion of the content up to the integration of indigenous technology*. But her views were also that time would not allow IKS integration as the subject is given only two hours per week. This way she thought IKS integration is a curriculum "add-on" although at the same time she sounded to have space for the integration, *policy sometimes*

is confined, does not allow you because of time as you won't be able to enlarge but you can because culturally they were doing it. In contrast, during the lesson observation (though IKS were not included in her lesson objectives), she had drawn some examples from the IKS perspective when dealing with orthographic drawings, linking with the fact that indigenous people used to draw things in the past. She further explained these drawings in the context of IKS citing places such as Sudwala caves in Mpumalanga Province.

The findings revealed that despite that the teacher demonstrates an understanding of the development of technology from long time ago to Technology as a subject, she still has the problem of understanding the integration of indigenous graphic designs or indigenous technology in the teaching of graphic design during the developing of Technology activities. Though she mentioned IKS during teaching, the lack of understanding remains a major problem, as the teacher seems not be clear on how IKS should be integrated in order to enhance the Grade 9 learners' understanding of graphics. Therefore, this might lead to compromising the teaching of the subject.

4.2 The resourcefulness of indigenous knowledge for teaching graphic skills in Technology Education

The teacher raised concern about the difficulty of teaching Technology without the necessary resources. She stated that Technology Education is a subject that needs one to have enough resources. Without resources, there is no concrete evidence to the learners to learn about drawings, leading to no proper foundation for the integration of IKS. She stated that it becomes difficult to find those artefacts as per her statement: *yes, it is not easy to find those artefact archives. I do not think that caves are still there to get the artefacts.* This teacher seemed to think that indigenous technological artefacts could only be obtained from the caves. Furthermore, the teacher stated that lack of resources is one of the biggest problems in the teaching of graphics, but that with the aid of IKS integration this problem can be addressed. Ironically, the teacher focused more on giving learners explanations on the chalkboard and other alternative methods were not considered. Learners were of the view that though the teacher made an effort to bring some resources to class, those did not assist much in their learning. One learner attested that the resources brought to class still may not help in the integration of IKS.

We noticed that even though the teacher was aware of indigenous technology, she struggled to integrate indigenous graphics knowledge and skills in her teaching. This, according to her, was due to lack of resources such as indigenous places, few books with the history for drawing in South Africa than other countries. She also claimed that there were no experts/elders to assist in the teaching of graphics with the aid of indigenous knowledge and skills near the school. The authors contend that the teacher needs to be assisted to identify resources in indigenous environments which are endowed with rich resources. CAPS stipulates the specific aims for Technology Education as giving the learners the opportunity to appreciate the interaction between people's values and attitude technology, society and the environment (DBE, 2011, p. 8). Furthermore, it outlines the topics and core content areas in which indigenous technology is one. This provides a starting point to be guided on how to amass and mobilise the indigenous resources for use in the classroom. The teacher seems not to be aware of this policy pronouncement as she claimed the policy document does not include it.

4.3 Learners' culture as a basis for indigenous graphics knowledge and skills

Despite her no-space-in-the-curriculum views, this teacher believed that culture has a great influence in the learning of graphics, and that it is important in design as learners will be able to see the relationship between technology before and modern technology. She stated, yes, *they can because of the tools that they used long time ago for drawing those graphics and even now they can also use those tools and patterns to differentiate, like some parts of countries those designs are very important, so they still use them.* In relation to the statement above, learners also agreed that integrating IKS in the learning of graphics can make learning much easier for them to understand graphic designs, as this will be based on their cultural backgrounds, *even young kids will easily understand but now some don't.* They felt that regardless of their knowledge about indigenous cultures, none of the learning activities in graphics incorporated their cultural practices, *no, I haven't come across indigenous drawings in the learning of graphic designs.*

The literature alludes to constructivism as the theoretical framework in line with the indigenous paradigm. Teachers should therefore take advantage of the opportunity afforded by CAPS to teach Technology by integrating IKS. The constructivism and indigenous paradigm are based on the learning where learners learn through the use of the cultural practices of the societies they live in. The study has established that the teacher has an understanding of cultural practices in societies and the importance that culture can play in the understanding of graphics to learners. However, this teacher finds it difficult to incorporate cultural practices in the teaching and learning of graphics with the use of indigenous technology, which attests to the need for the teacher to be trained on how it can be done.

4.4 The teaching approach that promotes the integration of indigenous graphics skills

The most appropriate approach used by the teacher to teach activities in graphic design is demonstration. The approach seems so convenient for the teacher despite the non-integration of IKS, *firstly, I demonstrate, then I give them the grids, then they do themselves.* During the lesson observation, she however managed (at minimal) to develop some relationship between the topic and indigenous knowledge practices through the explanation of concepts. However, the explanation lacked clear examples, hence even the assessment task given to the learners concentrated more on orthographic drawing with no support of IKS. The definition of IKS should incorporate the key important aspects such as people, context, culture, language, knowledge, practices, and dynamism (Shava, 2013) as enablers to consider varied approaches that can motivate learners in their learning and arouse their interest, as they will be learning about their own stuff. This will ensure drawing from the learners' diverse socio-cultural backgrounds for the learning of graphics and indigenous technology. In teaching and learning of graphics learners indicated that much was not done under the topic although they agreed that demonstration was the teacher's approach towards the activities they did in class.

5. Conclusion

The findings show that the integration of IKS is almost absent in the studied teacher's teaching of graphic design at Grade 9. This findings confirm the teacher's lack of know-how to integrate IKS. As an African teacher, it sounds ironical that she cannot integrate IKS in her teaching. One needs to understand this incapacitation from the point of view of teacher education being confined to the conventional technology content and methods. Indigenous environments and communities are endowed with the plethora of knowledge which teacher can take full advantage of if they can accommodate indigenous perspectives in their understanding of technology. Furthermore, teachers who can see the wealth of indigenous knowledge can transform the teaching of graphic skills in Technology Education, making the subject relevant and interesting to the learners. Teachers only need to see the learners' culture

as resourceful in this regard. The study's aim was achieved as an understanding was created about the studied teacher's efforts to integrate indigenous knowledge in the teaching of graphic skills at Grade 9. The study contributes an understanding of the gap that exists in the teaching of graphics. That gap is about teachers not taking full advantage of indigenous knowledge in the teaching of Technology despite its presence in the CAPS.

The study makes the following recommendations:

More studies are recommended which can cover other schools to showcase the integration of IKS to enhance the learners' understanding of graphic designs. Teachers should familiarise themselves with the CAPS document; they need training to do this. Teachers should plan activities that cater for indigenous technology as stipulated in the CAPS. Teachers should identify indigenous graphics resources and archives which can help them integrate IKS in their teaching, including elders such as the indigenous artist, Esther Mahlangu who hails from the Province.

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BRIDE TEKNONYMOUS NAMING AND RETENTION OF CULTURAL VALUES AMONG AFRICAN COMMUNITIES OF SOUTH AFRICA

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Abstract

This study investigated the role played by bride teknonymous naming in retaining the cultural values among African communities of South Africa. Teknonymous naming refers to the adaptation of parent's name based on the name of the first born child. In the context of this study, it refers to the bride's changing of name after marriage. During this period when advocacy for Africanisation and decolonisation as well as retention of indigenous knowledge are buzz words, the cultural practice of bride teknonymous naming is suppressed by Christian or Western naming. The newlyweds' females prefer to maintain their Christian or Western names than use teknonymous names if given. The study explored the bride teknonymous naming and retention of cultural values among the African communities so that this important cultural practice does not suffer extinction. The Indigenous Knowledge Systems theory underpins the study. The qualitative study was conducted utilising interviews, literature and observations as data collection tools. Ten Pedi married women who went through the cultural practice of bride teknonymous naming were sampled. The design was descriptive and interpretive. The thematic method of data analysis was used to analyse data. The findings revealed that the teknonymous naming of brides is practiced differently according to families; the practice of teknonymous naming is important as it helps the communities and tribes to retain their history, poetry and traditional names. In addition, it connects tribes with their ancestors, it fosters respect of women and elevate their status, and it fosters stability in marriages minimises cases of divorce. The study advocates for the retention of bride teknonymous naming and retention of indigenous knowledge.

Keywords: teknonymous naming; bride; African values; indigenous knowledge

Introduction

The cultural practice of teknonymous naming is practiced in different cultures worldwide. In some American natives, it is required that the child is renamed after the mother or father. In Arabic culture to refer to married woman as *Umm* "mother of", e.g. *Umm Khalifa*, mother of Khalifa, is honorific – shows respect. *Abu* "father of, e.g. *Abu Khalifa* (father of Khalifa) is the male equivalent of *Umm*" (World Wide Words, (n.d). Similarly, in Malays of Cocos Island parents are known by the names of their first-born child. For example, a man named Hashim and his wife Anisa have Sheila as their daughter. Hashim will be known as Pak Sheila (father of Sheila) and Anisa as Mak Sheila (mother of Sheila). In Korea, a woman whose son is named Su Min might be called Su Min Omma (mother of Su Min) (Educalingo, (n.d).

Teknonymous naming in general is practiced differently by communities in South Africa. According to Guma (2001), the naming of parents after their child is practiced in the Sotho society. For example, parents who have Pule as the first-born child will bear the name of *Mme wa Pule* (mother of Pule) and *Ntate wa Pule*. These names may be constructed by adding prefixes *Mma-* (mother) and *Ra-*(father). *Pule's* mother will be called *Mmapule* and *Pule's* father will be *Rapule*. Guma further adds that in some communities children are

renamed after their relatives. Where names of non-relatives are used, the names are usually associated with significant historical event of international or regional levels.

In this study, the focus is on bride teknonymous naming (*Go thea ngwetši leina in Pedi/Sesotho sa Lebowa* (Northern Sotho)). Pedi is one of the Sotho languages spoken in South Africa. In the context of this study, teknonymous refers to the naming of bride after marriage and it is practiced by most of the African communities of South Africa though the practice appears to be diminishing owing to Westernisation of marriages. According to the Sotho (Southern Sotho, Tswana and Pedi/Northern Sotho) culture, the bride is given a teknonymous name to keep the in-laws names. With the domination of Western culture, this practice is less practiced in most African communities. During this period when Africanization and indigenous knowledge are gaining space in the academic context, and as observed by Mapara (2009, p.139) "...this area has captured the attention and respect of international scholars but also gained the support and support of the United Nations (UN)," the practice of bride teknonymous is diminishing. Therefore, the author felt it imperative that the practice of bride teknonymous naming be explored in order to advocate for its retention among communities of South Africa. The objective of this paper is to uphold the positive perspective and legitimisation of the values of bride teknonymous naming.

This paper is structured as follows: Introduction, theoretical framework, methodology, the concept of teknonymous naming, types of teknonymous naming and their importance, the process of teknonymous naming, the findings and discussion, conclusion, and recommendations. The study explored three issues. Firstly, it explored the bride teknonymous naming and retention of cultural values among African communities of South Africa by examining how bride teknonymous naming is practiced, Secondly, it identified and described the importance of bride teknonymous naming. Thirdly, it sought to suggest measures of ensuring that the practice does not become extinct as a result of the Westernisation and Christianity. The following questions guided the study:

- How is teknonymous naming practiced in black communities of South Africa?
- What is the importance of bride teknonymous naming in black communities of South Africa?
- What measures can be applied to ensure that the practice of bride teknonymous naming does not become extinct as a result of the Westernisation and Christianity?

Theoretical framework

This study is underpinned by the Indigenous Knowledge Systems (IKS) theory. Maferetlthane (2012, p.23) quotes Mascarenhas (2004) who defines indigenous knowledge as

"The sum total of the knowledge people in a particular geographical area possess, and which enables them to get the most out of their natural environment. Such knowledge and skills are passed down from previous generations. The passed-on knowledge and skills are then adapted and added by the new generation, in a constant adjustment to changing circumstances and environmental conditions. They, in turn, pass on the body of knowledge intact to the next generation, in an effort to provide them with survival strategies."

Onwu and Mosimege (2004, p.2) define indigenous knowledge as

"An all-inclusive knowledge that covers technologies and practices that have been and are still used by indigenous and local people for existence, survival and adaptation in a variety of environments. Such knowledge is not static but evolves and

changes as it develops, influence and is influenced by both internal and external circumstances and interaction with other knowledge systems. Such knowledge covers contents and contexts such as agriculture, architecture, engineering, mathematics, governance and other local systems and activities, medical and indigenous plant varieties, etc.”

Indigenous knowledge system is in the South African context defined as “a body of knowledge embedded in African philosophical thinking, and social practices that have evolved over thousands of years” (Department of Education, 2003, p.4).

Given these definitions, the context and focus of this study, bride teknonymous naming as a socio-cultural practice in traditional marriages is an indigenous practice upheld by traditional communities of South Africa. Given that indigenous knowledge in comparison with Western knowledge, lacks literary heritage, the source of traditional knowledge is indigenous people and societies themselves. Knowledge is transferred to the next generation mainly orally by word-of-mouth. (cf. Mafaratlhane (2012). In this study, narratives from women who have experienced bride teknonymous naming were used to transfer knowledge.

Methodology

Malale (2018) has indicated that there is a challenge in researching indigenous knowledge because of limited literature to develop a conceptual framework. Data for this study therefore relied much on narratives from participants. The qualitative study was conducted utilising interviews as main data collection instruments. A literature study and observations were used to supplement data from interviews. The paradigm was descriptive and interpretive (Brynard & Hanekom, 2006; Niewenhuis, 2016). A case study involving Pedi speaking women in the rural areas of the Limpopo Province was adopted in this study. Sampling consisted of purposeful, snow-ball and on-the-spot sampling (Maree & Pietersen, 2016). As indicated in the abstract, ten Pedi women were purposefully selected because they were experienced in the practice of bride teknonymous naming. In snow-ball sampling, the participant is named by the preceding individual (MacMillan & Schumacher, 2014). The author also interviewed participants on the spot while attending traditional marriages. The initial intention was to gather the participants and have group interview. The thematic data analysis method was used to analyse data. In thematic method, the responses from participants were coded and unitised. Units of meaning were grouped to form categories. Categories that belonged together were further grouped to form themes which served as research findings (MacMillan & Schumacher, 2014). Owing to the participants’ different commitments, they found that interviews were not conducted in a convenient time and environment. The women were therefore interviewed informally at different locations especially where traditional weddings were taking place. The participants were interviewed with their consent. They were made aware that they were not coerced to participate and that withdrawal was permitted without consequences. In order to protect their identity, they were assured that their names will not be used in the publication of the study and those who will be interested in the findings would access them (Brynard & Hanekom, 2006). The women narrated their views regarding the process of bride renaming, importance of bride teknonymous naming and measures to ensure that the practice is retained. The rigour of the study was enhanced by using one of the criteria that is used to enhance trustworthiness, i.e. triangulation. In the context of this study, triangulation refers to the use of more than one method or instrument in the collection of data. As said previously, interviews were used supplemented by literature study and observations to enhance the validity and credibility of the study (Niewenhuis, 2016).

Teknonymous naming

This section defines the concept of teknonymous naming and discusses types and the importance of teknonymous naming.

Teknonyny – the concept

Teknonymous (adjective) or teknonym (noun) derives from the Greek words “tékn(on)” child and “Ónym(a)” name (Dictionary.com (n.d)). In simple terms, it refers to name change or name substitution. According to Educalingo (n.d). Teknonymous naming in traditional communities generally refers to the practice of referring to parents by names of their children. Teknonymous naming in traditional communities generally refers to the practice of giving children the names of their parents (Educalingo, (n.d)). In the context of this study, teknonymous naming refers to renaming or name substitution of bride after marriage.

Types and importance of teknonymous naming

There are various types of teknonymous naming, which differ according to communities. Guma (2001) distinguishes the following as practiced by the Sothos of South Africa.

Initiation names

Basotho youth are named according to age-group regiments. Those who initiated with the Chief’s son will be called by his name which was identified as belonging to him. Usually, older boys will wait to go with the Chief’s son. Mokwana (2009) adds that men from initiation are addressed by their regimental names, e.g. the Mangana group of initiates are addressed as *Mangana*, and *Mankwe* group of initiates are addressed as *Mankwe*.

Initiation is regarded as transitional stage and after initiation derogatory names such as *mushimane* (boy), (dog), *leqai* and girls *lethisa* or (brother in law of a polecat) in Sesotho of Lesotho) are dropped and teknonymous names are used. Those who are not initiated are said to smell like billy goats (boys) and pig with litter of piglets (girls). This is an indication that the initiate is promoted from boyhood or girlhood to man or woman respectively.

Christian Names

With the arrival of missionaries’ childhood, customary names were changed and Christian names were added to elevate an individual to status of convert. Indigenous names were associated with “paganism”. English (European names) were identified with Christianity. With the influence of Christianity, most African communities preferred European names, while others were forced. For example, names such as Jeremiah and James resulted from Christianization.

Bride teknonymous names

In this type of naming, a bride is given a name to be addressed by the in-laws instead of calling her by her maiden name. The name can be temporary to be used during early days after marriage. As the first-born is usually given the name matching her teknonymous name, the bride’s name becomes permanent. *Mmatshapo* will have her child named *Tshapo* and she becomes (Tshapo’s mother) (cf. Semenya, 2014).

Findings and discussions

The practice of bride teknonymous naming differ according to families or clans

One interview question pertinent to the study was how the bride teknonymous naming is practiced. Participants indicated that bride renaming is practiced differently in different families/tribes/clans. The differences are, however, minimal.

When asked about how their families conduct bride teknonymous naming one participant responded as follows:

“African beer is prepared. The bride stays in the house next to the door. A woman from the bridegroom’s family also sit next to the door but outside. This woman throws a necklace at the bride while suggesting a name. If the bride throws back the necklace, it is a sign that the name is rejected. And keeping the necklace is a sign that the name is accepted. The acceptance is followed by ululations as the bride moves out to meet members of the family.”

Another participant stated:

“The old women will gather in the “lapa” (traditional mud or reeds yard) with the aunt. The aunt will ululate and start giving the bride names to choose one. The bride covered with blanket will uncover herself and go outside on accepting the name”.

Another added that teknonymous naming is accompanied by a song sung in their family during the process of bride teknonymous naming:

“During the proposal for a name, other women will sing “MmaMokgadi MmaMokgadi tšwaa ntlong monna o tlile” (MmaMokgadi-a teknonymous name given and accepted by the bride) come out of the house, your husband has come.”

Singing this song is a sign that they cannot wait for the acceptance of a name and bride moving out to meet other members of the in-laws.

The day or time of renaming the bride also differed from family to family or clans. The following are different responses from participants”

“Any day after the arrival of the bride.”

“Early in the morning after the day of arrival at the in-laws”.

“On the day the bride arrives at the in-laws.”

“During the evening of the day of arrival at the in-laws.”

These findings are consistent with findings of a study conducted by Semenya (2014). According to the Semenya (2014), the way for giving names differ between the various Basotho groups. There are those who name the bride immediately upon arriving at the bridegroom’s home. Semenya (2014) found that the Pedi give names at a traditional wedding and at white wedding. The researcher observed in his attendance of a marriage ceremony that the naming is done immediately the bride arrives at the in-laws’ home. The bride would not speak to anyone until the name was given and accepted and she was given a necklace.

The importance of go thea ngwetši leina: Narratives from the Pedi women

The second question was how important is the practice of teknonymous naming and the following were the answers that emerged from most of the participants:

Connection with ancestors

Bride teknonymous naming is viewed as important as it connects us with the ancestors.

The following is response from a participant:

“The name is used to connect with the ancestors. When the ancestors are informed about the arrival of a bride, only traditional names are used. Names such as Jane cannot be used to connect with ancestors as they are foreign names not indigenous names”.

In African culture, it is important to continuously connect with ancestors. In events such as marriages, birth of children and initiations, ancestors should be informed to bless the event and welcome the bride. A curse may follow if the ancestors are not informed. The language that ancestors understand is indigenous language. When the bride arrives in the in-laws, ancestors are informed through the new name given by the in-laws. This implies that the ancestors will only understand names such as *Mmamasilo* not Rebecca.

Fosters respect and elevate the status of women

The practice of bride teknonymous naming is believed to elevate the status of women.

The following is an excerpt from a participant:

“It is a promotion of its own kind. You are no longer a lady, but a bride, hence name change ... You were a girl (maiden) you are now a wife or mother to be. That is why you are given a name of your child before the child is even born.”

The above response implies that names such as Sophie and Clara for a bride do not show respect for a maiden who has been turned into wife.

Semenya (2014) supports this finding. As said previously, among the Basotho, marriage changes the status of a woman. The in-laws will address the bride by her teknonymous name, not maiden name. The name becomes permanent as the bride's child is named after her mother. Bride teknonymous naming is a source of pride for married women. In the study conducted by Mokwana (2009), it is indicated that in many Bapedi dialects, the giving of a new bride is regarded as an honour. The same name suggests that she will bear a child by that particular name, e.g. *Mmamaropeng* (mother of Maropeng; the first-born child will bear the name (cf. Ashton, 1967).

By being given a new indigenous name, the bride is elevated to a higher status where she gains more respect than when she was still called by child name. As a sign of respect, the bride is for example, called *MmaMatome* (Matome's mother). All the in-laws, the husband and community at large are advised to know and use this new name.

Fosters stability in marriages and discourages divorces

The fact that married and renamed women are respected, their marriages become stable and divorces are minimised.

The following is the participant response in this regard:

“Bride teknonymous naming distinguishes married woman from an unmarried woman. It encourages respect and keeps the marriage. If you are given a name, misconduct including divorce will be a sign of disrespecting the owner of the name.”

Another participant added:

“...these young couples of today skip some steps. A bride stays for a day with the in-laws and the bridegroom takes her to Gauteng. So some members do not even know

her, including the ancestors. That is the reason they divorce easily. They are not properly introduced to the ancestors.

The participant further indicated that if you are given a name of one of the family members, divorce is regarded as a disgrace and disrespect of the owner of the name. The owner, for example, might be your aunt.

The participant's view support the saying that *lebitla la mosadi ke bogadi* (*The grave of a woman is where she is married*), which implies that once married, a woman is expected to endure the hardships) and other related proverbs (Rakoma, 1986; Malale, 2018). Moloko-Phiri, Mulaudzi and Heyns (2016) argue that proverbs such as this force are patriarchal and misogynistic in nature as they imply that women should be submissive to an extent of staying in the marriage even if they are abused. Therefore, it can further be argued that women cannot stay in abusive relationships to please the owner of the name be she the aunt.

Retention of the history of family or clan and traditional names

It was discovered from the participants' narratives that bride teknonymous naming helps the families or clans to perpetuate and preserve their history and traditional names by inter-generational transfer.

A participant had the following to say when asked about her view about the importance of bride teknonymous naming:

"Teknonymous naming keeps the history, family tree and poetry of the family or clan. For example, the name Mmathelo in our family is recited as "Mmathelo MmaMokhala molamola ntwā".

Molamolantwa is the one of resolves conflict or pleads for ceasefire. The participant further explained that in this context the name means that the bride arrived when there was a conflict in the family. Her arrival cooled down the situation. In addition, the participant further said that inherent within teknonymous names is the history of the family and clan. The name *MmaMaruping* (marupe – meaning ruins) implies that somebody in the family had passed on when the bride arrived in the family. The name *Mmatšatši* may mean that when the bride arrived, the family was poor – no houses and were therefore burnt by "letšatši" (sun). The name of the bride therefore reminds the family of certain events in the history of the family or clan.

Names of relatives such as aunts are also used. Therefore, by giving the bride a teknonymous name, the names of the in-laws will not be allowed to be in a state of oblivion. The bride is given a name chosen among other names of adults within the family or in-laws. The names are therefore transferred from generation up to infinite. As some of the names that are given to brides have meanings, history of the family or clan is not allowed to die.

Measures to retain the practice of teknonymous naming

The third question sought to elicit responses from the participants so that they could give measures to retain the practice of bride renaming. Most of the participants appeared despondent when asked this question; perhaps because things have changed (see 2. Theoretical framework) to a degree where there is no hope of revitalising the practice which is diminishing. The following are some the excerpts from the interviews:

"It is difficult because when we are given names we do not keep them".

“These names should be retained. But these days, they are not taken seriously. They give a name and after some time the name is not used. Like I was given the name of MmaPhetole expecting my first-born child to be called Phetole. It did not happen because we are Christians and only Christian names are used.”

“Bride renaming should not be postponed to the second day after marriage, but should be done immediately the bride arrives at the in-laws”.

“Even if some brides do not like the new names, they must just be given the names”.

“The problem our communities are westernised. I think we should go back to our culture as Africans. You are given a name of respected member of the family”.

The impression I get from the participants is that even if the brides of today seem not to prefer bride renaming, they should be forced to like them. The author further argues in support of the participants because as Africans we believe in ancestors even if we claim to be Christians. There are instances in life when you find yourself in a situation where the intervention of ancestors is required. In such instances, communication with ancestors is through indigenous names. For example, when a woman fails to bear children we consult with the ancestors or perform rituals as they might be angry followed by a curse for disrespecting them. Upon realising that currently black people prefer African names to European names, the author therefore argues that there is room for change in order to revive our bride teknonymous naming.

Conclusion and recommendations

The findings of his study revealed that teknonymous naming is practiced differently according to families or clans. The practice is important because it connects family or clan members with their ancestors, it fosters respect of women and elevates their status in the families, it keeps and retains the history of the family and traditional names of the family or clan, it fosters stability in marriages and discourages divorces. In view of the foregoing, the researcher concludes that bride teknonymous naming plays an important role in the retention of cultural values among African communities of South Africa. It is therefore recommended that in communities where the bride teknonymous naming is practiced, it should be maintained. In those communities where the practice is seldom practiced or completely discarded, it should be revived. Besides the roles, it plays such as keeping the history of the family/clan/tribe /community etc.; it is another way of keeping the indigenous knowledge. In addition, the practice of bride renaming will not succumb to Western culture.

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TECHNOLOGY TEACHERS' KNOWLEDGE OF CULTURALLY RELEVANT ASSESSMENT: A RECIPE FOR ENRICHING LEARNERS' ACQUISITION OF DESIGN SKILLS

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Abstract

The purpose of this qualitative case study was to explore Technology teachers' knowledge of culturally relevant assessment to provide feedback to learners from diverse cultural backgrounds characterised by indigenous and background knowledge. This suggests that relevant assessment should consider learners' background knowledge in an attempt to hone their design skills more meaningfully. Indigenous environments are rich in local technological knowledge and skills that can enrich learning in Technology Education. However, Technology teachers are not taking full advantage of these knowledge and skills. Data were gathered from three Senior Phase teachers and three HoDs through individual interviews and participant observation. This study yielded the following findings: Technology teachers' knowledge of culturally relevant assessment has implications on their assessment feedback to learners; culturally relevant assessment feedback can improve Technology learners' understanding of design skills and performance ultimately; culturally relevant assessment feedback may be hindered by teachers who regard indigenous knowledge as inferior to conventional (western) knowledge; some teachers penalise learners for answering questions using indigenous knowledge, consequently learners are shy to respond to the teachers' questions. The findings contribute knowledge about teachers' response to indigenous technology which is encapsulated in Curriculum and Assessment Policy Statement Technology Grades R – 12. A due regard for indigenous knowledge can make Technology teachers transform and/or decolonise the teaching of Technology to the benefit of learners.

Keywords: Technology teachers, indigenous knowledge, culturally relevant assessment, feedback, design skills

1. Introduction

Assessment plays a crucial role in promoting the acquisition of design skills in the Technology classrooms. Sleeter (2005) argues that assessment controls what gets taught and frowns upon the standardisation of curriculum that disregards relevance to the learners' cultural contexts. There is a growing concern that assessment in South African schools excludes learners from indigenous communities and little urgency is given to ensuring just and equitable means to demonstrate their learning (Montenegro & Jankowski, 2017). Technology teacher do not take full advantage indigenous knowledge and skills in the teaching of design skills. Technology teachers who use standardised assessment which only supports western knowledge alienate indigenous knowledge which forms the worldviews of the learners. The Curriculum and Assessment Policy Statement should also still do enough to guide teachers in varied assessment strategies that can accommodate learners from different backgrounds to promote culturally relevant assessment strategies which in turn can accommodate indigenous and non-indigenous learners in the assessment activities.

Technology teachers' knowledge of assessment strategies may have a huge influence on the selection of assessment methods which they will employ to establish their learners' understanding of learning content. Also, Technology teachers' exclusion of other knowledge systems may be the core reason behind the learners' poor acquisition of design skills in subject. To the contrary, teachers who possess a sound knowledge of different assessment strategies can select appropriate assessment methods that can accommodate learners from diverse cultural backgrounds. This suggests that Technology teachers should be conversant with different assessment methods in order to accommodate all learners in their classrooms particularly those from indigenous backgrounds due to the historical marginalisation of indigenous knowledge. Scholars have argued in favour of these claims. For instance, assessing learners for a specific aim should befit them in an inclusive manner (Montenegro & Jankowski, 2017). James (2006) has also argued that the assessment of learning aims needs to take more account of the social as well as individual processes through which learning occurs. By implication, therefore, assessment should not be divorced from the knowledge that learners bring from their social contexts. According to Sleeter (2005), assessment should be planned such that it can give both teachers and learners feedback on learning and allow learners to show what they know and can do. We argue that this is only possible if teachers can open up to culturally relevant assessment.

The main aim of this study was to explore the role that Technology teachers' knowledge of CRA can play in the teaching of design skills to learners. This aim was achieved through the following objectives:

- To describe the Technology teachers' knowledge of culturally relevant assessment.
- To identify evidence of the use of culturally relevant assessment by Technology teachers during the teaching of design skills.
- To establish the accommodation of indigenous knowledge in Technology teachers' assessment strategies during the teaching of design skills.
- To explain the effects of culturally relevant assessment on Technology learners in the learning of design skills.

2. Theoretical lens

This study was framed in the sociocultural theory, which advocates the knowledge that learners possess from their sociocultural milieus. This theory was deemed most relevant as the study investigated Technology teachers' knowledge of culturally relevant assessment (CRA) in relation to indigenous knowledge. We claim that learning from a social context provides an opportunity for learners to share and construct knowledge as informed by their cultural malleus. Hence, assessment should be made relevant to the knowledge and skills which are informed by their cultures. The knowledge and skills that indigenous learners have acquired from their cultural settings is equally valid as conventional knowledge and skills and should therefore be honoured in the teaching of design skills to the learners. Teaching design skills is honing the learners' abilities to solve technological problems. It is in this sense that indigenous knowledge should form part of the learners' learning so that they will graduate not only as conventional designers but indigenous designers as well. Aronson and Laughter (2016) state that culturally relevant teachers use constructivist methods to develop bridges that connect learners' cultural references to academic skills and concepts and build on the knowledges and cultural assets learners bring with them into the classroom.

On the other hand, Technology teachers who do not support the social constructivist theory believe only in western knowledge and exclude other knowledge systems which can be

acquired from the local communities. Nam and Smith-Jackson (2007) point out that teachers who apply the objectivist theory expect their learners to only attain the established outcomes. Such theory does not recognise the multicultural realities characterising the South African school classrooms. It has exclusionary intentions the goal of which is to perpetuate the colonial educational ideology. We argue in support of sociocultural constructivism, that since the Curriculum and Assessment Policy Statement (CAPS) is undergirded by the seven human justice principles, the teaching of Technology should be intentionally decolonial. The principles in question are social transformation; active and critical learning; high knowledge and high skills; progression; human rights, inclusivity, environmental and social justice; valuing indigenous knowledge; and credibility, quality and efficiency (Department of Basic Education, 2011). In addition, the CAPS Technology Grades R – 12's third specific aim includes indigenous technology (Department of Basic Education, 2011). Hence, learners' learning and assessment should primarily be informed by the educational imperatives of co-construction of knowledge within communities of practice, ubuntuism, orality, etc. all of which are fundamental characteristics of indigenous communities.

Teachers should be trained and show responsibility to learn along with their learners, the dynamics of indigenous knowledge. This way they may overcome the challenge of the social constructivist theory. It may be difficult for teachers to assess activities that have more than one correct answer. In this regard Jonassen (1991) points out that constructivists believe that learners can have different views about reality, and thus argues that evaluation should allow learners to give different answers. Hence, the social constructivist theory provides for learners to answer a question in different ways, so that they may give many different answers that will all be correct. Also, Karagiorgi and Symeou (2005) claim that the assessment that is intended to assess learners in accordance with their individual, unique knowledge is a conundrum to many teachers.

3. Literature review

The notions of sociocultural theory in as far as taking into account the learners' culture-based knowledge are well supported by literature starting with how CRA is defined. Sleeter (2005) states that CRA involves using tasks or test items and evaluation criteria that relate to the experiences, point of view and language of the learners whose learning is being assessed. Montenegro and Jankowski (2017) argue that CRA considers learners' differences and employs assessment methods appropriate for different learner groups. Stevens (2012) defines (CRA) as an ongoing day-by-day assessment that builds on the learners' knowledge. It is therefore important to know what a learner's understanding is based on so that relevant assessment tasks can be designed by the teacher. According to Robinson et al. (1999), different types of assessment can help learners to improve their performance, and that culturally responsive formative assessment (CRA) can have a huge impact on learning. These authors further argue that assessment should not inhibit learners' creativity, and that Technology teachers' culturally responsible feedback can promote the acquisition of design skills.

According to Muñiz (2019), in a culturally responsive classroom, learners' varied identities and experiences are identified, honoured and used to bridge rigorous new learnings. Aceves and Orosco (2014) advise that teachers can use culturally responsive feedback to give analytical feedback to learners and provide individualised assistance that can add to the cultural understanding of each learner. This suggests that when Technology learners answer from their own indigenous perspectives they should not be penalised unnecessarily. Rather, they should be allowed to use indigenous skills and be assessed fairly in accordance with their

background knowledge. In order to accommodate indigenous learners, marking in Technology Education should be subjective rather than objective – that provides a room for teachers to accommodate multiple approaches of assessment. Sticking to a memorandum without thinking flexibly about the answers that learners give may disadvantage them (learners). In order to be able to give analytical feedback, then, teachers should engage learners in dialogue in their classrooms (Aceves & Orosco, 2014). Dialogue can inform teachers on the different cultural views of learners in their classes and be poised to adopt a positive attitude towards their responses to the answers that learners give, thus using culture as enabling rather than a barring teaching and learning tool. Teachers can also use individualised teacher-learner conferences to provide analytical feedback as that even provides time and environment to understand learners. This claim aligns to Aceves and Orosco (2014), who aver that affording opportunities for individualised teacher-learner conferences can give each learner an opportunity to receive individualised teacher feedback, which has the ability to challenge them to think and can boost their self-esteem. This may however stall the teacher's schedule of class activities, hence, a teacher would have to think creatively about making time to accommodate learners this way.

Thomas (1992) recommends that the teacher should encourage learners to discover the limits of their ideas and help them to develop more adequate ones by asking questions that activate their prior knowledge, probe their reasoning and help them to connect and integrate new knowledge with prior knowledge through the introduction of diverse perspectives. Teachers should be able to learn and use the learners' prior learning when assessing them (Thomas, 1992). They need to acknowledge that other knowledge systems exist in the contexts where they teach so that they can provide culturally responsive feedback. Robinson et al. (1999) point out that one of the roles of teachers is to create an atmosphere that is conducive to the acquisition of design skills. In other words, they should create conditions in which design skills are enhanced without alienating other knowledge systems such as indigenous knowledge. They can ask open-ended questions to allow learners to use different avenues (knowledge systems) for finding answers to the questions. According to Robinson et al. (1999), the development of design skills includes helping learners to acquire the knowledge of their cultures. Teaching, learning and assessment should thus be tailored to suit specific learners in a specific place in order to promote the acquisition of design skills in Technology Education. According to Rosa (2017), performance assessment should be culturally responsive in order to truly serve the needs of learners from all backgrounds. Technology teachers can use performance assessment such as projects to accommodate learners from different backgrounds.

4. Research methodology

Wiersma and Jurs (2009) claim that a case study is a detailed examination of something. This can be achieved through the multiplicity of contexts or participants and methods. In exploring the role of culturally responsive feedback to promote the acquisition of design skills, then, we adopted a qualitative multiple case study in order to solicit multiple perspectives from the participants purposively selected from three primary schools (Moriarty, 2011). The participants consisted of three Senior Phase teachers and three Heads of Departments (HoDs) who had experience in teaching Technology. We selected one teacher and one HoD from each of the three schools which participated in this study. These participants were interviewed individually to gather their views and beliefs about culturally relevant feedback in teaching design skills. Individual interviews provide rich data about the meaning of an event that participants attach to a setting (Fox, 2009). In addition, participant observation was used to explore the implementation and effect of culturally relevant feedback in promoting

the acquisition of design skills. According to Fossey, Harvey, McDermott and Davidson (2002), researchers use participant observation to explore the naturally occurring routines, interactions and practices of a particular group of people in their social environments. We mainly relied on taking field notes and recording for the observation and interviews as they helped to capture fresh views from the participants and observation data. Semi-structured interview guides were designed with items that would help to answer the research objectives stated in the introduction above. An observation tool was also developed which helped to observe the teachers' attempts to integrate the CRA in the teaching of design skills. Thematic analysis was adopted for the analysis of data. According to Johnson and Christensen (2017), thematic analysis refers to the identification of themes in the qualitative research data. We triangulated across the methods and schools to ensure the trustworthiness of the study. Findings were then presented under the themes that emerged from the analysis aligned to the research objectives.

5. Findings

5.1 Technology teachers' knowledge of culturally responsive feedback

The participants were requested to explain their understanding of culturally relevant feedback. Five participants indicated that they had little knowledge about culturally responsive feedback. One participant said in this regard: *I have little knowledge about culturally responsive feedback. I was never taught to use culturally responsive feedback when I was training to become a teacher. I usually use my discretion to integrate indigenous knowledge and other knowledge systems in my assessment tasks.* The observations attested to this situation as it was noticed that two of the teachers only possessed rudimentary knowledge about culturally responsive feedback as they were unable to accommodate other knowledge systems in oral questions which they posed to learners. They seemed trapped in unilinear methods of assessment which bottle-necked any possibilities of learners answering from a different perspective. For instance, teachers were exclusively asking closed-ended questions that compelled learners to produce similar answers.

However, there were two participants who indicated that they were very familiar with culturally responsive feedback. One participant said: *I understand that culturally responsive feedback can help teachers to acknowledge different knowledge systems when they assess learners.* The participants indicated that the implementation of culturally responsive feedback is not catered for in the current curriculum (CAPS) and Technology textbooks which largely promote the use of western knowledge.

According to Aronson and Laughter (2016), culturally responsive teachers validate every learner's culture, bridging the gap between school and home through diversified teaching strategies and multicultural curricula. The findings showed that Technology participants who possess shallow knowledge about culturally responsive feedback struggle to accommodate indigenous skills and knowledge acquired from home. The teachers' rudimentary knowledge about culturally responsive feedback lead them to exclude and invalidate other knowledge and skills in assessment tasks; instead, they were hooked onto the conventional approaches in their practice.

5.2 The use of culturally responsive feedback in promoting design skills

The participants were asked whether they employed culturally responsive feedback in promoting the acquisition of design skills in their Technology classrooms or not. Five participants indicated that they attempted to employ culturally responsive feedback even though they were not conversant with it. They indicated that they often feared to implement

as they thought they would embarrass themselves as they were not sure about alternative answers that the learners might provide. One participant said in this regard: *I cannot implement something that I do not understand. Sir, as I am a professional teacher, I believe that I must use assessment strategies that I understand. If teachers can be taught to use culturally responsive feedback, they can use it to assess learners. There is a possibility of embarrassing yourself if you use something that you do not understand.*

It can be realised from the above views that Technology teachers might be eager to implement culturally responsive feedback, but they were reluctant to accommodate it due to their lack of knowledge about it. The participants who possessed little knowledge about culturally responsive feedback indicated that they experienced challenges of validating some other indigenous design skills that learners possess due to their shallow knowledge about indigenous knowledge. They further submitted that they seldom used culturally responsive feedback to accommodate the learners from indigenous communities. They also affirmed that some learners understand Technology from indigenous perspectives. They believed that it is the responsibility of Technology teachers to assess the usability of knowledge and skills possessed by learners.

The Technology teachers should be able to assess the value of knowledge and skills used by their learners in solving technological problems. The indigenous knowledge and skills that can solve the technological problems should be accepted when teachers assess learners. This is well encapsulated in the response of this participant who said: *Technology teachers should be able to evaluate different knowledge systems possessed by their learners in order to select knowledge and skills which are appropriate in Technology classrooms for promoting learning.* Another participant concurred: *Exclusion of indigenous knowledge in Technology Education assessment tasks can hamper academic performance of learners and create negative attitudes towards other knowledge systems.*

Technology teachers who do not advocate equity in learning exclude the indigenous knowledge and skills in the assessment tasks; this demoralises learners from thinking creatively and critically in solving technological problems. This finding is compatible with the view of Montenegro and Jankowski (2017) who state that assessment, if not done with equity in mind, privileges and validates certain types of learning and evidence of learning over others, can hinder the validation of multiple means of demonstration, and can reinforce in learners the false notion that they are not supposed to be in schools as what they learn is completely different from what they are taught in their communities. The participants also believed that it is their responsibility to implement culturally relevant pedagogy in order to accommodate different knowledge systems possessed by their learners. This finding is consistent with that of Montenegro and Jankowski (2017), who state that conducting assessment in a manner that takes into consideration the various needs of different learners is the teachers' responsibility.

5.3 Assessment strategies used by teachers to accommodate indigenous learners in teaching design skills

The participants were able to describe the different assessment methods which they use to promote the use of indigenous knowledge in their Technology classrooms. This finding contradicts the above about the use of culturally responsive teaching in promoting design skills. The participants "falsely" claimed that they accommodated indigenous knowledge. The observations negated this. While in certain instances they used varied assessment strategies, they based those on conventional approaches, unfortunately. They were of the

view that they accommodated their learners by employing the assessment strategies such as project, oral presentation and individual conferences. It should be noted that varying strategies of assessment can still be conventional if indigenous knowledge is not consciously accommodated. The participants believed that projects can be used as a vehicle to assess learners varied design skills. The project can allow learners to use their indigenous knowledge but only if indigenous scenarios are provided instead of the conventional ones. During observation it was noticed that teachers limited project scenarios to conventional ones, e.g. all learners were channeled to make western models such a frame structure for water tank (jojo tank) using straws, papers and glues. The participants suggested that Technology teachers should use the rubric to assess a technological product. One participant said: *I use the rubric assessment tool to assess projects of my learners. A good thing about project is that it accommodates all learners from different cultural backgrounds to use their skills and knowledge.* Agreed, a rubric can afford the teacher flexibility of its design such that it considers answers from the learners' own technological backgrounds informed by the available knowledge and skills in their communities.

The participants also indicated that they use oral presentations to accommodate learners who are not good in writing. The participants also indicated that in their classes they had learners who are poor in writing but are very good in talking. They suggested that such learners should be accommodated by using oral assessment, *You know, some learners practice talking at home through telling stories. Their parents narrate stories to them, afterwards they must practice by telling stories in accordance to their understanding.* This is good consideration for orality as a dominant communication method for indigenous people. It however should not be used merely for countering learners' inability for expressing themselves through writing but should convey indigenous ways of learning. The teachers, who are black Africans, had a good knowledge about African knowledge perspectives, but it was observed that they seemed not to take full advantage thereof to use it in learners' learning.

The participants also indicated that they used individual conferences to motivate learners to use their different knowledge systems. However, learners were reluctant to use the knowledge and skills that they had acquired outside their classrooms (evidenced from the observations). They might be encouraged to open up if teachers' assessment strategies are flexible enough and invitational. As stated above, Technology teachers can follow up on learners through individual conferences to establish different knowledge systems as indigenous knowledge audit strategy for use in the classroom. This way, they will also learn along, thus defusing their expressed fears above. As a matter of fact, the participants indicated that indigenous conferences can help them to understand the hidden meanings of learners' answers. One participant said: *You know, some learners are able to explain how to make things using skills which are not in textbooks. It seems as some learners come to school possessing knowledge which might be valid. We must make follow-ups before we mark the assessments of those learners. We must give those learners a chance to explain how those skills and knowledge solve technological problems.*

It is therefore crucial that Technology teachers understand that Technology learners possess different knowledge forms, thus some answers may look wrong as they are not based on conventional design knowledge and skills.

The effects of culturally responsive feedback in promoting the acquisition of design skills
The participants who indicated that they possess adequate of knowledge of culturally responsive feedback were very positive about its role in enhancing design skills. They

believed that it assists learners to retrieve knowledge and skills which can bridge between conventional and indigenous design skills in a Technology classroom, *culturally responsive feedback can help learners to relate new learning to their existing knowledge which can help learners to remember what they were taught when they are answering questions about design skills*. Technology teachers should therefore consider subjective assessment which can elucidate divergent answers from learners. They may use more of open-ended questions to motivate learners to answer questions from different knowledge perspectives. Open-ended questions may stimulate learners to use alternative knowledges or skills at their disposal.

The participants believed that the culturally responsive feedback can help learners to generate more ideas in solving technological problems. The participants indicated that when learners are allowed to use different knowledge systems their academic performance may increase. They then need to let learners' learning to thrive on this truth. Technology teachers who are conversant with culturally responsive feedback are creative to formulate questions which can elicit the real understanding of learners which may lead them to perform well in Technology learning activities. One participant stated in this regard: *I have realised that the indigenous learners perform well in the open questions which require them to use their background knowledge. It seems as the topics which are related to what they know can simplify learning for them*.

The participants indicated that when teachers give learners activities which are closely related to what they know they perform much better unlike when they are given activities which coerce them to use only western knowledge. It was however observed that teachers did not fully accommodate indigenous knowledge during their teaching. It was further observed that in few instances where learners were asked open-ended questions related to indigenous knowledge systems, they were active, as one participant acknowledged: *When I ask my learners open-ended questions and advise them to use any knowledge that they possess their participation is excellent. On the other hand, when I tell my learners to use only conventional knowledge that I have taught them their participation is not satisfactory*.

The findings show that the use of culturally responsive feedback can act as an agent to incite learners to acquire design skills. According to Aronson and Laughter (2016), culturally responsive teachers are multidimensional because they engage cultural knowledge, experiences, contributions and perspectives.

6. Conclusion

This study revealed that majority of Technology teachers are culturally knowledgeable as Africans but are not familiar with the CRA. As a result, do not accommodate other knowledge systems fully in the assessment of design skills in Technology tasks. On the other hand, Technology teachers who approach teaching and assessment from a culturally responsive perspective can take full advantage of indigenous knowledge which can in turn promote learning design skills from that perspective as well. This may enhance their understanding of design skills as they will engage local knowledge. The teachers' use of varied assessment strategies such as projects, oral presentations and individual conferences provide the opportune avenues for them to integrate indigenous knowledge. It is our view that these strategies should not only be used for the sake of variety that is limited to methods but should deliver alternative knowledge systems and skills. The contribution of this study is therefore the understanding that it brings to the body of knowledge about how CRA could enhance the understanding of learners' learning of design skills in Technology Education as well as teachers' knowledge thereof. We conclude that the teachers' knowledge of culturally

responsive feedback plays a crucial role in enhancing design skills in Technology Education. In this sense, we recommend that Technology both pre- and in-service teacher education should not train teachers only in conventional ways but should balance those with indigenous knowledge if CRA is to be accommodated. We also recommend that Technology teachers should expand their understanding and knowledge in the subject by pulling in indigenous technological knowledge.

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LEARNING SUPPORT VIDEOS THROUGH THE EYES OF STUDENTS

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Abstract

It is a well-known phenomenon that students in higher education grew up in the era of mobile devices and the Internet and subsequently use their mobile devices in both their personal and academic lives. It is therefore not surprising that the students of today, watch more videos than the average of other generations. In this paper, two groups of students from two South African universities explored the use of videos, especially to support their learning, in their different learning environments. In the first case, the lecturer made all the support videos, while in the second case the students took control and make videos with their mobile devices. Data was collected through a questionnaire, group interviews, and observations where the researcher received valuable information on how students used videos to support learning. The researcher was interested in the student's authentic experience on the use of the videos, how are the videos used, what are the similarities and differences between the two cases in terms of video use, what need to be avoided and what lessons can be learned. The research findings provide insights into how videos, both created by lecturers and students, can be used as learning tools. Students further explained what worked and did not work for them. From the student feedback recommendations are made with regards to the use of videos for learning support.

Keywords: Lecturer-generated videos; mobile technology; multimedia-principle; student-generated videos

Introduction

The popularity of downloading and watching videos on the Internet cannot be denied. According to the Cisco (2019) report, video traffic comprised 75% of the global Internet traffic in 2017, and they predicted that it will be as much as 82% in 2022. The popularity of videos is further confirmed by the fact that 77 962 YouTube videos are watched every second (Internet Live Stats, 2019). In this new age where students grew up with technology, it is perhaps not surprising that they watch between two and thirty-one hours of videos per week (Morrison, 2016).

While students from prior generations were content with longhand note-taking practices when attending lectures, the students today are expecting a different learning experience (Greene & Crespi, 2012). Growing up with technology at their fingertips, with information readily available on the Internet and bombarded with videos from an early age, students are not satisfied with anything less. Because students live and work in the "on demand economy", students are inclined to learn on the go. Mobile technology and videos expand the classroom which is therefore no longer limited to the four walls (Echo360, 2017).

Over the last decade, video recording devices and editing software have evolved into user-friendly and affordable tools, enabling students to easily create and edit their own videos (Cruse, 2007; Kearney & Schuck, 2006). As a result, videos found their way into the classroom, if not via the lecturers, then via the students. According to Kearney and Schuck

(2006) videos provide an authentic way of learning and open doors for collaboration, motivation, and enjoyment of lectures.

Literature review and conceptual framework

According to statistics, today's students watch more videos than any other generation before them (Heltai, 2016; Humphrey, 2016). Therefore, to place this research about learning support videos in perspective it is important to focus on certain main concepts. In this brief literature review, the focus will be on the visual aspects of learning with videos, the benefits of learning with videos; possible challenges in learning with videos; and lastly the value of videos generated by students and lecturers. The diagram illustrates the main concepts in this study.

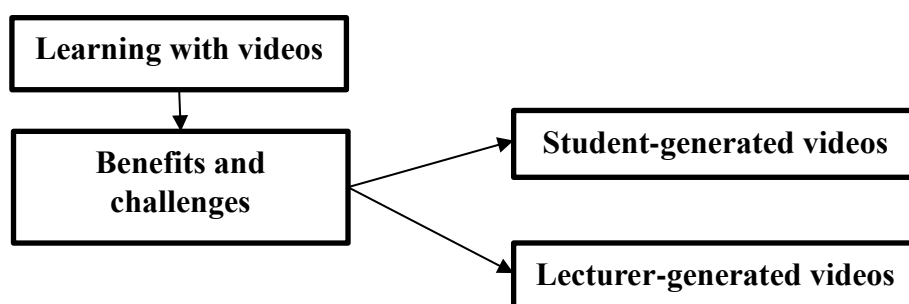


Figure 1: Main concepts

The visual aspect of learning with videos

When students learn with videos (multimedia learning), their understanding increases because it involves both text and pictures (Uyulgan & Akkuzu, 2018). Learners make meaningful connections through multimedia learning which enhance active cognitive processing. This statement confirms the multimedia principles advocated by Clark and Mayer (2016) for many years. When students mentally connect text and pictures, they are engaged in meaningful learning which supports understanding (Clark & Mayer, 2016).

According to Clark and Mayer's (2016) multimedia principles, knowledge construction is based on three principles of cognitive science. Students have two channels of processing visual material (dual channels) namely their eyes and ears. However, they can only process a few pieces of information at a time. Furthermore, students learn when they are engaged in appropriate cognitive processing such as engaging with relevant material, organising it in a coherent structure and integrating it with what they already know (Clark & Mayer, 2016).

One of the greatest strengths of learning with videos is that it resonates with the students on both an emotional and cognitive level (Cruse, 2007). The combination of emotional and cognitive levels has a positive effect on motivation and affective learning playing an important role in creating greater cognitive learning. The result of students learning with videos, is therefore that they are challenged on a cognitive level to such an extent that it increases learning.

Benefits and challenges of learning with videos

According to Leonard (2015), students watched videos to get a better understanding of what was done in class, especially content that involves steps or procedures, practical explanations of theoretical concepts and real-life examples. Students also tend to watch videos if they have

missed a class and close to assessment dates. The value of videos is the fact that it can be watched repeatedly. However, students confessed that they mostly use videos (posted on YouTube) only before an examination (Mayberry, Hargis, Boles, Dugas, O'Neill, Rivera & Meler, 2012).

The popularity of videos is demonstrated by the number of videos and video courses that are available on the Internet (Liimatta, 2015). Examples of educational videos usage are summarized in the work of Dong and Goh (2015); Kay (2012); Lee, Chae, Kim, Lee, Min and Park (2016) who justified that educational videos support classroom teaching and learning. Work from experts can be recorded and made available in a compressed format so that students can easily watch the videos anytime, anywhere. While working at their own pace, students can re-watch the video and pick the topic they want to watch. Mayberry et al. (2012) and Romaniuk (2018) further add that the use of videos increases student engagement.

However, the use of videos also has disadvantages as mentioned by Liimatta (2015) and Boateng, Boateng, Awuah, Ansong and Anderson (2016). They said that when videos are used in an online environment, communication between the lecturer and fellow students are limited. In addition, if lecturers do not update the content regularly, students lose interest because the contents are outdated. Technical problems like the quality of the video (image quality and sound quality), large file size, or lengthy videos coupled with the power and/or electricity problems can also prevent students from watching videos.

Student-generated videos

Kearney and Schuck (2006), as well as Green and Crespi (2012), found several positive aspects when students, rather than lecturers, create the videos. For example, they claim that students are more engaged in their learning when they make the videos themselves. They need to watch, edit and incorporate it in their notes. This results in a more active and deeper learning experience while they take ownership of their ability to obtain knowledge. Students' learning experiences become entertaining while increasing their engagement with the content. Not only is it a personal experience, but it provides students opportunities to connect with students outside the classroom in a meaningful way.

Although students favour lecturer-generated videos, they did mention that it was beneficial to make their own videos. While making the videos they needed to know the material well enough to explain it to other students and therefore it contributed to their own learning. Secondly, it gives them an alternative learning resource other than a textbook (Mayberry et al., 2012). This is in agreement with Pirhonen and Rasi (2017) who stated that students learn in an unconventional manner when they produce the videos, rather than using lecturer-generated videos.

However, in many of the cases described in the literature, the videos were made as part of an assignment given by the lecturer. Students prepared a lesson, and then record while they explain their topic (Mayberry et al., 2012; Pirhonen & Rasi, 2017; Green & Crespi, 2012; Uyulgan & Akkuzu, 2018).

Lecturer generated videos

In contrast to student-generated videos, Bravo, Amante, Simo, Enache and Fernandez (2011) used lecturer generated videos of problematic topics and claimed it had a positive effect on students' motivation to learn. The videos made the content more attractive, enhanced comprehension and reduced absenteeism in classrooms because students preferred the short

videos rather than long paragraphs of text. In a similar way, Bergmann and Sams (2012) recorded all their lectures for students to watch at home, and use the class time for discussing the work that the students don't understand. When incorporating videos as part of a flipped classroom model, the student's results were far better than previous years. However, in other studies, students did confess that when videos were made of the full lecture, they don't go to class but rather watch the video (Boateng et al., 2016).

Research confirms that students find lecturer-generated videos useful because when they watch it again, they noticed things that they missed during the lecture (Boateng et al., 2016). The videos are not only entertaining, but the students also understand the content better. However, the students recommended that the videos should complement face-to-face training and not be a duplication of lectures.

Most of the research related to lecturer-generated videos revolve around topics such as access to information, lecture capturing, assessment and video notes (Frentsos, 2015). These videos are made available in class or can be found on popular video platforms such as YouTube (Boateng et al., 2016).

An insufficient number of research studies exist on student-generated videos as a support tool or videos used for just-in-time learning. This study aimed to determine how student experiences differ between making their own videos and using lecturer-made videos. The question is, therefore: "How does the experience of students who created their own videos for learning support, differ from students who used lecturer-generated videos?"

Methodology

In this study, the researcher was interested in the authentic experiences of the students when working with videos as learning support. Therefore, this study is qualitative by nature (Strydom & Bezuidenhout, 2014). This study is also explorative and meets the requirements of a case study. A case study, according to Creswell (2007) is the kind of approach in which a qualitative design is used in the context of a particular case for cases. Explanatory case studies are used to obtain an understanding of what Yin calls "how" and "why" events (Yin, 2009, p. 9).

This study is based on the feedback of students from two projects. Firstly, the use of **mobile videos** for academic support and secondly, the **MobiTech** project, which explored the use of mobile devices in higher education. Although the two cases are different in nature, the researcher was interested in the experiences of the students in regards with using videos for learning support.

In this study, the researcher had two roles, she was both the lecturer and researcher in the **Mobile video** project and the researcher in the **MobiTech** project.

Participants

For the **Mobile video** project, the researcher taught MS Excel (spreadsheet) to a group of Internal Auditing students. This module has a subminimum of 40%, so students fail the subject if they do not meet the subminimum. In the past, students qualified for a supplementary test if their mark was between 38 and 39 percent. After the option of a supplementary test was removed, the lecturer assumed that without extra support, too many students will fail the subject. Therefore, the videos were created for that specific group. From

this group, 39 (n) third-year students (in two consecutive years) were conveniently selected to participate in the study.

In the **MobiTech** project, the researcher was interested to know how students use videos in their natural learning environment. Students from all levels at the Veterinary faculty were invited to participate. From these students, 8 (n) from a group of 179 second-, third- and fourth-year veterinary students volunteered.

Research design

In the **Mobile video** project, videos of 3-5 minutes were created using screen capturing software. The videos were made available on the learning management system of the university and later published on YouTube. However, students did not watch the videos and the lecturer then applied the Jigsaw teaching method to encourage the use of the videos in class as part of a group activity. It was after this combined use of videos, face-to-face lecturing and the jigsaw teaching method that the students started using the videos as support tools when not in class. After the last class, they were invited to complete the online survey that consisted of both closed-ended and open-ended questions.

In the **MobiTech** project, the 8 veterinary students that volunteered were challenged to create and use videos while they attend their theory and practical lectures during one of the weekly activities of the MobiTech project. Students used a variety of mobile devices to make video recordings. At the end of the week, they gave feedback during their group interview.

Data collection

In the **Mobile video** project, a questionnaire with both open and close-ended questions were used. While closed-ended questions limit participants' responses to a question, open-ended questions allow participants to supply and elaborate on any suitable answer (Oliver, 2009). The close-ended questions focused on student's mobile devices ownership, communication applications and video usage while the, open-ended questions were about the students' experiences with regards to the benefits and challenges while using videos. This activity was repeated the following year, and the new group of students was also invited to complete the online survey.

In order to gain a clear understanding of how the participants in the **MobiTech** project used videos in their different learning environments, group interviews were used. A group interview is similar to a focus group however, it differs in the sense that only one group of students was interviewed in a number of successive sessions (Harrell & Bradley, 2009). Although guided questions are asked, the researcher had the freedom to ask additional questions based on the responses of the participants.

During their group interview, the students were prompted about their devices used, what worked and did not work, the challenges and benefits and whether they watched the videos again. Although only one weekly activity was dedicated to the use of videos and multimedia, the participants also mentioned video and multimedia use in the other five weekly group interviews

Data analysis

The researcher's representation of the use of videos as learning tools was the result of observations and the rich reflections of the participants after they explored the use of mobile videos in various educational settings (Daniel, 2012; Miles & Huberman, 1994). The

interview text and the responses to the open-ended questions were saved and analysed manually, to identify trends, keywords and recurring patterns as described by Henning, van Rensburg and Smit (2004).

In the next section, the benefits and challenges of working with videos for these two groups are discussed. The lessons learned from the lecturer's/researcher's perspective, suggestions from both student groups as well as possible future research are also discussed.

Results

The participants from the **Mobile video project** used both computers and mobile devices to watch their video clips. The overwhelming reaction and buy-in of watching the video clips are evident in the positive adoption of the use of the lecturer-generated videos in the MS Excel module.

Participants emphasised that when they watched the videos, it helped them to understand the content better, especially the visual learners. If something was not clear in an exercise, or in the video that they were watching, they could watch the videos repeatedly whenever necessary.

Not only did the videos provide much-needed support when students are not in the class, but it also motivated them to do additional exercises. The process of doing exercises, watching videos and applying the steps to the question asked, empowered the participants and created the opportunity to become independent learners. As mentioned: "now I am able to do more exercises on my own at home, when I am stuck I am able to go back and watch the videos again for clarification."

Although the focus was on providing support and not to increase marks, the following remark was noteworthy: "I passed...with awesome marks and I actually understand long after we're done...". Because students are using the videos to master practical applications, they had to pause, rewind, and play. In doing so, they are actively involved by engaging with the videos, applying knowledge and watching it repeatedly, it deepens their learning experience while preparing for their assessments.

Because the videos were created by one of the lecturers who taught the module, the participants confirmed that the video content matched the curriculum, the steps were easy to apply, and the language was easy to understand. However, there were some challenges. Some participants complained about not having Internet access, the Internet is too slow, or they did not have enough mobile data to access the videos. One honest participant confessed that because he knew that there were videos available, he did not attend all the classes. Although it is a possibility that students might not attend classes, I did not experience it. On the positive side, at least they do have access to the videos.

The participants in the **MobiTech project** used mobile devices (smartphones, action cameras, video cameras, and tablets) to create video recordings of full lectures and practical demonstrations. Although they experimented with a variety of devices, the devices that was the most convenient was the smartphone and action camera. Although there are many videos available on video platforms such as YouTube or iTunes, the participants preferred the videos created by themselves or lecturers of the university. In that way, the content was relevant and aligned with the curriculum as well as pitched on the appropriate level.

The participants attempted to record full lectures, but they seldom referred back to these lengthy videos, except when they missed a class. One participant mentioned: “If I sleep through most of the lectures in class then I will definitely sleep again in my room”.

The participants mentioned various other benefits of using videos. For example, they could watch a video clip of a specific procedure repeatedly. This enabled the reinforcement of the content they had to master. The availability of videos was also convenient while preparing for an exam. Before they started studying, they preferred to watch a short video (save time) than reading through notes. They, therefore, preferred to watch a video first and then go to the written text as they understand the video (visual) better as it forms a picture in their minds.

Although creating a video which seems like a passive activity, participants incorporated the videos afterward into their daily notes. They combined their typed notes, photos, and videos into a study unit. By doing so, the participants were actively involved in summarising, connecting and building content, this was then saved for later use.

The participants were aware that their training was dependent on the type of cases treated in the academic hospital. It was important for them to record and get exposure to as many cases as possible. However, these videos were not planned activities and were created in real-time with whatever device they had access to at that moment.

Some of the participants experienced technical difficulties with their devices, for example, they could not save the video, or there was not enough storage space on the devices. Surprisingly, not all the participants favoured the making of videos and claimed that they if they made it, they would never watch it except if a camera could be placed inside the dummy animals (in the skills lab) so that they could determine if they were identifying the organs correctly.

DISCUSSION

To answer the research question, keywords, that indicate both differences and similarities in video use, were identified from the student feedback. Keywords used by both groups (indicating similarities) indicated that the students use the videos as an alternative to text (Uyulgan & Akkuzu, 2018; Clark & Mayer, 2016). The findings confirmed that because students were more comfortable with visual material, it saved them time, they understood the material better and they could watch the video repeatedly (Mayberry et al., 2012). They were actively involved when they had to apply the knowledge of the video on exercises, tests or creating connections to other information that were also recorded (Green & Crespi, 2012). The students from both groups indicated that the content of the videos made by either students or lecturers aligned with the curriculum, and therefore in both cases the videos were found useful. Both groups also reported that in some instances they experience technical issues such as data and storage issues.

Taking in consideration the shared positive experience of students when either lecturer-generated or student generated videos are made, it indicates that both kinds of videos can be used as a support tool. However, there were also keywords that were unique to the two groups. For example, for the **Mobile video** group (n=39), students confirmed that the access to videos encouraged absentees from classes but at the same time also encouraged them to work on their own and be independent from the lecturer. In being independent, they are motivated to do more practice activities and in doing so, they teach themselves. Therefore, the video becomes their primary form of support and not the lecturer. While practicing,

helping others and reinforcing the work, the students claimed that they have a deepened learning experience in comparison to the time they did not have the support videos.

The **MobiTech** (n=8) group, had a different experience of using videos than the lecturer-generated group. They emphasized the recording, saving and sharing of videos. In their learning environment, new examples and cases are presented daily and therefore, they cannot wait for a lecturer to make a video, their videos are many times made instantly of what is presented. They favor a mobile device to record, save and share their videos. This repository of cases is incorporated in their learning material and become part of their studies. Therefore, their content material keeps on expanding. They also emphasized the importance of shorter videos rather than longer recordings of lectures.

In this study, the question was asked whether the experience students had when working with student-generated videos differ from students that use lecturer-generated videos. From the feedback, it was clear that there are differences and similarities. Although the videos in both cases were created to support learning, for the participants in the **Mobile video** group, the experience had to do with their own learning, independence, and motivation, while the students in the **MobiTech** group made videos for themselves, as well as for future students. While the similarities indicated the value of both kinds of videos, the differences originated from the different context and environment in which the videos are used.

Lessons learned from both groups

The first lesson learned is the underestimated impact of visual material to our students. Although students have a textbook, when a visual element is added, it made the work easier to understand.

The second lesson was the lasting effect the support videos had. Participants became independent of lecturers, worked on their own, were actively involved and had a deepened learning experience. The third lesson was the motivational aspect because the participants had access to the videos after class, they understood the language and they knew how to use it, it motivated them to do more than the usual exercises.

Lastly, the value of the videos is in the immediate, on-demand availability. They could record a new case the moment it was admitted, as it happened or when demonstrated. There was no time to prepare, so they always needed to be ready to make a recording. Therefore, it was important to have a device that is ready, available, mobile and preferable handsfree.

Another lesson learned was the importance of making video recordings of cases that were presented during their studies, not only for themselves but also for students to come. They felt strongly that the more exposure they had to cases (past or present), specifically visual material, the better their training would be.

Recommendations and Conclusion

This study confirms the value of using videos for learning, more specifically learning support. While using videos, a visual component is added to the learning material of which students confirmed that they benefitted of. Not only the students that participated in this study benefitted, but future students will also benefit from the recordings made. Either they will have access to previous recorded videos of lectures, or of scarce and complicated cases that students self-recorded.

The students participating in this study, confirms the popularity of and their confidence in using videos. Both groups made valuable suggestions when videos are used for learning support. Students, especially the Mobile video group, feel very strongly that all lecturers need to make use of videos during their lectures or as part of their curriculum.

Both groups of students emphasized that videos need to be made by lecturers or senior students so that the content aligns with the curriculum (same level). If possible a dedicated person must record the videos to ensure the best view and quality. Software becomes outdated or medicine discontinued, therefore, regular updates need to be made of videos. Because students have access to a variety of devices, the videos need to integrate seamlessly over these devices.

In contrast, the **Mobile Video** group indicated a more internal as compared to the more external stance of the **MobiTech** group when using videos. From the similarities and differences indicated in this study, both ways of making videos supported learning, and how you use it, might be dependent on the educational context of the student.

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UNDERGRADUATE STUDENTS' PERCEPTIONS OF ACADEMIC ADVISING AS AN INTERVENTION STRATEGY FOR PROMOTING ACADEMIC PERFORMANCE

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Abstract

The study sought to establish undergraduate students' perceptions on academic advising as an intervention strategy for promoting student academic performance while at the same time developing professionals' mentorship capacity at Botho University. Mixed methods research adopting both qualitative and quantitative techniques was used to explore students' academic advising. Data gathering was triangulated employing questionnaires, focus group interviews and document analysis to ensure data validity and reliability. A simple random sample of 120 students was selected across campuses and programmes with the aid of a computer generating cohorts of the student database. Four focus groups from the university were purposefully employed comprising 8 students per group making a total of 32 students for the focus group interviews. Statistical analysis using SPSS and not satisfied with academic advising delivery and are comfortable with choosing academic advisors they prefer. The study recommended more use of developmental than prescriptive academic advising, further research is recommended in other tertiary institutions and also to get insights of perceptions of academic advisors and educational practitioners.

Keywords: Academic Mentoring, Academic Advising, Counselling, Career Guidance

Introduction

Mentoring and academic advising are students service interventions used in Higher Educational Institutions (HEIs) to enhance the quality of students' academic life and the quality of learning outcomes (Mullen, 2005). Advising students for success in higher education has always been an important and challenging task. This becomes even more critical nowadays as most higher education institutions are trying to boost their enrollment and improve their retention so that they can be self-sufficient financially and sustainable economically (Zhang, Gossett, Simpson & Davis, 2017). Mentoring and academic advising are used interchangeably in Higher Education literature based on the notion that they have a strong overlap. Academic mentoring is a process that involves a relationship between a more experienced and knowledgeable advisor with a student who is less experienced (Zachary, 2003). Academic mentoring provides guiding, professional networking and modelling as a mutual developmental process (professional, personal and psychological) and as a reciprocal socialization relationship for both mentor and mentee (Ramaswami & Murrell, 2018). Academic advising complements the mentoring role by advising students on what programmes or classes are available, assisting with scheduling or registration issues, availing academic regulations and policy information as needed as well as clearing students for graduation. Academic advising is a process that connects students' academic and personal worlds through discussions between the student and a representative of the institution, also called the advisor (Davis, 2010).

Crockett & Levitz (2015) found out that, over three-fourths of all advising programs had no systematic plan for evaluation and one-half did not even evaluate the performance of individual advisors. This has been the case with Botswana institutions of higher learning. Students are the main customers or beneficiaries of academic advising, and as such they are the most relevant research subjects to contribute their perceptions and appraise on the usefulness of academic advising for purposes of continuous improvement. According to Petress (2014), students interpret differently the way advisors interpret academic advising. Students look at the advisor competence, advisor's interest in the advising task and in individual students, adviser availability, advisor personality, as well as advisor's patience and preparation. On the other hand, advisors are more concerned with how they interpret their advising role, what recognition or rewards are available for competent or exemplary advising, what training and/or guidance is provided to advisors and what expectations administrators and colleagues have for advisors.

In Botswana, the pioneer university is the University of Botswana. Academic advising at the University of Botswana began during the University of Bechuanaland (Botswana), Basotoland (Lesotho), and Swaziland (UBBS) era. At inception, academic advisers were referred to as faculty tutors/advisers. Their functions included registering students, processing examination results, making recommendations for academic standing, and sitting on the Admissions Committee. The job proved to be too heavy for faculty tutors (academic advisers), and the university then introduced faculty administrators and deputy deans (Motshegwa, 2010).

Student academic advising at Botho University has been in operation from 2014. The University regards academic advising as the lynch-pin for students' success in the university and integral to fulfilling the teaching and learning mission of higher education. The students hold the ultimate responsibility for taking decisions about their academic choices within the framework of the University's regulations; the academic advisor's role is to advise and guide the student.

Overall, the study sought to establish undergraduate students' perceptions on academic advising as an intervention strategy for promoting student academic performance while at the same time developing professionals' mentorship capacity at Botho University, Botswana. The study has been motivated by current academic advising practices at Botho University that has some shortcomings in enabling students to have a supporter, who provide them with confidence, stability, assurance, coaching and consistency. Botho University academic advisors are faculty members who are not trained on academic advising. This often leads to poor academic advising service, with students being dissatisfied and demotivated to carry out their daily academic work thus making it difficult to retain them.

Literature Review

Academic advising can be tracked back to the 1800s the time when there was formation of American colonial colleges (Cohen & Kisker, 2010). The concept of advising students has been present in some shape or form since the inception of higher education in America. In the late eighteenth century, America gave birth to its first colleges: Harvard, William and Mary, Yale, New Jersey, Philadelphia, Rhode Island Queen's and Dartmouth (Rudolph, 1990). These institutions were created from the English template of Cambridge and Oxford and aimed to educate students into responsible graduates and life-long learners. During this time American colleges and universities teaching staff acted in loco parentis, or on behalf of parents (Cook, 2001).

In the 1870s two historical institutions in the USA, Harvard and John Hopkins Universities introduced advising systems (Frost, 2000). The role of academic advisors at this point was to foster personal assistance to students and create cordial relationships while at the same time inculcate and inspire confidence in the students (Hawkins, 1960). As students enrolled at universities, increased and became more diversified, it became a necessity for the expansion of academic advising systems (Cohen & Kisker, 2010). The influx of students in tertiary institutions after World War II resulted in further evolution of academic advising. It called for the hiring of full-time academic advisors to replace professors who were reluctant or not capable to take time for academic advising due to increased teaching load (Lucas, 2006). It subsequently weakened formal faculty advising systems as students advising duties were redeployed to become a function of the student services administrators in most of the campuses. That is, academic advising began to be offered by staff who did not directly teach the students and hence it was placed second to teaching.

Academic advising got increased attention in the 1970s and 1980s due to subsiding students' enrollment and alarming drop-outs (Biggs, Brodie & Barnhart, 1975; Crockett, 1978). The proliferation of universities and colleges after the Second World War provided a time for academic guidance to secure its place in education and advising groups began to emerge (Gordon, 1992). More-so in the late 1970s to late 1990s tertiary institutions focused on redressing the diversity and imbalances that were evident in the educational arena for groups based on their gender, race, age, disability, economic status race and ethnicity (Cohen & Kisker, 2010). Hence, campuses were grappling with pragmatic strategies for retaining students and improved cumulative grade point average (CGPA). Wilder (1981), points out that, a student retention study carried out by The American College Testing (ACT) Program in 1979 established that, academic advising was a vital intervention for student retention and progression. This led to the establishment of the National Academic Advising Association (NACADA) in 1979. NACADA is an association of professional administrators, faculties, advisors and students mandated to promote quality student academic advising on university and college campuses. (NACADA, 1996). Today many scholars (e.g., Allen & Smith, 2008; Chiteng, 2014; Campbell & Nutt, 2008; Roberts & Styron, 2010; Dillon & Fisher, 2000;) associate student retention, success, persistence and graduation rates to the mentorship by expert academic advisors.

Institutions of higher learning in Africa are lethargically adopting student academic advising. In most institutions the service is so rudimental that it is offered by student services department without proper policies and systems in place (UNESCO, 1998). In some cases, it is assigned to lecturers who in most cases lack the requisite skills and more-so lack the time to provide the service given the heavy teaching loads they have. In South Africa statistics allude that Higher education participation rates remain low in comparison to other countries, 30% who enter South Africa higher education system annually drop out during their first year, less than 50% of students who enroll for diplomas or degrees ever graduate, only one in three students of the intake into third year degrees graduate in record time or within four years and fewer than 50% receive a higher education qualification after five years (Scott, et al., 2014). These statistics of poor student retention and persistence in South Africa denotes that student academic advising is an appropriate intervention to mitigate the students' poor performance.

Academic advisors provide student connection to the institution which is of primary importance in student retention and persistence (Nutt, 2000). Student satisfaction, academic

and career planning, as well as goal-setting in general, are expected outcomes of good quality advising. These activities also impact on student's likelihood of staying in college. 75% of students who join university have indecision about choices on majors and careers (Cuseo, 2000). Most students are making these decisions while they are in college, and this exploration can and should be part of the academic advising experience. Since prolonged indecision about a major is associated with a higher rate of student attrition (Astin, 1977), it stands to reason that advising which includes effective academic and career planning can have a positive impact on student retention.

Academic advising assists students to realize the maximum educational benefits available to them. They understand themselves better and learn to use the institutional resources to meet their special educational needs. Advising helps students to integrate to the academic environment which is required for the successful completion of their studies. If students feel academically and socially integrated, they become more committed, yet those who have poor interactions with college are less likely to persist (Ritter, n.d.).

Research confirms that academic advising, and student services that promote connection between the student and the institution, as well as faculty-student contact can likely have a significant effect on student motivation, involvement, and retention (Tinto, 1993; Glennen, 1995; as cited in Tuttle, 2000). Metzner, (1989) posits that high-quality and effective academic advising tends to have a significant but direct effect on student retention and persistence through increased student higher grades, satisfaction, and a decreased intent to leave the institution (Hale, Graham & Johnson, 2009). If students are kept satisfied with their advisors it enhances the chance they will also be satisfied with the college life because they realize that they are taken care of and not lost. Based on the premise that student academic advising plays a key role in student retention it is also prudent to evaluate student satisfaction, perceptions and desires (Hale et al., 2009). The feedback from students on academic advising will provide the institution with basis for informed continuous improvement so as to increase student retention rates and graduation rate.

Conceptual framework

The study was guided by Astin's (1991) Inputs-Environment-Outcomes (I-E-O) conceptual framework in the analysis of the impact of academic advising on students' learning and development. According to I-E-O framework, student outcomes are a product of student inputs (pre-college characteristics and experiences), the college environment, and the interactions between student inputs and the college environment. Advising is an environment in the I-E-O framework as it is a service provided by institutions. Astin (1991) distinguished between-and within-institution characteristics. Between-institution characteristics depict the institution as a whole. Within-institutional environmental characteristics identify sub-environments that only influence some students. He further defined two types of between-institutional environment measures. One type includes structural characteristics like institutional size, control, and selectivity. In the I-E-O model, a student's input measures, such as gender, racial/ethnic identity, social-economic status, personality, academic preparation, determine the students' attitudes towards advising and the types of services sought from advisors. Additionally, advising services mediate or moderate the relationship between students' inputs and learning outcomes, as advising influences participation in educationally beneficial activities and helps students connect their classroom learning to the real world.

Methodology

Mixed research adopting both qualitative and quantitative techniques was used to evaluate students' academic advising. Data gathering was triangulated employing questionnaires, focus group interviews and document analysis.

The population of the study was 6 750 Botho University students. A combination of simple random and purposive sampling was adopted for this study. The questionnaires were administered to 130 students across programmes and 120 were properly filled in and collected constituting a response rate of 92%. The response rate was high as the researcher got assistance from Heads of Departments (HOD's) to distribute the questionnaires.

The research participants filled in consent forms to ensure adherence to research ethics and that they are not coerced to contribute in the study. Both the questionnaire and the interview guide were briefly discussed with the participants before they responded to them. The researcher audio record the focus group interviews and made notes during and after each interview with the permission of the participants

Four focus groups of 8 participants took part in the study. The size of the group was consistent with what is recommended in the existing literature of 7-12 participants (Nagle & Williams, 2012). The number was regarded optimal to promote focused discussion and enable the moderator to keep the participants on task.

Results and Discussions

The data obtained through questionnaires was analyzed using Statistical Package for the Social Sciences (SPSS) 2017 version. Focus group interviews were subjected to content thematic analysis whereby the data was coded first by assigning labels to words, paragraphs or phrases so as to enable the researcher to combine and differentiate interview data into concepts, ideas and themes.

Proxies on importance of academic advising

Various proxies were measured to determine whether student academic advising is useful to the students. The students responded their opinions on the importance of academic advising on a Likert scale ranging from strongly agree, agree, disagree and strongly disagree. The data was presented using descriptive statistics as illustrated below.

Table 1. Summary on importance and role of academic advising
Descriptive Statistics

Proxy	N	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Improved Interests	115	2.46	.930	.865	.349	.226	-.778	.447
Improved abilities	114	2.42	.930	.865	.402	.226	-.716	.449
Life goals	113	2.35	.933	.871	.395	.227	-.662	.451
Career goals	112	2.48	.939	.883	.218	.228	-.846	.453
Policies	112	2.46	.869	.755	.391	.228	-.562	.453
Know Courses	113	2.47	.856	.733	.402	.227	-.542	.451
College Support	112	2.52	.827	.684	.428	.228	-.545	.453
Degree	112	2.44	.888	.789	.428	.228	-.590	.453
Requirements								
Degree Majors	112	2.57	.846	.716	.226	.228	-.663	.453
consistent majors	113	2.50	.917	.841	.093	.227	-.795	.451

available paths	109	2.39	.872	.760	.416	.231	-.479	.459
extra curricula	110	2.50	.946	.894	.166	.230	-.881	.457
Online services	111	2.54	.892	.796	.110	.229	-.740	.455
Confidence	110	2.47	.864	.747	.303	.230	-.586	.457
Independent	111	2.38	.944	.892	.227	.229	-.812	.455
Improves performance	112	2.38	.932	.869	.312	.228	-.730	.453
Improves retention	112	2.43	.877	.770	.344	.228	-.568	.453
Improves persistence	111	2.33	.888	.788	.480	.229	-.430	.455
fulfilled needs	112	2.61	.933	.871	-.081	.228	-.848	.453
Valid N (list-wise)	102							

Of the 19 proxies on how academic advising has helped the respondents the mean statistic range from a minimum 2.33 to a maximum 2.57 which is a range between agree and disagree. The statistics points to the conclusion that academic advising at Botho University has to a lesser extent helped students in the respective proxies. The standard deviation for all the proxies is ranging between 0.684 and 0.894 and the interpretation is that data sets are not far away from the statistic mean. The skewness for all other proxies are positive meaning a positive skewness to the right, however fulfilled needs has a skewness of -0.081. The item on whether academic advising fulfilled participants' needs is much closer to disagree as depicted from the statistic mean, than other proxies on the importance of academic advising to students at Botho University. The skewness is closer to zero meaning the data distribution is relatively asymmetric and closer to the normal distribution.

The kurtosis is all negative for all the proxies on the importance and role of academic advising to the respondents. The interpretation is that data sets that have low kurtosis have light tails, or do not have outliers. Kurtosis that is negative denotes a distribution that is "light tailed" relative to the normal distribution.

Proxies on importance of academic advising

Various proxies were measured to determine the effectiveness of academic advisor in student mentorship. The students responded on a Likert scale ranging from strongly agree, agree, disagree and strongly disagree. The data was presented using descriptive statistics as illustrated below.

Table 2. Summary on effectiveness of the academic advisor
Descriptive Statistics

Advisor Evaluative index	N	Mean	Std. Deviation	Varianc e	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Good source	109	2.34	.884	.782	.338	.231	-.530	.459
Interested	108	2.38	.883	.780	.250	.233	-.596	.461
Courteous	109	2.39	.922	.850	.236	.231	-.735	.459
Responsibilit y	110	2.40	.869	.756	.229	.230	-.568	.457
Accurate	108	2.41	.854	.730	.294	.233	-.489	.461
Listened	110	2.43	.840	.706	.281	.230	-.464	.457

Career plans	110	2.44	.883	.780	-.007	.230	-.701	.457
Appointment	110	2.45	.819	.671	.127	.230	-.456	.457
Follow up	108	2.56	.835	.698	.115	.233	-.573	.461
Appropriate	110	2.57	.840	.706	.003	.230	-.566	.457
Valid N (list-wise)	103							

The study research question on “how effective are advisors in assisting students in academic advising?” is summarized in the table above. Of the 10 advisor evaluative indices on whether academic advisors are effective in their delivery of academic advising the respondents mean statistic range from a minimum 2.34 to a maximum 2.57 which is a range between agree and disagree. Majority students agreed on the advisor evaluative index that wanted them to give their overall perceptions on whether academic advisors were a good source for academic advice about student faculty and the university. Students gave very low scores on their advisors especially on the items on whether academic advisors were prepared for the advising appointment, whether advisors refer students to appropriate campus resources as needed and on whether advisors make a follow-up on unresolved issues. The three indices are very important in promoting a favourable atmosphere for academic advising between the advisor and the advisee. Academic advisors must have referral skills meaning the ability of the advisor to identify circumstances that are appropriate to escalate student assistance to another resource department or person. For instance, not all faculties are professional counsellors or are experts in all disciplinary areas. Students may have problems stalling their studies which are psychological or medical. In that case there is need for a collaborative process that calls for knowledge on the part of the advisor to recognize the services available on campus and the community.

The standard deviation for the evaluative indices on the effectiveness of the academic advisor range from 0.819 to 0.922 and the deviation is closer to the mean statistic which is consistent to the mean statistic that is between agree and disagree. The skewness for the data distribution is positive (skewed to the right) for all evaluative indices except on whether advisor is helpful in discussing career plans which is -0.007. This means that for career plans the data set is almost symmetrical meaning it is very closer to the normal distribution. The kurtosis for all evaluative indices are negative implying that there are no outliers in the data distribution and its light tailed.

Focus groups findings

The findings of the focus group interview were analyzed based on meaning and nature of academic advising, importance and contribution of academic advising, evaluative remarks on advisor effectiveness and recommendations on academic advising best practices themes. However sub-themes that emerged from these major themes were highlighted in this presentation of results.

Meaning and nature of academic advising

The focus group interviews established that the students were aware that student academic advising is a platform where they were “assigned a lecturer to facilitate a student learning”. It came out in the focus group discussions that there was “need to change from academic advising to something”, mainly because the advisor is not advising on academic issues only. It was suggested that it must change to something like “student mentoring” so as to incorporate social issues over and above academic issues. The rationale for that was, quoting

the words of one respondent, “social issues are not exclusive to academic issues”, as there are “two side of the same coin”.

Participants in the focus groups echoed the sentiment that there was a problem with assigning advisors, but however there is need for students to choose advisors they prefer. The participants said the choice could done the same way on the Student Portal like they do when they register for modules they also have the chance to choose the lecturer to teach them on a “first come first serve” basis.

The students also said that they were not even comfortable with Student Affairs Counsellors availed by the University because anyone would confide with someone, be he or she a professional counsellor of one’s choice. Participants said there was no trust in someone you have been assigned.

Importance and contribution of academic advising.

The overall sentiments raised by students were that academic advising was not making a meaningful impact in their learning mainly because of its delivery shortcomings. In some cases, it is a “meet and greet in the corridors”, with the advisors and in that case, it was not helpful. More-so, posted invitations by advisor on Campus-Vue, student portal or emails are not seen by the students.

Furthermore, the academic advising meetings conducted were purely prescriptive as students met as a group and there was no room for student case by case advising. There was no room for students to share with the advisor their personal issues negatively impacting on their academic performance.

Participants in the focus group discussion also raised that academic advising need not to be just academic but could be a get-way to the future, as it is also good for even high performers. In the words one respondent, “academic advising can be a good forum for information on scholarship opportunities, job opportunities, out of school competitions, LINKZ, research conferences, university cultural exchanges amongst others”.

Generally, there was consensus that academic advising did not impact positively on student college life because some of the students do not even know their advisors. Those who happened to know them attended one or two brief academic sessions and this validates findings from the questionnaire survey. Participants said for academic advising to be helpful, there is need to review processes, policies and procedures.

Participants’ recommendations on academic advising

Participants pointed out that most students do not know the role of academic advising hence there was need for a deliberate intervention to sensitize them on the benefits of it. Lack of information results in some of the students thinking that it is a, “waste of time” and that negative perception result in non-participation.

Discussants were consistent with the survey question on whether academic advising must be scheduled on the timetable just like modules. Scheduling advising meetings would reduce chances of students not seeing the invitations for academic advising. They also said prescriptive advising because it has predetermined objectives and outcomes need to be scheduled so that there is no clash with normal classes. However, for developmental advising students can approach their advisors at any time.

The majority of discussants had no problem with rewarding dedicated advisors. Some had reservations on the criteria for determining advisors who excel and deserve a reward. Other participants said, “advisee feedbacks could come in handy”, to inform on advisors who are top performers. Some participants said feedbacks breeds animosity and conflict between parties because, “a lecturer with a negative feedback may paint everyone in the group black”. It came out from the focus group interviews that students needed advisors from same discipline with them. Students suggested that academic advising must be made compulsory to all students and it would be up to the students to attend or not but an attendance register must be taken.

Conclusion

Student academic advising has a positive impact on student success and satisfaction in higher education. The findings from this study and past research validate the contribution of academic advising as an extension of teaching. It can also be concluded that there is need to continuously improve the processes and procedures of delivering academic advising. There is also need for getting feedback from students and advisors as they are key stakeholders in the conduct of academic advising. The study found out that developmental advising as a more one on one interaction enables the student and advisor to collaborate in exploring possible and available career options as well as different courses the advisee can enroll. The collaboration does not only promote a favourable relationship between the student and the advisor, but empower the students to confidently make rational choices in the pursuit of their education. The student will take the advisor as a mentor and be satisfied by the information given, be able to make appointment with advisor, be overallly satisfied with the university experience and will ultimately perform well in studies.

Recommendations

The researchers recommend that educationists to use more of developmental than prescriptive academic advising and this is supported by the notion that students want to choose advisors they prefer so as to confide with advisors they trust. It is recommended that there is need to continuously improve the processes and procedures of delivering academic advising through monitoring and evaluation. The researchers recommend that academic advisors must discuss possible career options with the students during academic advising for students to appreciate the purpose of learning as well as excelling in their studies. The researchers recommend further research in other tertiary institutions and also to get insights of perceptions of academic advisors and educational practitioners.

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SCIENCE TEACHERS' REFLECTIONS ON THE EFFECT OF CONTINUING PROFESSIONAL DEVELOPMENT PROGRAMMES ON CLASSROOM PRACTICES

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Abstract

The need for high quality continuing professional development (CPD) is a central component in nearly every modern proposal for improving the quality of education. As part of the education reform processes, many nations are also investing in teacher education as a major engine for driving the changes in the classrooms to ensure learners' academic success. Unfortunately, researchers strongly agree that current CPD approaches offered to teachers do not meet the definition of effective professional development. Many continuing professional programmes often fail to consider the impact on the teaching and learning in general and focus almost exclusively on teachers. Using a qualitative case study design, this research seeks to understand teachers' reflections on the effect of continuing professional development programmes on classroom practices. To collect the necessary data, 10 teachers who participated in one professional development programme – "Mpumalanga Secondary Science Initiative" were purposefully selected and interviewed using face-to-face semi-structured interviews. The findings of the study which are based on only three teachers, reveal that, teachers find the professional development programmes personally meaningful if they are classroom situated, content based and learner-focused. This paper therefore concludes that, under the right conditions, professional development may still assist teachers to be more effective and may result in improving students' achievement. The researcher recommends that the teachers should not only be involved in the participation of the programmes but also in the planning and designing of such programmes as they (teachers) are at the chalk-face.

Introduction

Continuing professional development (CPD) can be interpreted as a structured approach to learning that will facilitate competence to practice by intensifying knowledge, skills and practical experience. CPD in school education consists of any educational activity that helps to develop, maintain or increase knowledge, problem-solving skills, technical skills or professional performance standards, all with the goal of providing quality education (Mestry, 2017). According to Patton, Parker and Tannehill (2015), professional development is an obligation and an opportunity, serving as a form for change and for confirmation of current practice. Zhao, Jing and Endris (2015) therefore define continuing professional development as an ongoing, lifelong process of enhancing the quality teaching and learning by building the motivation, commitment, understanding, attitude, skills and knowledge of teachers and other educational staff, as it contributes to pupils' academic performance. Kennedy (2016) further adds to the idea that professional development can foster improvement in teaching. If student learning is to be improved, then one pathway for doing so is the provision of effective professional learning activities for teachers in schools, where effective activities result in positive change for teachers and their students (Opfer & Pedder, 2011). According to Kennedy (2016), professional development is required by virtually every teaching contract and that teachers participate in professional development every year. Teachers' professional development is also one of the keys to improving the quality of US schools (Desimone,

2011). According to Akiba and Liang (2016), teacher professional development is part of many districts and schools' strategies for improving student achievement and that teachers are under pressure to improve student learning. Research has also shown the link between high-quality professional development to higher quality teaching and high-quality teaching to student achievement (Smith, 2010; Wei, Darling-Hammond & Adamson, 2010). Professional development activities must therefore build on teachers' own knowledge and beliefs, perceived problems and classroom practices (Opfer & Pedder, 2011). Professional development is therefore seen as an essential mechanism for enhancing teachers' content knowledge and improving classroom practices. In their research, Phasha, Bipath and Beckmann (2016) conclude that teachers need professional development on content knowledge, teaching approaches, attitudes and that CPD assists teachers to refresh and increase their interest in the teaching profession.

Despite the widespread agreement about the importance of professional development, Kennedy (2016) postulates that there is little consensus about how professional development works, what happens in professional development, how it fosters teacher learning as well as how it is expected to alter teaching practice. Research on teacher professional development generally yields disappointing results, and that the PD activities have often been found to be ineffective or to be perceived as irrelevant by teachers (Opfer & Pedder, 2011). Changing teachers' classroom behaviour sustainably also remains a challenging endeavour (van den Bergh, et al., 2015). With this dilemma, the researcher begins to pose the following question "What are the reflections of science teachers on the effect of continuing professional development on classroom practices?" While approaches to professional development format have changed considerably, there is a continuation of the one-size fits-all workshops offered in a context removed from schools and students and focused on various topics that often do not relate to teaching and learning (Patton, Parker & Tannehill, 2015). However, much more empirical work is needed to address the question of whether, through the eyes and experiences of the teachers, the programmes have had an impact, or not, in their classroom practices, and whether particular programmes are more effective than others. Thus, this research seeks to collect and explore the opinions of the teachers who participated in one of these professional development programmes (the Mpumalanga Secondary Science Initiative (MSSI)) and determine whether it had any influence on their classroom practice. Although much research is available on staff development models, few studies have examined the issue of professional development from the teacher's perspective (Singh and Shiffelette, 1996). This paper therefore explores the teachers' reflections on the effect of continuing professional development programmes on classroom practices using the case of the Mpumalanga Secondary Science Initiative (MSSI) project.

Mpumalanga Secondary Science Initiative (MSSI) project

The Mpumalanga Secondary Science Initiative (MSSI) project coupled with this goal, promoted school-based or on-the-job in-service training (INSET). The MSSI approach, initially involved the training of curriculum implementers (CIs) (sometimes called Subject Advisors), who were then expected to act as teacher trainers thereafter. The training of CIs was initially carried out with a five-week group-study in Japan. Upon their return, the group of CIs was expected to organise district-level workshops for Mathematics and Science Heads of Department (HODs) in the secondary schools within the districts. In turn, the HODs would convene training sessions for their colleagues in the schools. In the later stages of the project (Phase 2), the key stakeholders in the MSSI intervention opted for a slightly different approach to CPD in order to correct some of the perceived shortcomings of Phase 1. The MSSI in Phase 2 sought to bring the intervention much closer to the teachers and the

classrooms. The new strategy of using teacher clusters (or networks) was intended to impact on the teachers' classroom practices more directly than had been the case in Phase 1. The entire project exposed the teachers to Japanese experiences and practices through the study missions in Japan and the interaction with Japanese experts; other experts from a local university also assisted the teachers during the teacher (cluster) workshops.

Conceptual framework

This research draws on the established framework on teacher change that was first developed by Guskey over 2 decades ago (Guskey, 2002). Guskey (2002) argues that professional development programmes are systematic efforts to bring about change in the classroom practices of teachers, in their attitudes and beliefs and in the learning outcomes of the students.

According to this model, significant change in teachers' attitudes and beliefs occur primarily after they gain evidence of improvement in student learning. This model of change is predicated on the idea that change is primarily an experientially based learning process for teachers. Learning outcomes are broadly construed in the model to include not only cognitive and achievement indices, but also the wide range of student behaviour and attitudes. Such learning outcomes include not only the students' scores on teacher-made quizzes and examinations but also students' attendance, their involvement in class sessions, their classroom behaviour and their motivation for learning. Students' attitudes towards school, the class, and themselves are also included as some of the learning outcomes. Attitudes and beliefs about teaching in general are largely derived from classroom experience. The crucial point here is that professional development per se does not change the teachers' attitudes and beliefs, but the experiences of successful implementations does.

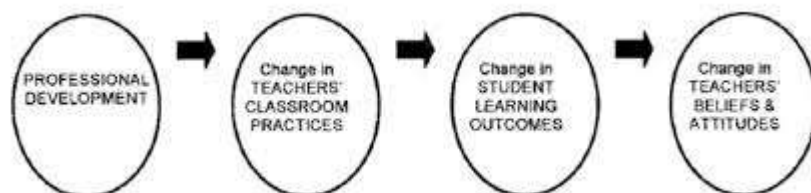


Fig. 1. Guskey (2002) model for teacher change

Research methodology

This paper was a part of a larger study that explored teachers' perspectives on continuing professional development. The researcher employed a qualitative approach and a case study design. This design is defined as an enquiry in which the researcher develops an in-depth analysis of a programme or activity of one or more individuals (Creswell, 2014). To collect the necessary data, the researcher had face-to-face semi-structured interviews with ten teachers who participated in the Mpumalanga Secondary Science Initiative programme. The researcher utilised purposive sampling to identify and select the participating teachers. The interviews were therefore transcribed, coded and categorised into identifies themes. The data was analysed through content and thematic analysis. The findings of the study were based on only 3 participants and the data was presented in coherent and meaningful themes. To ensure the credibility and trustworthiness of the study, the researcher piloted the instrument before the actual data collection. Member checking was also utilised where the researchers took the rescripts back to the participants to verify their responses. All the selected participants signed the consent forms to demonstrate their willingness to participate voluntarily in the study.

Findings of the study

The section below is derived from the interview conversations the researcher had with the teachers who participated in the professional development programme – MSSSI, which took place over a period of time. The data presented on this article was based on only 3 teachers (Teacher A, Teacher B and Teacher C). Primarily, the researcher was interested to hear participants speak about the project and its promises as outlined during the recruitment drive. The themes that emerged from the data include teacher practices and learner participation, focus on teaching, personal transformation and growth as well as the link between teaching and learning.

Teacher practices and learner participation

One of the questions the researcher posed to the participants was what is it that they found interesting about the professional development programme that they were involved in (the MSSSI project). One of the participants, teacher A, noted that he was intrigued by the way the project had tried to improve the teachers' ability to facilitate learning by encouraging learner participation:

I think what I enjoyed most is that the issue of making our lessons to be learner centred, because previously a teacher would just go there and disseminate the information to learners without the learners being involved. The learners were just listeners not taking part, but from this (MSSSI) programme one has realised that now, learners must be involved in one way or the other. They are part of the learning process. One must not undermine the learners, that they do not know anything. Another thing is that of preparing together, it helps because we sit and plan together and share the ideas.

The influence of the professional development programme on the teachers' classroom practices and most significantly on learner participation and learning in general, was a theme that began to enter our conversation. Many CPD programmes often fail to consider the impact on the learners, and learning in general, and focus almost exclusively on the teachers. As noted by this participant, the MSSSI programme assisted him to focus not only on teaching but also to begin to think about how his practices affect his learners too.

Personal growth and change in attitude

In the conversation with the participants, the researcher noted the fact that the participants felt that their participation in the programme helped them with their own personal growth and change in attitude. As Teacher B indicated how his involvement with the MSSSI influenced his thinking and that of his colleagues with regard to their personal development:

Maybe there is an idea that you have seen in the textbook, when it is applied in the MSSSI workshops you find that, this is simple to solve, so most of the misconceptions on Science were discovered there during our participation. And again, people were made to register (for further study). No one told us that we must register, we just decided on our own after maybe a session; I remember some of my friends said "you know this Potchefstroom University, let us go and register there because this MSSSI is telling us that we are lagging behind with information. We may know the information, but we were not able to discover how they come about getting the answer there". So, through the MSSSI we engaged with each other and discovered more and thought further about our own development.

As Dewey (1966) argues, a good learning opportunity is one that leads to further opportunities for learning and development. The MSSI intervention seems to have sparked the need and desire in the participants for further learning and development. The acknowledgment of one's limitations and thus the recognition of the need for further education was an important point raised by this participant in his description of how the MSSI project led to his personal development and subsequent transformation.

Focus on teaching

One of the important aspects for teachers in a professional development programme is that they must be able to take what they have learnt and apply it in practice. With this in mind, the researcher asked the participants how relevant the activities in the MSSI were to their teaching, Teacher A noted:

Seemingly, MSSI was done primarily for a syllabus that is there at school. Most of the activities that we were doing in the MSSI are in our textbooks. Most experiments that we did, even in terms of content, for instance, there was this organic chemistry, everyone was struggling with the topic but since the MSSI, we found it easy. Every MSSI activities that we did in the workshops, I brought them to school to give to the learners especially the science experiments.

In the above quote, the teacher describes how relevant the MSSI activities were to his own teaching. His description of the correlation between what he learnt in the project and his teaching attests to the relevance of the project. He may not have been aware that the MSSI project documents were deliberate in trying to build these links between what teachers had to do in their classrooms and the project activities. Considering this, the need for professional development activities to link well with teachers' classroom activities is critical.

Another participant, Teacher B also found the MSSI activities to be relevant to the specific content of the subjects that he teaches:

The project assisted us as we were doing Natural Sciences. Natural Science is a projection of geography, agriculture, physical science and biology, four subjects. So, if I have not majored in one of these subjects, it would be difficult for me to teach the other parts, so the MSSI assisted us to pinpoint some of the chapters that are from other subject areas. All these we did though the activities that they gave to us to do, like taking us to the dam to observe how water pollution affects the animals. We would then go and do the same to the learners; this is how I find it to be relevant.

The importance of the subject matter focus of the MSSI is highlighted in this discussion. In addition, the participant above emphasised the personal transformation that occurs when a teacher acquires skills in other subjects that they may not have specialised in during their pre-service teacher education programmes. A Biology teacher's sudden acquisition of Agriculture or Geography knowledge could be life altering as it could allow a career change. Furthermore, the ability to apply their new knowledge was enhanced by activities that were designed in such a way that the teachers could implement them with almost no need for adaptation. Another respondent describes an example when he says:

We did content, all about Natural Science. I remember the eco-system, they told us about each ecosystem that you can take the learners to observe the ecosystem and that it's not always that when you want to show them the eco-system you take them to

Kruger National Park. Even around the school. Yes, we were not aware that around the school can be an eco-system but when they taught us, we become aware. Even now when I want to take the learners to observe the ecosystems, I take them to the ground here in school.

Personal transformation and growth

One of the interviewee's participation in the MSSSI project was a major transformational experience. In a slight twist to the stories of the other teachers who used the MSSSI project to build and nurture their expertise, the project allowed this specific one to transform her career as a science teacher by developing in her new expertise in the physical sciences. She noted that the project turned her into a science teacher, which she was not before her participation in the project, Teacher C mentioned that

It helped me so much because I have not majored in (physical) science at the college, but I had done Biology and Geography. When I got to this school, I was asked to teach natural science and I struggled, but due to the MSSSI programme I managed to do it.

As this was a major (and possibly unintended) outcome of the intervention, I was interested in finding out exactly how the MSSSI project helped her to teach science. During the conversation, the researcher asked her exactly that:

I did not know even how to use the apparatus as well as to do many of the science experiments. You see in the MSSSI project, we mostly focused on doing science experiments, so now I do have the confidence and I do enjoy doing the science practical's because science is more on practicals.

From the foregoing quotation, it is evident that her participation in the project not only transformed her into a science teacher, but it also gave her the confidence to do what she was previously unable to do. It is interesting to realise that teachers do not only see professional development programmes as a platform to improve just their content knowledge and pedagogical content knowledge, but they also see it as a tool for their development as well as personal transformation. In this case, we see a teacher who did not train in science, but who, during and after her participation in the professional development programme, became and felt like a well-rounded science teacher. The investment in the professional development programme thus acquired a new personal meaning for this participant.

Link between teaching and student learning

This was important to pursue particularly in the case of the above participant as she had deliberately made a point about the links between teaching and student learning. Therefore, the researcher asked whether she found the MSSSI activities to be relevant in her classroom. Her response was positive, and she stated that in the project, they did many science experiments that she performed for her pupils, teacher C further added:

It helped a lot, most of the time we did some experiments in this project in both the workshops and cluster meetings. You see when you do only theory and you don't do practical, learners will never know. When you teach experiments, the learners do practical work and so they will not only hear but to see, touch, and it's not easy for the learner to forget.

The value of the practical work done during the MSSSI workshops for her teaching is underscored in her statement. Other MSSSI activities that she participated in and found to be relevant in her classroom included the focus on the science curriculum and ways to improvise in rural schools. In her examples, this teacher C mentioned the following:

There was a time whereby they taught us about the planets, and I was surprised this thing is so easy and how to make the learners to know ~~how~~ planets follow each other. It was very much interesting, and I came and practiced it and then I sent the learners to go and do the projects. That's why I am saying sharing knowledge is very much powerful. If I did not attend those workshops, I would still rob the learners, teach the biology part, and leave out the science part.

She elaborated further and described improvising in the rural setting:

in my case I used to know that if I want a beaker I must go to the laboratory and get it, I did not know that even what I am having I can use as an improvise. Now I just tell the learners just to bring, say a plastic coke bottle. We cut it into a beaker, and we do the activity. You see when they do, they understand better. When I want to put tea as my indicator into acid lemon or vinegar what will happen, then they discover not by teacher telling them; you see practical is very interesting and it makes the learners to understand the subject.

The ability to improvise in the rural South African setting was a very important lesson that this specific participant learnt in the professional development intervention. While the issue of improvisation might seem obvious to some, it is not so for the many teachers in rural areas whose major explanation for the poor scientific knowledge of many learners is a lack of adequate facilities such as laboratories and equipment. While not trivialising these genuine needs and complaints, it is important to note that the approach in this case was to continue in spite of the challenges and limitations of context – a very important goal of the MSSSI project.

Conclusion

Based on the data gathered for the purpose of this paper, it is clear that the activities that the teachers who were involved in the MSSSI project emphasised specifically science content. This seems to have been one of the highlights of the MSSSI projects. What actually attracts teachers to professional development is, according to Guskey (2002), as demonstrated in the previous section of conceptual framework, their belief that it will expand their knowledge and skills, contribute to their growth and enhance their effectiveness with their students. The data in this study shows that a professional development programme that focuses on content tends to provide teachers with the knowledge, skills and confidence to teach the subject matter. Many researchers agree that teachers with better content knowledge have more confidence and motivation to develop their knowledge and skills further than teachers with less content knowledge do. Although this study was conducted on a small sample of teachers, the analysis provides a rare look at how professional development impacts on teachers' practices. The findings advocate for content-focused professional development as a way to foster teaching practice that boosts student achievement. The researcher further argues that the greater the unity between the personal circumstances and motivations of the teachers and those of the CPD intervention, the more likely the outcome will be meaningful for the participating teachers. In turn, the ability to sustain the benefits of the intervention will be enhanced.

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STUDENTS' VIEWS ON THE EFFECTIVENESS OF FORMATIVE ASSESSMENT IN PREPARING STUDENTS FOR SUMMATIVE ASSESSMENT: THE EXPERIENCES OF UNISA HONOURS STUDENTS

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Abstract

As an ODL university, the University of South Africa (Unisa) employs formative assessment, which is largely in the form of written assignments. The study on which this article is based explored the effectiveness of formative assessment methods practised in open and distance learning institutions of higher learning for honours students in the Adult Basic Education and Youth Development Department. The aim of this study was to investigate students' views on the effectiveness of formative assessment in preparing students for summative assessment. A qualitative research approach was used, whereby 16 honours students who wrote the end of the programme examinations during January/February 2017 and 2018 and four honours lecturers were selected using the snowball sampling method. Data were collected through one-on-one individual interviews and analysed using the Saldana method of qualitative analysis. The findings indicated that, in an ODL context, students felt that formative assessment did not adequately prepare them for summative assessment. The researcher recommends that the University looks into the effectiveness of the current formative assessment tool and to encourage students' use of online tools that enhance collaborations between lecturers and students which will prepare students for summative assessment.

Keywords: Assessment; assignment; honours; open distance learning; performance; summative assessment

INTRODUCTION

Globalisation and the promotion of lifelong learning have contributed much to the development of distance education, and specifically open distance learning (ODL) (Ng, 2016), which has improved access to higher education for adult students and those who work for a living. According to Ng (2016), drop-out levels among distance learners are higher than among learners engaged in face-to-face teaching, with the former not faring well during assessments due to them not spending sufficient time on studying and completing their assignments. A high dropout rate will ultimately affect the number of students enrolling in ODL institutions, for example, the number of students that dropped at the University of Phoenix (USA) from 460 000 to 213 000 during the year 2010 (Gillepsie, 2015). Even though institutions of higher learning conceive assessment to be integral to the learning process (Biggs & Tang, 2007), choosing significant assessment methods (both formative and summative) that guide and motivate students has become a cause for concern. In this research, the researcher investigated students' views on the effectiveness of the formative assessment tool (assignments) used at Unisa to prepare honours students in the Adult Basic Education and Training (ABET) Department for summative assessment. The study was motivated by the researcher's own experience that students' performance in formative assessment, even though there were exceptional cases, was better than their performance in the summative assessment. This was concerning, but to cast light on the subject, first-hand information from the students themselves was needed. The honours module, which is the

focus of this study, administered three assignments as a form of formative assessment. Of the three assignments, one was a multiple-choice question assignment, whereas the others were essay-type questions. In as far as summative assessment was concerned, the examination paper consisted of five essay-type questions, in which students were expected to answer three questions. The summative assessment partly deviated from the formative assessment in the sense that no multiple-choice questions were used to assess students during the year as part of their formative assessment. A wide range of literature has been documented on assessment in an ODL context, including the different methods of assessment used, but there is limited information regarding students' views on the effectiveness of such strategies. The study on which this article is based searched for the voice of students themselves regarding the effectiveness of specifically the formative assessment tools used in ODL universities. Based on the researcher's experience, part of the study was to unpack the mystery surrounding differentials or variations in students' performance with regard to both formative and summative assessment.

While ODL practices in universities are gaining prominence and are used as tools to combat problems of access, quality and equity (Oladejo & Gesinde, 2014) the truth is institutions of higher learning are still experiencing challenges of quality assurance in the ODL programmes they offer (Latchem, 2016). According to Latchem (2016), unlike the conventional methods of face-to-face teaching and learning contacts with students, information and computer technology (ICT) forms an integral part of ODL. Thus, the programmes that are more flexible are needed to compensate for lack of physical contact between practitioners or lecturers with students. ODL institutions are forever searching for ways of promoting assessment and the use of appropriate assessment systems to boost fruitful, long-term learning (Gibbs & Simpson, 2004). The role of formative assessment is thus seen to be a means of monitoring student learning and providing interventions (i.e., changing ongoing teaching processes, in order to achieve programme outcomes) (Halinen, Ruohoniemi, Ketajavuori et al., 2014). ODL institutions use various forms of formative assessment, namely, observation, assignments, projects, portfolios, checklists and rating scales (Chaudhary & Niradher, 2013). From the research, which Chaudhary and Niradher conducted in a number of ODL institutions, it became evident that assignments, as tools for formative assessment, were among the key characteristics of ODL institutions (including Unisa). In the same breadth, Sánchez, Soldado and López see formative assessment as a process to improve achievement (2014), which means an assessment must drive learning and be used to help teachers identify gaps. In other words, assessment must be part of the teaching process and must not be seen as detached from teaching practice (Postareff et al., 2012). Instead, assessment must be seen as something that helps students to acquire a deeper understanding (Watkins et al., 2005). Postareff et al (2012) thus recommends that assessment should be planned concurrently with the development of teaching and learning material, to avoid detaching assessment from the learning content. Voices from the literature encourage the use of multiple methods of assessment to cater for all student types (Nascimbeni et al., 2018; Gallagher, 2010; Gamiz et al., 2014; Maki, 2002). For example, Maki (2002) posits that some students might perform well in multiple-choice questions pertaining to their discipline, but not do well in essay-type assignments that require them to apply what they have learned.

While authors such as Chaudhary and Nirandher (2013) declare that the system of assessment in ODL fails to satisfy students' expectations, using feedback effectively during formative assessment can improve learners' performance during summative assessment (Gallagher, 2010; Parr & Timperley, 2010; Chokwe, 2015). The type of feedback given to students is influenced by how those who administer assessment tasks view the purpose of teaching and

learning: for example, those who see it as the transmission of knowledge are likely to view assessment as a means of testing students' ability to reproduce knowledge (Fletcher, Meyer, Anderson, Johnston & Rees, 2012). Thus, the feedback provided will focus on what is missing, instead of being directed to encouraging deeper learning (Parr & Timperley, 2010; Ng, Xie & Wang, 2018) where students are given clues on how to search for more information. Effective feedback not only helps students to evaluate what knowledge they have but provides them with an indication of where to proceed next and how to accomplish that (Hattie & Timperley, 2007). Some gaps have been identified in the quality of feedback given to students, especially in providing written feedback (the norm in ODL institutions) rather than verbal, one-on-one feedback (Parr & Timperley, 2010). According to the aforementioned authors, written feedback does not provide sufficient support and development because it is corrective, rather than encouraging dialogue. One of the causes of insufficient feedback is when somebody who did not specialise in the course concerned (Chaudhary & Nirandher, 2013) does the evaluation. As Chaudhary and Nirandher (2013) argue, only teachers who have a sound grasp of the subject matter can provide effective feedback. Cant, Widd and Machado (2013, p 1319) posit that the geographic separation between lecturers and students also contributes towards ineffective parting of knowledge and skills in the form of feedback.

To bridge the performance gap between formative and summative assessment in an ODL context requires a mix of print, audio, video, online and computer-based provision (Latchem, 2016, p7). Such mix, according to the aforementioned author, increases interaction and collaboration with learners (p7). The current literature supports the above view by emphasising that the use of technological tools by an experienced ODL practitioner creates a conducive learning and teaching environment for ODL students (Oladejo & Gesinde, 2014; Taruskirwa, 2016; Cant et al., 2013). Researchers came to notice that lecturers themselves lack the confidence to implement such assessment (DeLuca & Klinger, 2010; Beziat & Coleman, 2015). Conversely, Simpson (2013) indicated that an assessment tool might not be the sole cause of ODL students' poor performance. Instead, students may also perform poorly because many do not complete their learning content. This assertion warrants an intervention into the measures ODL institutions use to enhance student learning. One way is to develop study material that promotes learning at a distance, for example, courseware, video and audio cassettes (Oladejo & Gesinde, 2014). While Ng (2016) proposes working in groups as a way to encourage collaboration and interaction among distance students, Simpson (2008) posits that motivating students might help to improve their performance. In the same breadth, Cant et al (2013) advocate for using technology tools such as online announcements and discussion forums as another way of bridging the physical gap between students and lecturers.

The main research question guiding this research was:

What are the students' views on the effectiveness of formative assessment in preparing students for summative assessment?

The sub-questions are:

- What are students' views on the use of assignments as a tool of preparing students for the upcoming examination?
- How effective is the use of written feedback to prepare students for the final examination?

- What role may the ODL practitioners play to provide assessment for learning that equips students with knowledge content?

THEORETICAL FRAMEWORK

In focusing on the inadequacy of formative assessment in preparing students for summative assessment, this article is underpinned by Vygotsky's (1978) socio-cultural theory, which emphasises the role of the environment and adults in providing support for, and empowering, the development of learners. According to this theory, a learner acquires knowledge through contacts and interactions with people (the inter-psychological plane), then later assimilates and internalises this knowledge by adding his or her personal value to it (the intra-psychological plane). In his theory, Vygotsky mentioned that the tools used to test learners only determine their actual level of development, and do not measure their potential ability. If a learner is able to move from his or her actual level of development to a higher level of potential, this is what Vygotsky terms the "zone of proximal development (ZPD)", that is, the learner engages in collaborative interaction with his or her peers or with an adult. The ZPD plays a major role during the designing of instruction and analysing learning (Shabani, Khatib & Ebadi, 2010). The process of selecting and shaping learning experiences to suit learners is called mediation, which serves to assist the learner, in the sense that she or he no longer works in isolation. According to Vygotsky, scaffolding, which entails changing the quality and quantity of support given to a learner in the course of teaching (McKenzie, 1999), has the following advantages: it provides clear direction; clarifies the purpose of the task; keeps students on-task; and offers assessment to clarify expectations.

The theory has an implication for the teaching and learning process by indicating the role the environment plays in enhancing the development of the learner. It suggests the use of testing tools that not only provide information on what the learner knows but must also lead to higher-level abilities. In as far as assessment is concerned, using scaffolding enhances the use of different assessment methods and provides continuous support to help the learner internalise the learning content. In as far as the clarification of tasks is concerned, the theory calls for feedback, which clearly states where the gaps are, and what needs to be corrected and creating an environment where there is collaboration between people by using, for example, the on-line discussion forum on MyUnisa.

METHODOLOGY

The study reported on here was based on the research philosophy of interpretivism and constructivism, which, according to Kipo, are "multiple realities or truths based on an investigator's construction of reality (subjectivity of reality is an indication that reality is a social construct and keeps changing)" (2013). A qualitative research design was used, focusing on Unisa honours students' perspectives and experiences. Since the aim of the study was to discern Unisa honours students' views on the effectiveness of formative assessment in preparing students for summative assessment, a case study was deemed the best design to employ.

The population of the study comprised plus or minus 150 students who had registered for the honours programme and wrote examinations during January/February of 2017 and 2018. Obtaining information from the University regarding students' details was impossible, given the institution's standing policy to safeguard students' personal information. Because there was limited access to possible participants of the intended study, the researcher employed snowball sampling to source information-rich participants, that is, students who

wrote the honours module during the aforementioned years. According to DeVos, Strydom, Fouché and Delport (2014), the non-probability snowball sampling method is directed at identifying hard-to-reach individuals. With the help of participants, the researcher was able to identify other students who had passed the honours module. Given these challenges, 20 participants finally formed the sample of the study – 15 females and 5 males. A total of 16 of the participants were students who had passed the honours module and 4 were lecturers coordinating other honours modules. Out of the 16 students, 10 participants had written the module during the January/February 2017 examination, and 6 during the 2018 examination. Lecturers were robbed into the study because participants raised their concerns about lecturers' contribution to the problem under discussion, so the researcher found it profound to hear the lecturers' side of the story to increase the trustworthiness of data collected. The researcher introduced herself to the participants via e-mail and/or telephone, and those who were willing to participate replied to the e-mail or confirmed this via a phone call.

The researcher adhered to the ethical clearance processes of informed consent and ensuring privacy and confidentiality. The participants were informed of the nature and consequences of the research, and their confidentiality was assured as a primary safeguard against unwanted exposure (Denzin & Lincoln, 2013). Participants were informed that the consequences of the research would inform future policies and bring about improvement in the assessment practices at the institution. Since the majority of participants lived far from Pretoria (where Unisa is located), a consent form was e-mailed to them, and they were asked to sign and return it.

Data collection strategies

The researcher used one-on-one interviews and minutes of meetings to collect data, as these were the only convenient techniques. The interviews, done telephonically due to the geographic location of the participants, took about 40 minutes each. Since most participants were employed and not readily available to be interviewed, a mutually agreed-on time was determined, which did not interfere with the participants' normal schedules. In trying to accommodate each participant's preferences, the interviews were conducted over a period of a month. An interview guide was developed, consisting of both closed and open-ended questions, which allowed the researcher to ask probing questions to explore participants' views in greater detail (Hoets, 2012; Jensen & Laurie, 2016).

The researcher did a follow-up using member checking as a strategy to increase the trustworthiness and credibility of the data collected. A total of 15 out of 20 participants had access to e-mails and an interview transcript was e-mailed to the group to check whether what I captured is what the interviewees said. Some of the participants were unemployed and were running short of data, so the researcher read their ideas over the phone for them to confirm.

Data analysis

The researcher engaged in a thematic analysis of the data, using the Saldana method of qualitative analysis. First, data were broken down into codes. Saldana (2015) describes coding as a "critical link" between data collection and their explanation of meaning. Coding was thus done by identifying patterns which demonstrated certain habits, their salience and their importance in people's daily lives. Data were then categorised by grouping, reorganising and linking the codes to consolidate meaning. Finally, the themes which emerged from the categories were used to discuss the findings of this research. To speed up the process, data analysis was done concurrently with data collection.

FINDINGS

Students' responses

Generally, participants were concerned about the formative assessment tools and feedback, which according to them (at Unisa specifically) did not provide much training for them to master summative assessment. In general, the participants blamed the formative assessment method used in this honours module for their average performance in the course. Below is a discussion of the themes that emerged from the study.

Assignments as the formative assessment tools used to prepare students for summative assessment

All participants expressed their dissatisfaction with assignments as the only tool used during formative assessment in the honours module under discussion. In their view, writing assignments on their own was difficult, because they struggled to understand the questions being asked. Students were asked whether they approve assignments as the assessment tool. Below is one participant's response.

Participant A remarked:

I do not prefer it because it was difficult for me to write assignments, since some of the assignments' questions were not clear. I wished that I were staying next to Unisa to visit my lecturer or have a study group to ask for clarification.

As a follow-up question, students were asked whether they were aware that they could request a list of students in their vicinity and interact with e-tutors. A total of 10 of the students confirmed they knew about the two mechanisms but they have never used them. A total of 3 students confirmed they have used them and the other 3 said they were not aware of them. One of them said:

Participant B:

I know about requesting for a list and contact details of peers, but really I do not like working with a group.

The participants also indicated that the honours module has a limited number of assignments, therefore they did not get enough training.

Participant C: commented:

Three assignments are not enough to train us in this module, because after writing the third assignment, which I finished in August [...], I relaxed because there was no more pressure to submit.

According to the participants, questions on the assignments need to cover the scope of the work and should be structured the same way as the examination questions. The main issue was the multiple-choice question which makes up Assignment 01. The participants felt that it would have been better if it was an essay-type question, because there is no multiple-choice question in the final examination.

Participant D said: *My performance in this assignment (multiple-choice) was excellent. I got the total mark, but this type of question was not catered for in the final examination.*

Participant E said: *I realised that some of the content themes did not form part of the assignments and since there were no questions asked for such themes, I was not sure whether I mastered the content or not.*

The ODL context make it difficult for students to get lecturers' help. A facility offered by Unisa (list of students) to enhance collaborations between students is not adequately utilised. Students are unable to master the content without lecturers' guidance.

The role of feedback in enhancing student performance

Some participants opined that they wished to receive feedback on their assignments within a week or two, when they could still remember what they had written about. Most participants indicated that by the time they received feedback, it did not make sense because they had forgotten about the content. Unfortunately, in an ODL context, unlike at a face-to-face university, assignments take many routes before they are sent to the appropriate lecturer. Moving from one section to the next delays the submission of assignments to the marker, and ultimately it takes about a month for a student to receive assignment feedback.

Participant C remarked:

I received my assignment feedback after a month, and for me to be in touch with the lecturer's comments, I have to start from scratch, to read the assignment questions and what I wrote because I shall have forgotten everything.

Participant F stated:

[The] formal feedback that we receive, in the form of tutorial letter 201, [was] given to us very late. I feel that I did not get sufficient support from the university to prepare me for the final exam.

As a follow-up question, students were asked how regularly they used the online tools on myUnisa or visited their lecturers for clarification of content, and this is what they said:

Participant G commented: *It is very difficult for me to use myUnisa because I do not afford to buy data. Unlike in urban areas where some students use free WIFI, I stay in rural area without that luxury. Secondly, visiting Unisa will cost me an amount of R200, which I do not have.*

The participants indicated that written feedback is not as good as the verbal commentary, because some words in the lecturer's comments were not understood. Some claimed that the feedback provided was so scanty that it became difficult for them to map their way forward. Two participants who had submitted hard copies (the majority submitted electronic copies) indicated that, from the signature attached to their assignments, clearly the marker was not the module's primary lecturer.

Participant D commented:

Sometimes I struggled to understand what the lecturer was trying to explain in the feedback. Therefore, because of scanty or complicated feedback I went into the examination with many gaps.

Students were dissatisfied with the untimely feedback. Students from rural areas and disadvantaged backgrounds are unable to make use of other facilities offered by the University for ODL.

Lecturers' responses

Lecturers' comments regarding student performance

I held interviews with four lecturers coordinating honours and other modules and noted some comments during staff meetings from colleagues. When lecturers were asked a question about students' performance in assignments versus the examination, they responded differently:

Participant A:

My course is a portfolio module and the students perform badly in assignment. Performance in the examination is good because I urge them to start the portfolio early during April month so that they get enough time to redo the assignments.

Participant B:

Performance in assignments is good but students fail dismally during exam.

When participant 1 and 2 were probed by asking reasons for the poor performance in assignments and the examination, Participant 1 said:

Students seem not to understand assignment questions, because they give wrong answers.

Participant B:

In assignments, students just copy the information from the prescribed sources as it is, thus they pass, but it is the feedback they give during exams which shows that they did not understand the questions.

Participant C indicated that *poor performance during examination was a sign that students did not prepare enough for the examination.*

Participant D said that *due to poor performance, most of the students do not finish the course and drop out.*

During the meetings when lecturers were encouraged to use announcement and the discussion forums, one lecturer said: *It seems students do not visit myUnisa because when I post a message, only 2 or 3 students respond. Sometimes I will ask a group about a question that the majority failed and try to search for their challenges, but all in vain.*

DISCUSSION

Generally, the participants' views pointed to shortcomings within the institutional milieu in providing support, as well as deficits related to using the assessment tool of formative assessment. This agrees with Latchem's (2016) assertion that in an ODL context, there is a need to apply rigorous measures for quality assurance. Many opined that there was no proper mediation (Vygotsky, 1978), because only one type of assessment tool was used and because they worked in isolation, struggling to achieve the learning outcomes. One of the complaints was the use of only a few (three) assignments for formative assessment. This result resonates with Rózewski et al's (2011) assertion that more sophisticated ways of assessing students are

needed in an ODL context. Dissatisfaction with lecturers was caused by the fact that there were no other ways – except through assignments – for students to “hear the voices” of their lecturers. They needed that form of collaboration which Vygotsky (1978) posits leads a learner to develop to a higher level of potential (ZPD). The truth is there are online tools that may enable students to hear their lecturer’s voices which are not maximally utilised, for example, video conferencing, DVDs, myUnisa announcements and discussion forums. This research sheds light on the fact that the above online tools mostly disfavour students from rural and disadvantaged backgrounds. To enhance collaboration and scaffolding, participants suggested an increase in the number of assignments used for formative assessment. The foregoing comment brings to light the fact that the only time the students in an ODL context see the need to study is when they engage in their assessment task. It has emerged from this research that some of the ODL students lack discipline because they do not afford their studies ample time (Ng, 2016), hence they performed poor during the summative assessment. While the authors Chaudhary & Niradher (2013) suggested the administering of a variety of assessment tools to improve student performance, it became evident from the findings of the study that the problem is not merely about the type of assessment tool used but that students do not make an effort to complete their work schedule (Simpson 2013; Ng 2016).

The data collected indicated the importance of feedback in formative assessment in an ODL context. The participants’ comments concurred with Parr and Timperley’s (2010) assertion that written feedback is inadequate: it only indicates what is missing, not what to do next and how (Vygotsky, 1978; Hattie & Timperley, 2007; Ng et al., 2018). Unlike feedback given in institutions which are not ODL, in an ODL context the participants indicated that, apart from receiving limited feedback, they struggled to understand some of the vocabulary used, hence one participant’s wish to meet with his or her lecturer. The above comment indicated the pangs of an ODL model where students are not able to meet with their lecturers on a daily basis. There appears a contradiction of Gillepsie (2015)’s assertion that ODL promotes access, equity and equality, because it is not meeting the needs of students from diverse backgrounds. The truth is at Unisa students are allowed to meet with their lecturers per appointment but visiting Unisa, it is alleged, is too costly for some students. The research revealed that there was a need to use feedback effectively (Chokwe, 2015), where lecturers’ interaction with the students’ written work was to focus more on bridging the content gap, something which Halinen et al (2014) refer to as assessment for learning, and not to check what is missing only. Providing a detailed feedback to students will not only enhance deeper learning (Ng et al., 2018), but it will prepare students for summative assessment.

The participants’ frustration with the discrepancies between formative and summative assessment are evidence that the former was sometimes not used as a teaching exercise (Postareff et al., 2012). While multiple assessment methods (in the form of different types of questions; multiple-choice and essay-type) are asked during formative assessment, the final examination does not feature multiple-choice questions. The participants indicated they loved the multiple choice type of questions– a finding which supports the views of Maki (2002), that different students fare well in different types of questions. This finding calls for fairness in assessment, as proposed by Makamane (2011), where different lecturers use similar assessment techniques.

The lecturers’ responses indicated that depending on whether the module is a portfolio or not, performance of students in an ODL context is not good in formative and summative assessment. Unlike the argument presented in this research, where student performance in

formative assessment is better than in summative assessment, lecturers coordinating portfolio modules indicated that students perform badly in assignments and perform well in the final examination. Good performance in the examination was made possible by allowing students time to redo the assignments in preparation for the final assignment. Perhaps if students who registered for other modules other than the portfolio were allowed to redo the assignment and re-submit, that would encourage deeper learning (NG et al., 2018) which will make them ready for the summative assessment. However, given the time constraints and the ODL system which according to Chaudhary & Niradher (2013) cannot satisfy the students' expectations, the above cannot be practised. Findings from this study showed the importance of professional development of practitioners, because according to Cant et al (2013), a good practitioner will accommodate all the learners during teaching and assessment processes. A good practitioner will use all powers at his or her disposal to encourage students to use other online facilities to enhance collaboration, which will result in the mastering of content.

CONCLUSION

This paper has shed light on students' views on the ineffectiveness of using assignments to prepare students for summative assessment. In the study inadequate and untimely written feedback from assignments and the students' inability to use other online facilities contributed towards making students not ready for summative assessment. Students' inability to use online facilities such as video conferencing, emails, Myunisa announcement and discussion forums has kept students isolated because there was no intensive collaboration between lecturers and students that will prepare students adequately for summative assessment. The paper has highlighted that lack of face to face contact in an ODL context contributed to lack of self-discipline where some students failed to afford their studies more time and hence they performed badly during summative assessment.

Having a small sample is one of the limitations of this study, along with the fact that only a few students had registered for the honours module, and the study was confined to Unisa students only. It is therefore not possible to generalise the findings. It is recommended that further studies involve a larger sample from a wider area.

Based on the findings above, the recommendation made here is that:

- Formative assessment must be used as a tool for teaching and could only be accomplished when the feedback is detailed and timely.
- Module coordinators must encourage students to use the support structures (technology) available at Unisa.
- More discussions with lecturers can be enhanced using myUnisa announcements and discussion forums.
- Students from disadvantaged backgrounds can be supported telephonically to hear the voice of their lecturers.

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UNIVERSITY STUDENTS' PERCEPTIONS ON THE USE OF SMARTPHONES IN LEARNING AND TEACHING: A CASE OF A UNIVERSITY IN A RURAL SETTING

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Abstract

The study sought to explore University students' perceptions of using smartphones in learning and teaching in institutions of higher learning in South Africa. Smartphones have varied application software uploads (communication, multi-media, e-learning), which has changed the communication dynamics of societies, thus, affecting every area of human life. The focus of this paper was students at a university situated in a rural environment. Interpretive qualitative case study methodology was adopted for this study, and focus group interviews were conducted to solicit data from the participants. The study utilised the purposive sampling technique to select the study participants from a population of first year students. Data presented and analysed followed verbatim and thematic frames. The results established that academic information can be rapidly disseminated to students using smartphones - a tool that grabs their attention, focus and minds - in the 21st century learning and teaching environment. However, students need adequate training on how to use smartphones effectively and efficiently for academic activities with minimal disruptions. Furthermore, the students asserted that with substantial support and encouragement, they can actively engage smartphones responsibly in their learning processes. Also, the study revealed that students get disconnected and frustrated by lecturers who still use traditional methods in content delivery, which does not equip them adequately for the current global work environment. The study concludes that using smartphones in learning and teaching wins young minds by meeting their interests, needs, desires and being at par with the current global digital trends. The study recommends training of students on how to use smartphones meaningfully and responsibly for academic purposes. Similarly, the university should also equip lecturers and encourage them to use smartphones in teaching to avoid a disconnection with students. Current trends should be adopted and promoted to match the global market demand for contemporary workforce.

Keywords: Smartphones, technology, psychology, digital learning, social media, learning & teaching

Introduction

Since its invention, the mobile phone (cell phone) has undergone extreme transformation and development from being a tool for social interaction to becoming an academic resource in the scholars' space. It has, thus, changed the learning and teaching landscape in the 21st century. The current infrastructural design, with a variety of applications that revolutionise the use of mobile phone, gave it the name "smartphone". Smartphone is an advanced digital mobile phone device that has improved considerably in the 21st century, and has applications that support access to services such as electronic mail, biometrics, social media, electronic learning and many more. According to Carey (2012) and Neyid (2011), smartphones have become an inescapable part of life; they develop synergy among users, open different pathways for learning, and are very popular with today's generation of students.

According to Johnson and Natarajan (2017), smartphones have become an integral part of the daily life of humanity since they are handheld digital mini-personal computers with advanced operating systems that offer computing abilities and connectivity options. Nevid (2011), however, argues that today's generation has no memory of a world without the World Wide Web, cell phones (smartphones), or personal computers - making the generation an Internet-surfing, iPoding, texting, Googling, Facebooking, IMing, etc. assemblage. It is, therefore, not surprising that smartphones have become a household resource for many people (literate and illiterate alike) in the 21st century, especially among the youth.

Researchers have observed that the smartphone has become the most rapid invention adopted, and one of the most affordable to many, including students studying at universities in rural settings. Research attests that today smartphones are used in a variety of assistive contexts including teaching and learning and knowledge sharing. Further, Ebiye (2018) posits that smartphones play a very important role in students' life, especially in teaching and learning. Given the above positions, we were interested in what students' perceptions of using smartphones in learning and teaching, especially at a rural university, were.

Statement of the problem

The researchers observed that many of the 1st year students that enrolled at one of the rural universities in the Eastern Cape Province of South Africa were from socially, infrastructurally and economically previously disadvantaged backgrounds (schools and communities), where most households depended on government assisted grants. The researchers observed this status from a register that is kept by the Academic Advisor. However, most of the students own a smartphone, tablet or a mobile device, which indicated to the researchers that these mobile devices were affordable, and that students from rural areas, just like their counterparts from the urban areas, were digital natives.

Concordia University (2019) contributes to the ongoing discussion surrounding the efficacy of digital devices in the classroom by submitting that schools must face the fact that smartphones are in the domain of students of all ages and are being utilized, thus, their prohibition may be of no use in the academic environment. Expressing a similar view, Alrasheedi, Capretz and Raza (2015) are shocked that some educators were reluctant to incorporate electronic learning initiatives in their teaching, despite the well-documented benefits. Given the ongoing debate on the use of mobile phones in institutions of higher learning, especially smartphones, what preoccupied the researchers was: 'what is the psychology of using a smartphone in teaching and learning in poorly resourced universities? Hence, the aim of this study was to explore perceptions, experiences and beliefs of using smartphones for learning and teaching among first year students from a university in a rural setting.

Literature review

Carlson (2005), as cited in Nevid (2011), observes that a new generation of students has arrived, who might not want to hear lecturers lecturing for an hour. Seemingly, Nevid (2011) and Carey (2012) share the same sentiment that the Millennials have come of age during a time of dramatic technological changes in societies, and educators, therefore, should examine ways of adapting the institutional classroom to reach them and teach them more effectively. These comments provoked us to look at the psychology of using smartphones with the 21st century university students.

Despite the awareness of the potential benefits of digital mobile devices (smartphone) in academia, many academics (lecturers) are still reluctant to adopt this advanced influential tool in their teaching and learning setting. Accordingly, Carey (2012) contends that if lecturers were to be asked about incorporating smartphones in their classroom practice, many would express frustration at the problematic nature of cell phones, including that they cause distractions, make noise and are used for cyber-bullying or cheating, and they would, therefore, consider restricting their use in lecture halls. On the other hand, Woodcock, Middleton and Nortcliffe (2012) posit that students use smartphones due to the wide range of academic applications that support their learning. Furthermore, smartphones are compelling tools in the hands of students and lecturers, and using them in classrooms could present new opportunities to enhance a cooperative learning environment.

Carey (2012) maintains that whether academics appreciate smartphones or not, the reality is that this digital technology tool has become pervasive in classrooms, and lecturers can choose to be proactive (to employ and direct their use) or can continue to exert their energy in combating them. Carey further argues that if educators were truly preparing students for the future, then it was their obligation to incorporate these ever-present devices into their daily teaching practice.

Perceptions, experiences and beliefs about using smartphones in teaching and learning

There are varied perceptions, experiences and beliefs when it comes to the use of smartphones for academic purposes as is reflected below. Some educators or lecturers have magnificent stories to tell while others have unpleasant experiences and do not want to hear about the use of smartphones in lecture halls. Montrieux, Vanderlinde, Schellens and De Marez (2015) carried out a study in Belgium in 2012 on teachers' and students' perceptions concerning the impact of using tablet devices for teaching and learning purposes. The study found that the use of tablet devices in the classroom setting had an impact on both teaching and learning practices, and that innovative teachers attempted to shift from a teacher-centred to a learner-centred approach. Their study showed that the introduction of tablet devices entailed a shift in the way students learn, as the devices provided interactive, media-rich, and exciting new environments. Nevid (2011) warned that although instructors needed to adapt the classroom to meet the learning needs of Millennials, they should draw upon their knowledge of the learning process to help their students become more effective learners in the classroom. Accordingly, digital technology resources (smartphones) should be integrated as a learning tool, not as a replacement of effective teaching (Nevid, 2011).

According to Russell (2018), as Bring Your Own Device (BYOD) programme becomes more and more widespread, questions are raised about the benefits of allowing students to actively use mobile phones as learning tools in classrooms. Ngesi et al. (2018) experimented with the use of mobile phones as supplemental instruction in a language class in a South African high school and conclude that the benefit was immense. So, the psychology of using a smartphone in teaching and learning is the puzzle that the researchers intended to discover in this study.

Scholars hold different views on the use of smartphones in the lecture halls. A study by Thomas and Muñoz (2016) in United States of America revealed concerns held by some students about the risks involved in allowing mobile phones at school. The research was on perceptions of mobile phone integration in the classroom at high school. The study found that although seven out of ten of the students interviewed thought mobile phones supported learning, serious concerns still existed among thirty per cent of respondents, who felt the negative effects of smartphones justified a school-wide ban. Thomas and Muñoz's (2016)

findings concurred with the observations that were made by Carey (2012) that some students had worries that ranged from general distraction (for example, phones ringing during class) to fears about other students using smartphones for cheating, sexting and cyberbullying. Despite the worries, many students use their smartphones for school-related activities. It is evident that such students derive educational benefit from this device, especially when engaging the academic applications and features for knowledge development.

Ormiston (2009) confirms the reality that many students have phones in their pockets, purses, or hoodies; so, why not get those tools out in plain sight and use them for good academic endeavours and achievements? This correlates to Concordia University's (2019) suggestion that subsequent generations of mobile phones continued to evolve and, thus, became more affordable and portable, and now offer so much more value beyond the means of social communication. Apparently, institutions of learning should face the fact that smartphones are already being utilized by students of all ages and take full advantage of the benefits it provides in the learning setting.

Ormiston (2009) and Carey (2012) agree that most students spent a lot of time learning about the features on the cell phone, such as how to navigate and the limitations of the smartphone; therefore, such valuable knowledge should be exploited in the classroom. Hence, scholars and educators should rethink about the digital communication technology device as a useful learning tool beyond the walls of the school (Ormiston, 2009). Further, Ormiston argues that smartphones cannot be removed from classrooms because of distractions as purported by some scholars since pens and pencils were never banned in schools. Ormiston's (2009) argument was that some students were using pens to pass notes during class, and that pencils and pens survived the perception that one could use either to poke peers in the eye.

Smartphones in Education

It is worth noting that the 21st generation students are so inclined to their smartphones to the extent that they feel disorganised if they could not have that device. Literature attests that as teaching tools, mobile devices are becoming a contemporary part of the education experiences in classrooms, from preschool through university (Lynch, 2015). American studies indicate that students who used tablets for learning in class and at home found that learning experiences improved across the board, and some students seemed to respond well to the stimulus of mobile devices by staying on task, correcting mistakes in real-time and, most importantly, got excited about learning (Lynch, 2015). Yaros in Fuhrman (2014) asserts that under the current methods of teaching in higher education, a mobile device could be a distraction rather than a helpful tool, since nobody seemed to be looking at how to teach with smart devices, while keeping students engaged. Yaros raised an interesting psychological comment by stating that his goal was to find out how people learn and interact through technology and how students think with new technology and multimedia content, whether they read and think differently (Fuhrman, 2014). Lynch (2015) posits that mobile learning can, and does, make a positive difference on how students learn when used the right way, mobile communication technology device has the potential to help students learn more, comprehend better and constructively develop knowledge.

According to Marongwe, Munienge and Chisango (2019), smartphones should be used in education to enhance learning and teaching by engaging students in the discussions, ensuring, however, that students use the gadget responsibly in the lecture halls. It is, therefore, important to explore possible strategies that could advance the use of smartphone devices in teaching and learning, admitting the fact that this instrument pass in and out of lectures with

ease (Carey, 2012; Ormiston, 2009). The researchers noted that the majority of the students (participants) had smartphones and smuggle them into classrooms, and as such lecturers should take the opportunity and make use of the digital technology that appeals to their students.

Challenges of using smartphones in the learning and teaching setting

As alluded to earlier on, different authors, academics, scholars and other stakeholders have different experiences when it comes to the use of smartphones in lectures. Many authors are of the view that despite the benefits that smartphones bring to the learning space, they also come with challenges. According to Lynch (2015), lecturers' authority could be undermined when mobile technology is allowed in classrooms, and the bring-your-own-device policies may create situations where some students may be more privileged than others, introduce competition and extravagancy, notwithstanding the possibility of theft. Neyid (2011) states that many students knew how to use smartphones efficiently and effectively in the learning and teaching environment and continually explore the application tools to generate interest in academic work. Therefore, it is the prerogative of lecturers to develop the competency, skills and proficiency required to be technologically efficacious in their lecturing process (Concordia University, 2019). Conversely, Farley, Murphy, Johnson, Carter, Lane, Midgley, Hafeez-Baig, Dekeyser and Koronios (2015) caution that a lack of knowledge and skills, including technology-supported pedagogical knowledge and technology-supported classroom management knowledge, teacher attitudes and beliefs could pose as challenges to students.

The study gap

The literature reviewed in this study show that most of the studies that were carried on the same topic were conducted in urban areas and/or disadvantaged urban areas in South Africa or outside South Africa. Very few studies were carried out at deep rural universities where the current study was conducted. The current study focused on 1st year rural university students in one of the poorest universities in the Eastern Cape Province. The study used students who were purposively sampled as discussed above. Data was obtained on the perspective of the participants as to how they perceived use of smartphones in teaching and learning. The findings of this study may inform future research to be conducted on a larger scale than that of the current study. Due to the gap identified, the study is expected to add to the existing body of knowledge.

Methodology of the study

An interpretive qualitative case study methodology was adopted for the study, with focus group discussions used to solicit data from the participants. Focus groups proved to be suitable for this because it gave participants and researchers ample interaction space and time to discuss issues surrounding the use of smartphones during lecturing sessions. The researchers established rapport with the participants and had the opportunity to ask for clarity from each other guided by open-ended questions.

Students were divided into four groups of twenty-five each, taking gender issues into consideration. The discussions took place at the university auditorium and a daily session per group lasted for about two hours, with each group engaged twice. Appointments were made with the study participants, taking into cognisance their lecture periods. The three researchers involved in the study were present at all the engagement sessions. The atmosphere was free and participants were excited to share their perceptions, experiences and beliefs on the use of smartphones during lectures, given that they were coming from a rural background.

The purposive sampling technique was utilised to select one hundred study participants from a population of first year rural students. The sampling technique was adopted because the participants could provide rich information, and were willing to provide information on perceptions of using smartphones in teaching and learning at a rural university. Convenient sampling was employed to select the university used in the study. The sampled institution and participants were convenient for the study due to easy accessibility and proximity to the researchers. Data are presented and analysed using verbatim and thematic frames. Member check was done to avoid misrepresentation of participants' views.

Ethics

Permission to conduct the study was granted by the institutional research office, and an ethical clearance certificate was issued by the university ethics committee. All the participants signed consent forms after the researchers explained to them the purpose of the study and what the results were going to be used for. We assured the student participants that they were under no obligation to participate in the study, and were free to withdraw at any stage of the study without any victimisation or intimidation. Coding was applied for the purpose of anonymity and confidentiality. Participants were issued with the findings of the study to confirm the authenticity of the results before the study was released for public consumption.

Discussion of findings

Presentation and discussion of findings are done simultaneously. As alluded to earlier, coding is used to present data as follows: Focus Group Discussion (FGD) as FGD1, FGD2, FGD3 and FGD4. All the groups were asked to respond to three questions, which were: Given the global calls that have been made to use technology in class, and that most students have access to a smartphone and cannot live without a mobile device, what are your experiences, perceptions and beliefs about using a smartphone in teaching and learning? Why should smartphones be used as a learning gadget? From your experience, what are the challenges encountered in using smartphones during lectures?

Perceptions, experiences and beliefs about using a smartphone in teaching and learning

The question on perceptions and beliefs attracted varied responses that indeed represented students' different social backgrounds and beliefs. Some groups explained that they enjoyed the freedom of having no one telling them not to bring smartphones to lectures unlike what was happening in high schools as expressed by a member of **FGD3** below;

We are on top of the moon, in high schools our teachers were too strict to the point of confiscating our mobile phones and give us at the end of the term. Sometimes you could be punished because the school policy was not permitting learners to bring cell phones to school because the teachers thought they could cause chaos. Here, at varsity no one asks you, so the experience is awesome. We are enjoying this freedom because we need to keep chatting with friends and be updated on current trends. It makes us to be connected with the rest of the globe.

From the above excerpt, the participant from **FGD3** did not mention anything to do with using smartphones for learning purposes; the students are just excited because no one controls them. All that comes to their mind is chat, look at updates and get connected. This could probably be stemming from the fact that they do not normally get instructions from lecturers to use their smartphones for learning purposes. Also, it can be drawn that their background lacked sound technological exposure; so, using a smartphone for learning purposes was not an immediate need.

Other groups claimed that their attention was divided since, as 1st year students, they had a lot to share with friends and relatives left behind (an adjustment problem), and, therefore, had the challenge of integrating digital technology into the classroom environment. This is an attestation to the distractive aspect of smartphones (Yaros, 2014 in Fuhrman, 2014). Yet, another group talked about surfing the internet 24/7 since they were experiencing an exposure to unlimited Wi-Fi access for the very first time. This is best capture in the comment from **FGD4** who said;

We take advantage of Wi-Fi at varsity because the system was upgraded. You don't struggle when given assignments or preparing for a test. The experience is awesome

It can be established from the quotation above that though these students are at a rural university, they have access to Wi-Fi, which they can equally enjoy for study purposes just like students who are at a university in town. Furthermore, according to the students, the system was upgraded, which shows that the rural university is making efforts to offer opportunities that were previously absent for students to have access to better education.

Very few students pointed out that smartphones were usable for academic purposes. **FGD4** explains about use of smartphones for learning, a point that was not discussed by FGD1, FGD2 and FGD3. **FGD4** had the following to say;

We are using our smartphones for study purposes when we are given work to do by our lecturers. Sometimes it is difficult for us to go the library because there is no space it cannot accommodate us all the students

Interestingly, from the discussions raised by **FGD4**, it is evident that some students are championing the use of smartphones for learning purposes without lecturers initiating it. So, students are already using their smartphones in a learning environment to counter the rurality mentality. This finding is in line with the observation made by Farley et al. (2015) that students were actively using mobile technologies, such as smartphones and tablet computers, to support their learning, but current learning systems and teaching practice did more to hinder than to help. Additionally, Concordia University (2019) concurs that university students were already using smartphones, adding that while critics were citing the opportunity for cheating, unauthorized socializing, and social isolation issues involved, the fact was that students were using smartphones every day, and they were using them to learn. Teachers could be a positive force in helping students to use smartphones properly in the classroom (Concordia University, 2019).

The students complained about lecturers' attitudes towards the integration of smartphones in the lecturing environment. This is reflected in the comment made by **FGD4** excerpted below;

Our lecturers do not tell us to use our smartphones for different activities but our Academic Advisor told us during orientation that we can use our phones to look for information.

From the above remark, it was deduced that lecturers did not incorporate smartphones in mainstream lecturing, probably due to incompetency or lack of digital communication technology savvy or lack of the necessary skills or for fear of moving into an unfamiliar territory. This finding is similar to Crompton's (2013) suggestion that educators feel uncomfortable to change their teaching style in order to accommodate mobile learning. For

lecturers to embrace digital technology in the classroom it may require an institutional policy that compels them to do so. Notwithstanding the above, it could be that lecturers assumed that not every student had a smartphone, given the rural environment they were operating in and where most students come from.

From what has emerged above, it can be summarised that students were so excited to experience the use of smartphones, with access to unlimited Wi-Fi. Some students were using smartphones for private engagements, while other others used it to enhance their learning. Those who used it for learning activities, did so on their own. It is evident that lecturers were not into the smartphone integrated learning and teaching setting.

Use of smartphones as learning gadgets

The second question that was asked the study participants was; ‘Why should smartphones be used as a learning gadget? (What are the ideas behind using it?). This question was well responded to by all groups and the groups shared the same sentiments that smartphones should be officially used in lecturing. Students based their position on the benefits they experienced when using smartphones on their own for academic engagements. Extracts of what each of the four groups as shared is reflected below. A participant from **FGD1** indicated that;

We advocate for the use of smartphones in our lectures because we have to move with time. Technology has become the language of the day. It will be to our advantage to use smartphones in our classes because we won't lag behind and will have access to the same information being accessed by urban students. We won't feel inferior to other students though we have a rural background and we can equally compete for the same job opportunities upon graduation.

A similar sentiment was expressed by **FGD2**. From **FGD2** one participant submitted that;

We are techno-students born during the era of technology; this is 21st century where technology has dominated. The idea of using smartphones in class will put our minds at peace that even if we are a rural university but at least we are catching up with rest of the world. The real world is looking for technologically orientated students, employers are looking for those have sound use of using technology, so, a smartphone takes us a step there.

Seemingly, the excitement of using smartphones for academic pursuits was beyond sharing knowledge with peers but the mere fact of having free uncapped Wi-Fi provided another dimension to their learning experiences. The availability of data to explore electronic libraries was an added value to their studies. Struggling and scrambling for books could be a challenge of the past, with collaborative learning enhanced by smartphones.

Another participant, from **FGD3**, stated that;

Smartphones can ease our work and enhance our learning since nearly everyone has a smartphone or a tablet and the university gives us free Wi-Fi that is unlimited. We will not struggle and scramble for library books. We can do our assignments anytime and anywhere because we move with the library in the pocket. What we would like is to compete with students from the so called ‘top universities’ that have good infrastructure in place which we do not have as a disadvantaged university”.

Though sharing the fear about lecturers still holding unto the traditional views of lecturing and ignoring the value of digital technology, the participant added; “Our *only problem is lecturers who are unenthusiastic to use smartphones for learning purposes in class*. The contemporary teaching and learning environment can only benefit students if lecturers minimize their perception of the disadvantages of smartphones, and digitalised their classrooms. Students cannot fit into the 4th revolution work space if these negative views are not abandoned and students allowed to study through a medium that motivates and encourages them. According to a participant from **FGD4**;

For us to keep focused we need technology to be integrated in lectures. Lecturers should now adopt more engaging approaches to grab our attention and to make learning alive and active. Sometimes classes are boring you see students coming in and going out or dozing off in class, others talking, texting or chatting. Smartphones can help us to be creative.

It can be established from the discussion above that students are for the use of smartphones in class. Students believe that the psychology behind using smartphones in class is to win the attention of students, move with time, compete with students from urban universities, access information, boost confidence, have job opportunities, ease their academic work, be creative and to make learning more engaging. The idea of easing their work and accessing information is in line with the findings by Concordia University (2019) that students can get answers quickly, and smartphones provide the ability to get answers really fast. In some situations, a student may not ask for clarification to a question he or she has in an open classroom—because they can use their smartphone to get the answer they’re looking for (Concordia University, 2019).

It also emanated from the findings above that lecturers were not enthusiastic to use smartphones in class. Students remarked that lecturers should use approaches that are more engaging to grab the attention of students since they were a techno-generation. It is evident from the study that some lecturers were still using old pedagogical methods that made them to create a gap between lecturers and students. Students in the study indicated that the psychology of using smartphones in lectures was to close the gap between urban and rural students in terms of information accessibility, wishing, hence, that lecturers could adopt use of smartphones in classes. This finding is closely related to the finding by Shuler (2013). Shuler holds that smartphones allow educators to reach underserved children that are geographically or economically disadvantaged, and that these devices can encourage 21st century skills like communication and collaboration. From the findings of the study, students talked about networking as perceived by Shuler in (2015). **FGD3** explained that all what they wanted, as rural students, was to compete and be at par with students studying at the so-called top-notch universities that have got all the good infrastructure in place. So, use of smartphones in class would make rural students feel good, competent and confident, thereby fulfilling their needs, aspirations, wishes and desires. Also, the paper found that students got disconnected and frustrated by lecturers who still engage traditional methods that do not equip them (students) adequately for the current global work environment as raised by a participant from **FGD4** above.

Challenges faced in using smartphones in the lecture halls

Lastly, all groups were asked to respond to the question on challenges that students encountered using smartphones in class. This question was responded to based on students’

own observations and assumptions since these 1st year students were not officially using them in class. To the researchers' surprise, the students identified the envisaged challenges and at the same time made proposals as to how those challenges could be addressed. The enthusiasm in students showed that they were ready to use the smartphones responsibly in class, only that the opportunity was not yet created by some of their lecturers. The challenge that was common across the four groups was that of both lecturers and students' attitudes towards use of smartphones in class. Perceptions of **FGD2** are best summarised in points out that;

Our lectures seem cold, some of them are not interested in using smartphones because they think we will become unruly and our own private stuff like Facebooking, tweeting, whatsAping, and other stuff. Some of them are very old that it is difficult for them to switch to use of smartphones they fear that their authority can be undermined and lose respect. On the other hand, we also have students who are stubborn, have no self-control and disrespect others. It needs a mindset shift for both lecturers and students to accept that times have changed and we need to keep pace with the 21st century wonders.

The above excerpt indicates that students were not only seeing lecturers as barriers to the adoption of smartphones in class but themselves as well due to their unruly behaviour. The issue of attitude is something that is very difficult to control and monitor, it takes one to stand up and decide to change and embrace the 21st century phenomena. Use of smartphones is meant to enhance teaching-learning and creating an interesting space that challenges students to be creative and innovative. Shuler in (2013) argues that some educators were bound to be skeptical but should know that mobile technologies were here to stay since these devices were a part of children's lives today. So, they might as well be used for good and can enable meaningful learning experiences (Carey, 2012). It can also be noted from the above findings that students know that some lecturers are afraid of losing their authority and, subsequently, respect. Furthermore, it can be depicted that some lecturers do not want to leave the comfort zone they are so used to, like the traditional methods that are mostly lecturer-centred. Newer approaches are always associated with more work and adaptational challenges. The views shared by students in the study resonate very well with the findings by Crompton (2013) that educators may feel that they have to change their teaching style in order to accommodate mobile learning, and many are unwilling or unable to do that.

Conclusion

The paper concludes that using smartphones in learning and teaching win the young minds by meeting their interests, needs, desires and be at par with the global digital trends. Students are already using smartphones; what is left now is for the lecturers to ignite that zeal for meaningful learning to take place. Students' attention is so easy to grab if their needs and interests are catered for. Students demonstrated their readiness to use smartphones by acknowledging their own weaknesses that might hinder the meaningful adoption of smartphones in class.

Recommendations

In the light of the findings, the study recommends that lecturers should reconsider use of smartphones in learning activities to win the attention of students. There is also need for students to be trained on how to use smartphones meaningfully and responsibly for academic purposes. Furthermore, the university should also train lecturers and encourage them to use smartphones in learning and teaching to avoid a disconnection with students. The 21st century

trend of digital technology integrated education should be adopted and promoted to match the global market demand for a technology savvy workforce.

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ICT PARTNERSHIPS AND SKILLS PROGRAMMES IN THE EASTERN CAPE PROVINCE

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Abstract

The National Electronic Media Institute of South Africa (NEMISA) is determined to be part of the solution for a digitally literate South African society by 2030. NEMISA is a state-owned-entity that falls under the Department of Communications and Digital Technologies (DCDT). The purpose of this paper is to give an overview of the current Information and Communication Technology (ICT) training programmes conducted by the Eastern Cape e-Skills CoLab (EC CoLab), the provincial presence of NEMISA. This training is offered to different types of potential and current ICT users, namely, basic, sector, ICT practitioners and leaders. For example, eSkills4All, a basic, end user computing course may be offered to basic unemployed youth, while Cybersecurity Essentials which requires some background in Information Technology (IT) is offered to ICT technicians or unemployed graduates. Collectively, the participants range from school learners, unemployed, employed, unskilled, semi-skilled, youth, SMEs to managers and directors. As the EC CoLab's mandate is ICT skills development (and not ICT infrastructure deployment), it has partnered with entities such as the Eastern Cape Department of Education (ECDoE), Technical and Vocational Education and Training (TVET) colleges and privately owned ICT centres to host ICT training programmes, with a strong emphasis on the rural districts of Eastern Cape. For the purpose of this paper we used our existing database of courses that are offered by the EC CoLab. We pulled out courses from the database then on the results section of this paper we explained who is eligible to do the course and what the prerequisite are if there are any. In the results section of this paper, an outline of how the data was collected is given in a table form. Firstly, NEMISA as the national skills institute gives a mandate to its provincial colabs on the type of users that need to be trained. Based on the experience of the users in terms of the ICT skills, a particular course is chosen for that group, such as ICT Practitioner group where all the participants have an IT background, a cisco course will be chosen. Most of the courses offered by the colabs have no prerequisites except for the ICT practitioners where an IT qualification will be expected. The data was collected from our databases, course and partner database where we keep all the information about users, courses and the type of community to be trained. We also looked at the partner involved per training and make use of its ICT centre that is closer to the community being trained at that time. Some of the courses such as digital marketing do not require an ICT centre and therefore, we make use of our own Tablets as the EC CoLab. We only hire a venue in such cases. The distribution of the training programmes throughout the province, combined with the efforts by the 8 other provincial CoLabs contributes towards NEMISA's mandate of equipping South African citizens towards taking an active part in the Fourth Industrial Revolution (4IR) era.

Keywords: ICT Skills, Rural Development, Education, Training, e-skills, ICT, Sectors

Introduction

Over the last few decades, Information and Communication Technology (ICT) has demonstrated that it is a major contributor to global economic growth. However, ICT on its own is not sufficient; other inputs such as human capital are needed (Lanvin & Passman,

2007). It is strategic to make ICT skills (also referred to as digital skills or e-skills) a prerequisite in teaching, learning and in the workplace in order to benefit individuals who would like to continuously participate meaningfully in the ever changing way of life. While we may have functional telecommunications infrastructure and/or devices, if there are no ICT skills to complement them, there may be a problem. This means that people need to be trained on how to use emerging ICTs especially because the Fourth Industrial Revolution (4IR) is taking centre stage. Professor Klaus Schwab defines the 4IR as “the developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live and work”, therefore citizens need the necessary e-skills to participate meaningfully in the digital economy for work and personal purposes (Schwab, 2017). National Electronic Media Institute of South Africa (NEMISA), a state-owned-entity reporting to the Department of Communications and Digital Technologies (DCDT), plays an advocacy role in developing users, consumers and citizens within the knowledge based environment. At the same time, it acts as a national catalyst for developing e-skills in South Africa. Provincially, NEMISA has presence through e-Skills CoLabs located at universities. Currently there are nine provincial e-Skills CoLabs that allow for e-skills training up to local community level. The Eastern Cape e-Skills CoLab (EC CoLab) where the authors are based has a thematic area in ICT for Rural Development (ICT4RD). Its university base is at Walter Sisulu University (WSU) (Summit, 2013). Each e-Skills CoLab and its partners’ research on different methodologies, pilot and rollout ICT courses.

Objectives of the Paper

The main objective of this study is to discuss the various types of users considered for ICT capacity building, where they come from and examples of training programmes that are currently offered by the EC CoLab. We also discuss examples of partnerships which the EC CoLab formed to date in order to effectively deliver courses.

Background

One of the EC CoLab’s main partnerships is with the EC DoE. Together, they roll out eSkills4All, an interactive and automated, basic digital literacy course to educators. This course consists of the following modules: Introduction to Computers, Word, Excel, PowerPoint, e-Mail and Internet. eSkills4All was created in South Africa and uses the local English, voice overs and examples. It is accredited by the Vaal University of Technology (VUT) and South African Council of Educators (SACE). The pass mark for the course is 60%. This course is currently undertaken at five EC DoE ICT Centres located in Mthatha, East London (Stirling and Mdantsane) and Port Elizabeth (Struandale and Uitenhage). There are ambitions to extend to EC DoE Vodacom ICT Centres located in Lusikisiki, Maluti, Mount Frere, Sterkspruit, Butterworth, Graaff-Reinet and Lady Frere. The EC DoE selects the educators who will participate in the course based on proximity to their ICT Centres. The EC CoLab purchases the course licenses.

In order to reach additional remote Eastern Cape communities, the EC CoLab has forged partnerships with different Eastern Cape TVET colleges. The advantages of these partnerships are multifold: TVET colleges have a large, distributed geographic footprint that reaches remote communities and they usually have adequate telecommunications infrastructure and devices. Like the EC DoE, the TVET colleges are also responsible for the recruitment of course participants from their communities. Priority is given to women and unemployed youth as this fulfils the EC CoLab mandate on ICT for Rural Development.

In addition to basic digital literacy training, the EC CoLab offers different courses to Sector users, ICT Practitioners and eLeaders. Sector users include SMMEs who are interested in Digital Marketing skills to aid their businesses e.g. agriculture, textiles and film. Digital Marketing involves the use of devices such as tablets or smartphones to create capturing marketing material specifically for their businesses. This material may then be advertised on social media. The EC CoLab recruits participants for these training sessions. ICT Practitioner courses include Cisco training which is offered to IT Technicians, managers and unemployed IT graduates, in order to upskill them. Examples of courses include Introduction to Cybersecurity, Cybersecurity Essentials, Introduction to Internet of Things (IoT) and IT Essentials. The eSkills CoLab conducts its recruitment for these ICT practitioners' courses from its large pool of Eastern Cape government, TVET College and SMME contact list. The Cisco courses offered by the EC CoLab are accredited by the WSU Cisco Academy. Organizational eleaders' training is related to their readiness for the 4IR. The assumption is that a large percentage of leaders have limited IT skills, therefore, there is a need to host training to inform them about the background and future of the 4IR. This also equips them with ICT management and decision making skills which can be applied in their respective organisations.

Theoretical Framework

The theory relevant in this paper is based on a multi-stakeholder approach. NEMISA, a state-owned-entity adopted this approach through collaborating with South African universities to reach diverse communities. Likewise, the EC CoLab has partners with different stakeholders e.g. the Eastern Cape Department of Education (EC DoE), Eastern Cape TVET colleges and privately owned ICT Centres, to deliver e-skills courses to communities across the province. The EC CoLab is also an active member of the Eastern Cape ICT Working Group, a provincial gathering that tackles ICT related issues within the province. Multi-stakeholder partnerships maximizes impact, avoid duplication, fills the gaps and leverages the use of existing infrastructure and devices (El-Gabaly & Majidi, 2003). This framework is adopted in order to provide relevance to the National Development Plan (NDP) which aims at reducing inequality and eliminate poverty by 2030. Further, in his 15 August 2012 speech, the Minister in the Presidency Mr. Trevor Manuel said "It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal" (South African Government).

Methodology

The EC CoLab keeps a list of courses that it offers to the Eastern Cape communities. We also keep a list of the types of users we offer courses to, in a form of a database. The EC CoLab uses its partners and other contacts established to advertise the course for recruitment purposes. When a certain targeted number is reached another group gets carried over to the next intake. If a user meets the prerequisites for a particular course they applied for, they then enroll on the course. Their information is stored on the database for research purposes. In terms of the courses offered, an agreement between the CoLab and its partner is first established. Then a centre where the course is going to be delivered is identified and recruitment process will begin. A centre closer to the community that is going to be trained is preferred and therefore, high preference is given to it so that people do not travel long distances to attend the training. The EC CoLab courses are offered for free to the communities and therefore, finding a centre closest to the community is advantageous. Course evaluation forms and some questionnaires about other researches that are undertaken by the EC CoLab are always handed out to attendees at the end of the course. It is these responses that we use for research purposes. The purpose of the EC CoLab is not only to

offer trainings but also to conduct research on the ICT matters across the Eastern Cape Province. It is the research findings that helps the EC CoLab team to form partnerships with relevant stakeholders and also to know more about the ICT centres distributed across the province.

Results

Over the past few years, the EC CoLab has rolled out various training programmes to basic digital literacy (or e-literacy), sector, ICT practitioner and eleaders groups. A list of some of these programmes conducted recently are shown in Table 1. Each of these is explained on the discussion section below.

Table 1. Type of Users that are trained by EC CoLab

Type of users	Course Examples	Prerequisites	Target community	ICT Centre
e-Literacy	E-skills4All, E-skills4Communities Cyberawareness for learners Programming for learners Robotics for learners	none	Educators, disadvantaged communities, learners	EC DoE, EC TVET Colleges,
Sector Users	Digital Marketing for SMMEs	none	NGOs, SMMEs, Communication Professionals	Not required-use of eSkills CoLab tablets
ICT Practitioners	Introduction to Cyber Security, Introduction to Internet of Things (IoT), Cyber Security Essentials,	Preferably tertiary level IT background	IT Technicians, IT Managers, unemployed IT graduates	Walter Sisulu University, TVET colleges
e-Leaders	Future Fit Leaders eLeaders: Getting Ready for 4IR	none	Organization leaders	Not required

Discussions

Statistics South Africa indicates that there are high unemployment and ICT literacy rates in the Eastern Cape Province (Stats SA). As a starting point, the introduction of basic digital literacy (e-literacy) programmes is essential for educators, learners and disadvantaged communities in order for them to start to participate in any digital economy. The aforementioned eSkills4All course, accredited by VUT, represents one formal digital literacy course which can be applied in society's work, social and job seeking endeavours. In addition, the EC CoLab coordinates other basic literacy courses such as Cyber awareness and Introduction to Programming to learners as this knowledge and skills are relevant in this 4IR era.

Sector users use digital skills for work in a specific sector, organisation or profession. To date, the EC CoLab has rolled out sector user courses such as Mobile Technology for SMEs

(including train-the-trainer sessions) and Digital Marketing sessions for SMMEs, NGOs and Communication Professionals. These courses are not strictly sector specific; therefore, they cater for a large number of small business participants in the Eastern Cape Province.

Examples of ICT practitioners are IT technicians, network administrators and unemployed graduates. The EC CoLab offers courses related to cybersecurity and IoT that help participants with skills that will either assist them to perform their job tasks better or increase their competence in the ICT job market. Most of the participants are usually employed in the public sector.

Organisation and business leaders need to be able to exploit the opportunities provided by ICT, in order for their entities to operate more efficiently and effectively in this 4IR era. For example, the EC CoLab, in collaboration with the Western Cape e-Skills CoLab offered workshop entitled 'Future Fit leaders' which taught organisational leaders on 10 proven attributes and actions which they need to have together with the changes they should anticipate and prepare for, with regards to the 4IR. Future fit leaders are those equipped with digital transformation strategies which benefit their organisations.

The implementation of ICT programmes mostly requires telecommunications infrastructure complete with the internet. Therefore, there has been ongoing research by the EC CoLab to identify functional ICT centres to host the various programmes across the Eastern Cape Province. The priority is to partner with government owned ICT Centres e.g. EC DoE ICT centres, TVET colleges, but if absolutely necessary, privately owned remote and hard to reach ICT Centres with a proven track record of ICT training to their communities. Some training takes place at WSU computer labs or through the use of tablets connected to the internet. The EC CoLab also leverages on existing agreements and collaborations e.g. between WSU and 6 Eastern Cape TVET colleges to negotiate and extend the use of their infrastructure to conduct training to the communities in their vicinity. We have also requested the Eastern Cape ICT Working Group meetings, which is co-chaired by the Office of the Premier and the Eastern Cape Socio Economic Consultative Council (ECSECC) to assist us with the contact details of any ICT Centres which they know. The ICT Working Group is a good platform to enquire because this is a forum where ICT initiative processes across the province is discussed.

Our perception is that, so far, the training is effective due to the written evaluations by course participants who usually mention the benefits of the training to them and suggest other relevant courses which the EC CoLab can offer.

Conclusion

Over the past few years, EC CoLab has made a lot of progress in ICT skills training; thousands of individuals have been trained. The rollout of ICT courses is not easy as the rural Eastern Cape there are many areas with limited or no ICT telecommunications infrastructure. The partnership with the EC DoE and TVET colleges are beneficial as they increase the reach of the training programmes as their ICT Centres extend to remote, rural towns. This reduces the need for prospective course participants to travel to urban centres to obtain ICT training. Forming partnerships is very beneficiary to the EC CoLab to reach its goal of delivering ICT skills training in the rural communities of the Eastern Cape. The EC CoLab forms partnerships with other CoLabs in other provinces and this helps especially when delivering accredited courses. A CoLab in Western Cape might have an accredited course with its

partner and when EC CoLab adopts the same course, the process is smooth because we only bring the trainers who are already accredited.

Recommendations

Overall, the EC CoLab training have gained a lot of momentum and the number of people trained keeps rising. We are always actively looking for more government partners, with ICT Centres, as the rollout of training programmes becomes cofunded. People living in remote regions of the Eastern Cape are in desperate need of ICT skills. The EC CoLab would like to reduce the need for them to travel to urban areas through offering training with partners within their locality. The more partnerships we get, the closer we will be to the people. There are recommendations that perhaps Massive Open Online Courses (MOOCs) should be used to reach remote regions. The EC CoLab would like to take an active step towards this by undertaking a research on MOOCs where we will investigate the current uptake of online courses and the perception of academics and employers on MOOCs qualifications.

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PSYCHOSOCIAL IMPLICATIONS OF CURRICULUM CHANGE ON LESOTHO PRIMARY TEACHERS

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Abstract

The aim of curriculum change is to improve educational programs and practices which will assist to achieve overall educational objectives in a more effective way. The scarcity of literature on psychological implications and wellbeing of teachers especially during curriculum change transition and implementation triggered the researcher to explore teachers' psychological reaction during curriculum change. Aim of this paper is to report on one objective of a master's degree thesis which is; to determine the psychological effects of introduction and implementation of the Integrated Curriculum and Assessment Policy on primary school teachers. The study adopted the qualitative research approach, guided by appreciative inquiry theory and located within the parameters of the interpretivist paradigm. Semi-structured interviews and focus group discussions were deployed to generate data from four sets of participants being primary school teachers, primary school principals, curriculum designers, and subjects assessment packages designers. Thematic analysis was engaged to analyse data. Findings revealed that demotivating factors are more than motivating factors in curriculum change and implementation. Factors like assessment procedure, workload, lack of teaching aids and learning resources, and unprofessional approach of District Resource Teachers (DRTs) impacted negatively on teachers' motivation. Findings revealed that teacher emotions are embedded in the process of curriculum change and implementation with emotional responses ranging from positive to negative responses being more evident in many occurrences. Responses in some occurrences reveal that some teachers were disciplined because they were interested to learn and adopt new teaching approaches. The study recommends that curriculum policy makers must not ignore teachers' psychological well-being when introducing educational changes. As curriculum implementers, teachers must be allowed to participate in the process of curriculum design. Teachers must appreciate and embrace change to allow innovation and improvement.

Keywords: Psychosocial, attitude, emotions, motivation, curriculum change, teachers.

Introduction

The winds of change that have swept Lesotho's education sector in recent years, has brought mixed reactions among members of the society. This was brought by the introduction of the Integrated Curriculum and Assessment Policy. The aim of curriculum change is meant to improve educational programs and practices which will be of assistance to achieve overall educational objectives in a more effective way (Irez & Han, 2011). Cheng (2004) concedes that teachers are considered as key actors in the educational reforms and practice. Therefore teachers must be 'psychologically prepared to respond effectively to any waves of education reforms.

Implementation of educational changes could affect teachers' motivation (Kingful & Nusenu, 2015), determine their attitude to conceptualize its content and principles (Grossman, Onkol & Sands, 2007) trigger their emotions (Lee & Yin, 2011), foster them to change their

behaviour (Yildirim, Akan & Yalcin, 2016) and affect their social relations with learners and other stakeholders (Eloff & Swart, 2018). This paper explored teachers' emotions, motivation and attitude during the curriculum change and implementation process.

As teachers are the implementers of curriculum policy and its content, they have a direct contact with learners, therefore teachers psychological state will likely affect their performance when executing their teaching mandate and how they relate with learners and colleagues (Beacco, et al. 2015). The Organization for Economic Co-operation and Development (OECD) report (2005) indicates that it is evident that a good teacher has a momentous influence in improving the chances of success for his or her students hence their psychosocial state is key in all aspects. Psychosocial factors like teachers' attitude, behavior, and conduct, teacher self-efficacy, student-teacher relations are multi-dimensional concepts which influence student and teacher's academic performance (Kolo, Jaafar, and Ahmad, 2017).

Curriculum change

A rapid and fundamental curriculum changes are being experienced in different education systems across the globe in recent years. Fullan (2001) in Yeun (2004) postulate that change in schools is driven by demands of school management, government policy initiatives and teachers efforts to respond to changing learners needs. Curriculum change is driven by a need to solve perceived social problems to advance nation-building, social solidarity and economic development and philosophical response on the role of schools (Bascia, Carr-Harris, Fine-Meyer, & Zurzolo, 2014). The 21st-century reforms in curriculum policies are influenced by globalization, economic changes, and rapid growth of information and communication technology and diversity of societies in local, national and at international level (Voogt & Pelgrum, 2015). Although not all changes lead to improvement, but all improvements require change.

Education reform and innovation in many countries of the world is always filled with brilliant ideas and policies but seems to fail when being implemented or it becomes situational (Cheng, 2004). Educational changes appear to be threatening, while at the same time they bring about anxiety, discontent, and suspension (Jorgenson, 2006). Irez and Han, (2011) point out that educational change is a difficult process because it involves a change in organizational structures, resource distribution, and allocation, communication links, practices, beliefs, and attitudes of implementors and policymakers. Sanders (2016) views change as a continuous process being the 'law of nature' which occurs deliberately or intuitively and there are forces which revolve around its trustworthiness of people, community, competing demands of governments and curiosity of people. Curriculum change can be influenced by planned or unplanned factors in and outside the school environment (Voogt & Pelgrum, 2005).

Since integrated curriculum was introduced in 2011, many school principals and teachers have lodged complaints about the integrated curriculum and continuous assessment to school inspectors and curriculum designers. Teachers' grievances were about the uncertainty of applying new teaching methods, vague assessment procedures in the classrooms, and a lack of teaching and learning materials in other learning areas (subjects). Unreceptive behavior and changes to social life were also observed among other teachers in and outside the school premises.

Psychological Implications of curriculum change

In the face of every change, a key question is how we react and respond to change and how we can develop within ourselves and to adapt, and behave differently. Lee & Yin (2010) indicate that teachers' responses to curriculum change are represented in different ways, this is due to how change is contextualized and its distinctiveness to individual teachers.

Understanding Teachers emotions

Emotions are notoriously regarded as a difficult concept to define across different disciplines. Fried, Mansfield & Dobozy (2015) indicate that different terminologies are used depending on the theoretical perspective; however, Yoo & Carter (2017) considers an emotion as multi-componential which comprises with elements such as appraisal, subjective experience, physiological change, emotional expression and action tendencies. Teachers' emotions are regarded as important as the educational change and policy itself. Emotions are at the heart of teaching hence Zembylas & Schutz (2016) asserts that teachers' emotions are intertwined to many diverse aspects of their teaching work. Kelchtermans (2005) indicate that during the change process, teachers experience intense emotions in their work of teaching, they often feel passionate about pupils, about their colleagues, about schools structures and resources, about their teaching profession, about their interaction with schools inspectors and parents

Teachers attitude towards change

Fullan (2009) concur that attitude is generally an opinion which represents a person's overall inclination towards an object, idea, or institution. Eloff & Ebersohn (2004) states that attitude are acquired through experience and have a direct influence on persons' life. Attitudes can be positive, negative or neutral; attitudes can be dormant; attitudes are more generalized and may not function at all (Wagh, Indoshi & Agak, 2009). Teachers' attitudes towards change and resistance to change are considered a reason for failure or success of processes that involve change in educational systems (Avidov-Ungar & Eshet-Alkabay, 2011).

Teachers' attitude is linked to the application of teaching strategies used to cope with challenges they experience in their work, and it also molds student's learning environment, influence and motivates their achievement (OECD, 2009). Teachers are regarded as instruments through which the curriculum is to be transacted and fulfilled; hence Areekkuzhiyil (2014) concedes that their attitude and perceptions towards curriculum change and its implementation is significant. Successful implementation of curriculum change relies wholeheartedly on cooperation and support of teachers (Avidov-Ungar & Eshet-Alkabay, 2011).

Teacher Motivation

Han & Yin (2016) view motivation as the energy or drive that moves people to do something by nature. Teacher motivation is viewed by Simic, Puric & Stancic (2018) as an important determinant of the teachers' success, the success of their students and their school in general. It is observed that curriculum change does not happen in isolation; it impacts on teachers' motivation, students and the whole school system (Lourmpas & Dakopoulou, 2014). Teachers' motivation and self-efficacy is viewed as a catalyst for the country to attain overall objectives of introduced curriculum (Schieb & Karabenick, 2011) which include attainment of basic education for everyone; educational programmes which will reflect Lesotho's requirements; entrepreneurial and technological skills; accessibility of language policy for medium of instruction; formation of integrated and assessment strategies; and promotion of active co-operative partnership in educational administration (Ministry of Education & Training, 2009). However, the country may not achieve these goals if teachers are not well motivated and lack a commitment to the realization of these objectives. Teacher motivation

involves both the desire to teach and one's interpersonal approach towards students and interaction with school administration (Blaskova, Blasko, Figurska, & Sokolo, 2015).

Theoretical Overview

The Appreciative Inquiry (AI) stems from positive organizational scholarship and organizational development. AI aims to search for the best in people and their organizations. Organizational life must be seen as a universe of strength rather than a place to solve problems (Cooperrider, Whitney & Stavros, 2008). AI advocates for a collective inquiry into the best of what is, to imagine what could be, followed by the collective design of desired future state and thus, does not require any use of incentives, coercion or persuasion for any planned change to happen (Bushe, 2012). AI allows teachers to accept, embrace and appreciate curriculum changes, find the best in what it can offer, its future possibilities, and best in school, instead of nagging about its shortfalls, criticisms and being resistant to change. AI principles are Constructionist, Simultaneity, Anticipatory, Poetic and Positivity. In the teaching and learning context these principles relate to the character and emphasis of managing and facilitating change (Cooperrider, Sorenson, Yeager, & Whitney, 2005).

The *constructionist principle* proposes that our acts determine our beliefs, and our thoughts and actions are the results of our interaction with the environment. Teacher's interaction, metaphors, and discourse with students and other teachers daily is a co-construction of what they visualise (Bushe, 2012). This will inspire innovations, creativity, stories, and imaginations with whole new possibilities in implementing the integrated policy (Bushe, 2012).

The *Principle of simultaneity* is viewed as the keystone in organizational change (Bushe, 2012). Unconditional positive questions lie in the heart of the AI. When inquiring about the human systems, change occurs; therefore change and inquiry are simultaneous events. Kozik, Cooney, Vinciguerra, Gradel & Black (2009) indicates that within the school context, the application of AI resuscitates that it is empirical for one to have the ability to ask a good question.

The *poetic principle* proposes that topics or subjects we focus our attention on are creating and determine what we learn. Our past, present, and future are endless sources of learning, motivation, and interpretation where our experiences are being co-authored and co-created (Eow, Zah, Rosnaini, & Roselan, 2010). In engaging AI in education, teachers, policymakers and parents must focus their attention and energy on the intended behaviors and results they want for learners (Waters & White, 2015).

The *Anticipatory principle* theorizes that our actions and decisions today are inspired by what we intend to be in the future (Bushe, 2012). Practical learning propels effective way of envisioning learning transformation which mobilizes educationists, teachers, and learners towards anticipated future (Eow, Zah, Rosnaini, & Roselan, 2010).

The *Positive principle* proposes that if a person feels positive, he is likely to act positively, or if he feels negative, will act alike. The positive emotions and attitudes of teachers toward integrated curriculum reform will strengthen their psychosocial well-being. As a result teachers' motivation and vitality will increase (Bushe, 2012). Reicher (2014) articulates that positive emotions are a result of "opening up" against "shutting down" effect of cognitive, emotional and physiological changes.

Methodology

The qualitative research design was used to give logic (Creswell & Creswell, 2018; Gilbert & Stoneman, 2016) in this study by involving semi-structured interviews and focus group discussions. The study is framed within an instrumental case study design because of its descriptive nature in providing insightfulness in the phenomenon (Gray, 2018; Thomas, 2017). The limitations of a case study design, such as the strong reliance on individual memories, which affect the quality of data, and the localized nature of the description (Lindegger, 2012), are also acknowledged.

Four sets of participants were 13 primary school teachers as prime respondents were sampled by snowball; two primary principals were conveniently sampled; five National Curriculum Development Centre (NCDC) and two Examination Council of Lesotho (ECOL) officials were purposively sampled as secondary respondents and were all interviewed. Other teachers from grade one to seven were engaged in focus group discussion. Two primary schools were conveniently sampled in this study because of their accessibility and availability. Semi-structured interviews and focus group are data collection instruments and diverse sets of participants were used for crystallization purposes and to reduce biases (Gilbert & Stoneman, 2016). Before making any conclusions about gathered data, thematic analysis approach was used to analyze data.

Findings

Teachers' emotions

Mixed emotions were experienced among teachers since the implementation of the new curriculum. Teachers' emotions play a great role in educational change process, to the extent that they may provide a way of understanding how teachers make sense of such changes (Sanders, 2012). Majority of teachers who participated in this study expressed that they were stressed and frustrated due to increased workload, high teacher-learner ratio, the uncertainty of teaching and assessment approach and lack of teaching and learning material.

Teachers mentioned that lesson plan demanded more time and energy. They had to take their work home for preparation and marking to avoid deadline. Since the implementation of the new curriculum, schools are obliged to enroll all learners regardless of their disability, culture, belief, or socio-economic background. Integrated curriculum adheres to the principle of inclusion, which includes diversity, equity and inclusive education (Ferguson-Patrick, Reynolds & Macqueen, 2018). Many teachers have no skills to approach learners with different learning disabilities or psychological challenges. And teachers were emotionally affected by this.

Teachers' Attitude

School principals, curriculum designers, and assessment tools designers are viewed by the researcher as relevant candidates to observe teachers' attitude more accurately. These respondents concur that teachers' attitude differs depending on their willingness to accept, appreciate and embracing educational changes, and readiness to explore new teaching methods, assessment procedures, and curriculum relevant to the local context (Knoef, 2017) and response to national contemporary issues and teachers understanding of content and skills to develop lesson plans.

Majority of teachers has shown a negative attitude towards curriculum changes. Teacher's negative attitude is provoked by workload, unconversant District Resource Teachers (DRTs) and school inspectors, poor training they received and indistinct continuous assessment

procedures. However, few teachers embraced and appreciate the educational changes made and the relevance of an integrated curriculum in the local context. Few participants foresee Lesotho's brighter future with this curriculum. They articulated the importance of educational changes which was long overdue. Avidov-Ungar & Eshet-Alkakay (2011) study revealed that teacher's positive attitude towards change lead to behavioural attitude which determine their readiness to implement new changes

Teacher Motivation

Han & Yin (2016) suggest that teacher motivation is identified as a key determinant for learner motivation, effective teaching, and implementation of curriculum changes. Intrinsic and extrinsic factors contributed to teachers' motivation in implementing and applying necessary changes in their classrooms. Workload; reporting procedure; late arrival or lack of teaching materials; DRTs and school inspectors approach and learners' continuous assessment and poor performance are some demotivating factors. However, principals state that some teachers were motivated by new teaching approaches and the good relationship which existed among them and teachers in neighboring schools. Curriculum designers observed that teachers were confused and demotivated as they rely more on textbooks and technological advancements which they were not conversant with.

Conclusions and Recommendations

The above discussions affirm that psychological wellbeing of teachers can affect the deliverance of quality education and effective implementation of curriculum changes in our schools. For curriculum changes to be effective attitudinal adjustments by teachers are critical (Avidor-Ungar & Eshet-Alkakay, 2011) and if teachers' attitudes are incompatible with curriculum innovations and objectives, they are likely be resistant. Successful implementation of curriculum changes requires teachers' wholehearted cooperation and support (Iskandar 2015). The Ministry of Education and Training must adhere to its obligations to provide and deliver learning and teaching material in time, provide relevant and proper training to in-service teachers and prospective teachers in teacher training institutions. Teachers' participation in curriculum development and design is critical to avoid negative attitude, nagging, and resistance towards curriculum changes. It is concluded that if teachers are not properly trained and equipped with relevant knowledge and skills, implementations of curriculum changes are in jeopardy.

To minimize the emotionality of teachers on learners with disabilities, Gill & Salkulkar (2017) grand teachers must develop personal well-being and effectiveness of teaching to supplement socio-emotional development and how they can accommodate them in their classrooms. Frustration, stress, apprehension, and anger are some teachers' emotional experiences. It is important for curriculum designers to understand how educational changes can be abstract, how they portray change as a mechanistic journey (Sauders, 2012).

Teacher motivation derives primarily by intrinsic and extrinsic factors. Han & Yin (2016) suggest that teacher motivation is identified as a key determinant for learner motivation, effective teaching, and implementation of curriculum changes. The study revealed that learner' continuous assessment, workload and progress reporting, the unreceptive approach of DRTs, teacher self-efficacy, lack or late arrival of learning and teaching materials, self-development, teacher-learner relationship, and learner performance are some factors determining teacher's motivation to implement curriculum changes. The study suggests that school management must adopt extrinsic motivations to encourage teachers for effective job performance and satisfaction (Kingful 2015). Teachers are also encouraged to develop

strategies to enhance their motivation and ability (Clipa, 2017) to effectively embrace curriculum changes. In conclusion, teachers are expected to embrace, appreciate and find the best in what integrated curriculum can offer and its future possibilities instead of nagging about its shortfalls, criticisms and posing resistance to change.

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PARTICIPATION IN THE ACET PROGRAMMES IN MASHASHANE-MARABA AREA OF LIMPOPO PROVINCE: GENDER DISCRIMINATORY?

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Abstract

The unemployment rate in South Africa stands at 27. 6% and the youth aged 15-24 years are the most vulnerable in the South African labour market. Unemployment rate among this age group was 55, 2% in the 1st quarter of 2019. Youth unemployment escalates every year and it is worsened by yearly increase in Matriculation figures. Those who do not join higher learning institutions opt for labour market but might not access jobs because of lack of relevant skills. The Department of Higher Education and Training has established Adult and Community Education and Training (ACET) in order to equip the youth with employable skills. The concern for the unemployed male youth who hang around street corners in groups of three or four not having anything to do in Mashashane-Maraba, motivated this exploratory study. The objective of the study was to establish why males did not participate in the ACET programme in spite of the opportunity to acquire knowledge and skills. The qualitative approach was adopted with case study design. Individual interviews were conducted at four community-learning centres in Mashashane-Maraba area. The study revealed that mostly female youth than male patronise ACET programmes with the hope of getting a certificate that would enable the possibility of employment. The study concludes that ACET programmes are open to both males and females and therefore non-gender discriminatory. Male youth chose not to seize the opportunity to learn skills for employment.

Keywords: ACET programmes, unemployment, gender discriminatory, Youth, and employable skills.

INTRODUCTION

The unemployment rate in South Africa stands at 27. 6% and the youth aged 15-24 years are the most vulnerable in the South African labour market. Unemployment rate among this age group was 55. 2% in the 1st quarter of 2019. The Organisation for Economic Cooperation and Development Report (OECD, 2009) indicates that the problem of youth unemployment stems partly from demographic shifts in the structure of the population and the fact that many of the jobs that formerly employed young people no longer exist. According to the OECD Report, there is generally a mismatch between skills acquisition and business needs in the Southern African Development Community (SADC) region. Skills development of the labour force requires an enabling environment so that the provision of skills is balanced with the provision of opportunities to use these skills. Therefore, skills development should be integrated with employment promotion for both the formal and informal private sector.

Filmer & Fox (2014) indicate that resource-rich countries in Africa, present particular challenges when it comes to employment. They further argue that natural resource rents, if poorly managed, lead to overvalued exchange rates and uncompetitive real wages. This is true that such conditions severely hamper job creation in export-oriented sectors. At the same time, the few but highly paid employment opportunities in the natural resource sector

encourage young people to “wait for a job” - behaviour that can distort educational choices and aggravate skill mismatches in the labour market.

According to Statistics South Africa, unemployment among youth increases in the 1st quarter of every year and it is worsened by yearly increase in Matriculation figures. The Report on 2018 National Senior Certificate Examination indicates the following pass rates for the past four years: 70.7% (2015), 72.5% (2016), 75.1% (2017) and 78.2% in 2018. Those who do not join higher learning institutions opt for labour market but might not access jobs because of lack of relevant skills. Equal Education (2017) indicates that for every year that we celebrate a high matric pass rate, there is an increase in the number of youths (majority black) who join the long queue of unemployment and poverty. Oluwajodu, Blaauw, Greyling and Kleynhans (2015) indicate causes of graduate unemployment in South Africa as: skills, institution attended by graduate and differences in expectations from employers and graduates. Cloete (2015) points to the structural nature of unemployment as one of the main reasons for the increase in long-term unemployment. She further indicates that South African graduates are often unsuccessful in the recruitment phase, because they lack some of the required skills.

The choices for skills development and the modalities for delivery vary as the transition progresses. Workforce development is influenced by education, apprenticeship and early work experience, labour market programmes, including non-formal training programmes, that facilitate the operation of labour markets and address the needs of those encountering problems therein, and labour market policies that influence the investment climate and jobs creation for youth (Adams 2007).

The Department of Higher Education and Training has established Adult and Community Education and Training (ACET) in order to equip the youth with employable skills. ACET programmes are offered through Community Education and Training Colleges. These colleges serve as an alternative entry point into Post-School Education and Training (PSET) for those youth and adults who did not, for whatever reason, have access to sufficient education and training earlier in their life (DHET, 2019). The Community Education and Training Colleges shall be flexible in their programme offerings and include programmes driven by the community developmental priorities, as well as the priorities of the State (DHET, 2015). The concern for the unemployed male youth who hang around street corners in groups of three or four not having anything to do in Mashashane-Maraba, motivated this exploratory study. The Organisation for Economic Co-operation and Development (2013) indicates that long periods of unemployment for youth have been shown to have potential “scarring” effects, which have a harmful impact in later life, particularly for not in employment, education or training (NEET) youth. It further shows that this unemployment can lower future income levels, skills validity, future employability, job satisfaction, happiness and health levels. The Table 1a shows the number of students enrolled in Community Education and Training Colleges (CETCs) by programmes and gender in 2017:

Table 1a: Number of students enrolled in CETCs by programme and gender, 2017

Programme	Female	Male	Total
AET Level 1-3	32 138	17 934	50 072
GETC: ABET Level 4 (NQF Level 1)	87 632	28 281	115 913
Grade 10 (NQF Level 2)	117	104	221
Grade 11 (NQF Level 3)	42	113	155
Grade 12 (NQF Level 4)	56 279	28 869	85 148

Non-formal programmes	4 111	1 561	5 672
Occupational Qualifications	-	-	1 018
Total	180 319	76 862	258 199

Source: CLC Annual 2017 20190205, data extracted in February 2019

Note 1: Dash (-) means that data is not available

Note 2: Non-formal programmes were previously referred to as other/skills programmes

The table 1a presents a total of 180,319 female students enrolled in CETCs in 2017 compared to 76,862 males. It indicates that there were on average more female students in CETCs in 2017 compared to males for all programmes except Grade 11 where the males proportion was higher. The largest gender disparity was recorded for GETC: ABET Level 4, where females were 3 times more than males (DHET, 2017). Female enrolment has consistently outnumbered males in CETCs.

Table 1b: Number of students enrolled in CETCs by programme and gender, 2016

Programme	Female	Male	Total
AET Level 1-3	40231	20217	60448
GETC: ABET Level 4 (NQF Level 1)	94208	28411	122619
Grade 10 (NQF Level 2)	223	61	284
Grade 11 (NQF Level 3)	798	551	1349
Grade 12 (NQF Level 4)	57255	28370	85625
Non-formal programmes	-	-	-
Occupational Qualifications	2064	1042	3106
Total	194779	78652	273431

Source: CET College Annual Survey 2016, data extracted in November 2017.

Note 1: Dash (-) means that data is not available

Note 2: Non-formal programmes were previously referred to as other/skills programmes

The table 1b presents a total of 194,779 female students enrolled in CETCs in 2016 compared to 78,652 males. It indicates that there were on average more female students in CETCs in 2016 compared to males for all programmes.

Table 1c: Number of students enrolled in CETCs by programme and gender, 2015

Programme	Female	Male	Total
AET Level 1-3			67 468
GETC: ABET Level 4 (NQF Level 1)			126 307
Grade 10 & 11 (NQF Level 2 & 3)			1 294
Grade 12 (NQF Level 4)			84 526
Non-formal programmes			4 007
Occupational Qualifications			
Total			283 602

Source: CET College Annual Survey 2015, data extracted in December 2016.

Note 1: Dash (-) means that data is not available

Note 2: Non-formal programmes were previously referred to as other/skills programmes

The table 1c presents a total of 283,602 for students enrolled in CETCs in 2015. The figures for female and male students were not available. The largest enrolment was recorded for

GETC: ABET Level 4, with 126,307 students. The lowest enrolment could be seen in non-formal programmes (4,007) and Grades 10 and 11 (1,294).

The objective of the study was to establish why male learners did not participate in the ACET programmes in spite of the opportunity to acquire knowledge and skills. The National Policy on Community Education and Training Centres (2012) indicates that access to education and training must be made available through viable institutions to employed and unemployed, young and old to encourage an economically active population and community participation. The Adult and Community Education and Training play a crucial role with regard to the disadvantaged groups of people in the sense that it offers education and training opportunities to those youths and adults who did not, for whatever reason, have access to sufficient education and training earlier in their life (DHET, 2019). The National Policy on Curriculum Development and Implementation in Community Education and Training (2017) indicates that the programmes at Community Colleges shall offer learning options that seek to improve livelihoods, promote inclusion into the world of work and that supports community and individual needs.

THEORETICAL FRAMEWORK

Transformative theory forms the basis for this study. Transformative learning theory was developed by Jack Mezirow in the late 1900s. As the father of transformative learning theory, he used this theory to describe how people develop and use critical self-reflecting to consider their beliefs and experiences, and over time, change dysfunctional means of seeing the world. Mezirow (2009) describes transformative learning as learning that transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change. The chronic unemployment that hits the youth of this country very hard calls for transformative learning. This type of learning would hopefully be instrumental in helping the youth to turn their challenges into their successes. Mezirow (2000) mentions the 10-step processes for transformative learning:

- Experience a disorienting dilemma: This relates to an experience within which a current understanding is found to be insufficient or incorrect and the learner struggles with the resulting conflict of views. Such experiences often are those to which learners point as the beginning of the process of questioning their understanding and views and entering the transformative learning process. This disorienting dilemma is also sometimes descriptively referred to as creating a state of “disequilibrium” for the learner. Adult learners come to the learning centres with lot of experience accumulated in their lives. Since they committed mistakes during their life experience, it is their wish (and fear) to not commit further mistakes. They are content with their decision but on the other hand are fearful of making blunders, hence disequilibrium.
- Undergo self-examination. This often goes with feelings of guilt or shame. Adult learners are not children and as such are able to do introspection which brings feelings of guilt and regret.
- Conduct a deep assessment of personal role assumptions and alienation created by new roles. For adult learners to cope with the learning environment, they have to make new relationships and take new actions.
- Share and analyse personal discontent and similar experiences with others. It is critical that adult learners share their discontent and the process of transformation with others and recognise that others have negotiated a similar change.
- Explore options for new ways of acting. In the process of transformation adult learner can offer to become a group leader or scribe. This will help eliminate isolation.

- Build competence and self-confidence in new roles. This can be done by participating in the activities, for instance initiating conversation etc. Self-confidence can assist adult learners to actively involve themselves in learning activities.
- Plan a course of action – One needs to know the starting point of learning activities that can equip one with employable skills.
- Acquire knowledge and skills for action - through the on-going discussions with his group on how to respectfully ascertain other group members' needs,
- Try new roles and assess feedback – There is the need to help members who might be slow in understanding and grasping the skills
- Reintegrate into society with a new perspective - gradually gained confidence in his ability to respectfully assist others and include them.

The unemployed youth and adults of Mashashane-Maraba Area could use transformative learning theory for critical self-reflecting to consider their beliefs and experiences, and over time, change dysfunctional means of seeing the world. As Mezirow describes transformative learning, they could also learn transform problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change.

METHODOLOGY

The qualitative approach was adopted for this study. This qualitative study involved field work where the researcher physically went to the people to interview, observe and record behaviour in their natural setting (Creswell 2000). The case study design was used to investigate why males did not participate in the programme in spite of the opportunity to acquire knowledge and skills. The male youth in Mashashane-Maraba have been given the opportunity to learn to acquire relevant knowledge and skills but most of them do not participate in the programme that would equip them with the needed skills for employment. In this study, the case studies of the four centres were able to yield thick descriptions through narrative explanations of learners, facilitators, and centre managers participating in adult and community education and training programmes. The research took place in the Mashashane-Maraba Area of the Polokwane Cluster. The Polokwane Cluster is made up of 17 community learning centres but only a few are active with a minimum enrolment of 9 Participants. Four centres from Mashashane-Maraba were selected as targets for this study. The total enrolment in these centres was 49 and only 28 learners were active during the data collection.

The researcher used open-ended interviews because they do not limit the respondents (Yin, 1994). Individual interviews were conducted with learners at four community-learning centres in Mashashane-Maraba area. A total of 6 learners were interviewed for this study. To complete the process of data collection the researcher did observations at community learning centres in Mashashane-Maraba. The intention of doing observations was to enable the researcher to see the attendance by male youth in the ACET programme and to have an understanding of the environment in which youth learn the trades in order to become employable. Babbie (1995) indicates that a complete observer observes a social process without becoming a part of it in any way. Quite possibly, the subjects of study might not realise they are being studied because of the researcher's unobtrusiveness. This was the case in my study.

The data collected in the field was grouped into themes, then analysed using data matrix. Miles and Huberman (1994) indicate that data matrix is a method of analysing data qualitatively by making use of transposing rows and columns to enable the researcher to follow the responses of a specific individual across all conditions. Table 2 under presentation

and discussion of data displays data matrix. McMillan and Schumacher (2006) support the method of using data matrix by saying that data is segmented, which is divided into relevant parts (units) or chunks of meaning, social scenes or events. Because it was difficult to process large amount of diverse content all at once, the researcher concentrated on sets of smaller and similar material at any one time.

PRESENTATION AND DISCUSSION OF DATA

The interviews were confined to mostly male learners than to females. The researcher was interested in finding out from the male participants the reasons why other male youth are not attending ACET programmes. These people are not in employment, nor education and training but decided to not attend ACET programmes which would empower them with employable skills. Table 3 shows some of the responses made by the participants:

Table 2 Data Matrix: Responses

Interview Questions	Male Learner A	Male Learner B	Male Learner C	Male Learner D	Female Learner A	Female Learner C
What is your age?	19 years	25 years	21 years	30 years	18 years	29 years
What is your aim of enrolling for ACET programme?	To get a certificate	To get a certificate	To pass	To look for a job	To pass	I want a job
What type of job are you looking for?	I want to go to university	Any type	Hairdressing	Plumbing	Boiler making	Nursing
What type of programme have you enrolled?	GETC	GETC	GETC	GETC	GETC	GETC
What could be the reason for other male learners not attending?	They laugh at me and say it is night school	They are not interested	Lack of interest	They say it is a waste of time	It is not interesting	They are looking for a job
What do you think could be done about the programmes to attract other male learners?	Add Grade 10, 11 and 12	Teach us how to fix cars, how to repair stoves	Give us certificate in hairdressing	Teach us how to fit in bath tub, taps, sink and showers	Give us certificate in Boiler making	Teach us first aid and how to drive ambulance

The participants who were interviewed were youth in the ages between 19 and 30 years. From the interviews one could understand that they attend ACET in order to get a certificate that can enable them to search for employment. When asked the type of employment they aspire to get, they indicated practical skills employment such as hairdressing, plumbing, and boiler making. The participants in the ACET programme have enrolled for General Education and Training Certificate for Adults. The interview indicated lack of interest by male youth in the ACET programmes and further showed that addition of skills development could attract more male youth.

The data from the interviews was complemented by observations at the centres. This enabled the researcher to see the enrolment and the attendance by male youth in the ACET programmes. The researcher could also have an understanding of the environment in which youth learn the trades in order to become employable.

Table 3: Enrolment and Attendance of Learners for the period January to September 2018

CENTRE	ENROLMENT			ATTENDANCE		
	Female	Male	Total	Female	Male	Total
A	10	3	13	6	2	8
B	4	1	5	2	1	3
C	13	2	15	7	1	8
D	14	2	16	8	1	9
Total	40	9	49	23	5	28

The figures in table 3 above were obtained from the attendance registers at each centre. The table shows that the female enrolment figures are higher than male enrolment. The participation by male youth in the ACET programmes is terribly poor. This is worsened by low enrolment accompanied by poor attendance. Generally the enrolment decreases gradually as the year goes by. Several factors are attributed to the decreasing enrolment but the inability of the ACET programme to provide learners with practical skills for employment was cited as the main factor. Usually after writing and realising that they did not perform well in the centre based assessment (CBA) tasks, learners drop out. From the table, the centres enrol more females than males. These are youths and adults between 17 and 48 years who are parents and yearning for employment.

DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

The aim of the study was to establish why males did not participate in the ACET programmes in Mashashane-Maraba in spite of the opportunity to acquire knowledge and skills. The Department of Higher Education and Training has established Community Colleges to offer ACET programmes to the unemployed youth and adults. The programmes are meant to equip youth and adults who due to some reasons could not access sufficient education.

The study revealed that mostly female youth than male patronise ACET programmes with the hope of getting a certificate for employment. In the four centres that participated in this study, only one male learner per centre could be found and interviewed. When asked where other male youth were and why they were not attending ACET programmes, lack of interest in the programmes was given as the reason. It was indicated that they prefer hanging on the street corners rather than wasting time with something that does not meet their expectations.

The study concludes that ACET programmes are open to both males and females and therefore non-discriminatory. Male youth choose not to seize the opportunity to learn skills for employment. The responses given in Table 3, indicate that male youth lack interest in the ACET programmes that are offered by the community learning centres. The interviews indicated a need for practical skills to be offered by community learning centres in the Mashashane-Maraba Area. This study therefore recommends that for the ACET programmes to attract both male and female youth, practical skills should be offered at community learning centres.

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FOUNDATION PHASE STUDENT-TEACHERS' KNOWLEDGE OF MATHEMATICAL CONCEPTS: A LONGITUDINAL STUDY

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Abstract

This study presents the outcome of a research project involving the B.Ed students in different universities in South Africa. The longitudinal research project emanated from the findings of a previous study on teaching mathematics in the Foundation Phase Programme. The research involved the coordination of a longitudinal study on the development and implantation of a baseline online assessment using first and fourth year primary school teacher education students (B.Ed Foundation Phase Level) in both Mathematics and English language and literacy between 2018 and 2020. This study tracked student-teachers' knowledge of the methodology for teaching mathematical concepts in primary schools from the commencement of their B.Ed Foundation Phase Mathematics Programme till they graduate at universities in South Africa. The study adopted a survey design of a correlational type and used the convenience sampling technique to select the participants who responded to online questionnaire which was used for data collection. This report is based on the performances for the years 2017 and 2018 of first-year B.Ed Foundation Phase Mathematics students ($n=1494$). Frequency counts, mean, standard deviation, and percentages were used to analyse the data, while histograms and box-plots were used to describe the status of the participants. Tools used included comparison frequency distribution and percentages. The findings revealed that there were variations in the performance of students in the selected mathematical concepts over different periods of time. The study recommends that universities should re-design the Foundation Phase mathematics programmes in order to improve the students-teachers' knowledge of teaching primary school mathematics.

Keywords: Foundation Phase, online assessment, primary school, students, mathematical knowledge

Introduction

The aim of this study was to establish student-teachers' mathematic knowledge for teaching mathematics at the Foundation Phase level using longitudinal approach. Related studies have identified the fact that quality of teaching and learning is not achieved by "the wave of a wand" but depends on methods, content, learner and educator attitudes (Bagarukayo & Kalema, 2015; Mlitwa, 2006). This means that the teaching and learning of pre-service teachers in the colleges and universities should be a kind of participatory medium that improves knowledge for teaching and thinking abilities of students. Teaching and learning of mathematics at the Foundation Phase level requires specific mathematics knowledge which focuses on learners' understanding of mathematics (Adler, 2017; Usiskin, 2012). This, according to some researchers, should be based on three approaches that inform the teaching of mathematics in the primary school, thus topics approach, the process approach and the conceptual fields approach (Long & Dune, 2014; Webb, 1992). These lead to knowledge construction that supports new interventions during the training programme. In view of this, the current study was based on constructivist approach to teaching of mathematics since the

participants' knowledge for teaching mathematics was tested based on how they responded to the online assessment.

A number of studies indicate that involving pre-service teachers in different assessment strategies enhances their understanding of professional development and give them opportunities to be critical thinkers in the context of mathematics education (Evans, 2014; Burroughs & Luebeck, 2010). These underpin the long-awaited campaign for educationalists to do their best to change classroom settings in order to bring about much-needed and stronger mathematical reasoning. Thus, teachers should have sound subject knowledge when presenting both content and pedagogy to their learners. This is only possible when both leaders in education and subject teachers/lecturers devise a programme that promotes and facilitates the professional learning and development of their teachers in their schools (Friesen & Francis-Poscente, 2014; Evans, 2014). This training of pre-service teachers should be a form of internship to which all teachers are exposed so as to prepare them adequately for the profession and research activities in order to improve the quality of teaching and learning in our education fraternity (Gokalp, 2016). This type of training is all about issues around teacher's knowledge for teaching in general and its implementation in the classroom situation. Being able to explain why and the meaning of mathematical concepts to a primary learner requires much more than merely being able "to do" in the teaching and learning situation (Friesen & Francis-Poscente, 2014). The presentation of one's lesson should develop a frame that represents the blending of both the content and pedagogy into an understanding of how both a particular lesson and mathematical problem are organised, represented and adapted for successful instruction that brings meaningful understanding to a learner (Adler, 2017; Usiskin, 2012; Shulman, 1987).

The implementation of this programme at the Foundation Phase level was to establish whether or not this would be a successful model for implementing a new, centralised Foundation Phase mathematics curriculum, specifically impacting pre-service teachers' mathematics knowledge for teaching habits and further developing their beliefs and attitudes to successful classroom teaching as well as learners' learning of mathematics (King, 2014). This, the researcher believes can help solve the problem of misconceptions among learners in the learning of mathematics in schools.

Much research has been conducted on ending the trends of poor performance in mathematics and science among South African learners due to ineffective methods of teaching, underqualified educators as well as limited content knowledge that has bedevilled the teaching profession (Pournara, Hodgen, Adler & Pillay, 2015;). What has not been widely researched in South Africa or globally is the question of Foundation Phase mathematical knowledge for teaching using a longitudinal approach, hence the current study. Looking at the ongoing outcry about poor performance of learners in mathematics as well as the curriculum implementation changes in the country, the current study on Foundation Phase students provides empirical evidence of the successful incorporation of students' mathematical knowledge for teaching using online assessment in the country's universities. This is based on the fact that successful curriculum reform relies mostly on teachers' commitment and professional development (Fetters, Czerniak, Fish & Shawberry, 2002). The above confirms the findings by Fetters *et al.* (2002) when they argue that curriculum reforms must conform to teachers' pedagogical practices that should not challenge the certainty of why and how they should change their practices. To address the above problem successfully, the following research question was posed: In what ways can longitudinal study approach be used to track student-teachers' progress in their knowledge for teaching of mathematics in

primary schools from their initial year to the last year of the B.Ed Foundation Phase mathematics Programme offered at the universities countrywide?

Research Methodology

Design

This research applied a positivist paradigm as well as a quantitative approach which formed part of a five-year, larger project within the Department of Higher Education and Training (DHET) to strengthen primary school teacher education known as PrimTEd in South Africa. A design-based research approach with an assessment stream was used. A survey design was utilised for this study. Research has shown that design-based research (DBR) is relatively new in the field of education (Anderson & Shattuck, 2012). However, it is worth knowing that DBR is quite appropriate for successful intervention in schools' programmes, especially for students who are studying to become future teachers or researchers in the field of education. It is further believed that DBR has the potential to bridge the gap between educational practice and theory because it aims both at developing theories about domain-specific learning and the means that are designed to support teaching and learning, looking at the purpose of the study (McKenney & Reeves, 2012; Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006).

Sample procedures and instrument(s)

The study's sample comprised 1494 (female=994 and male=500) first-year Bachelor of Education (B.Ed) students. The respondents were randomly selected based on the purpose of the study. Data collection instruments included individual, baseline, online assessment tasks administered at the various universities in the country. The closed-ended questionnaires were electronically emailed to the students with the password and the stipulated period required to complete the task.

Reliability of the Instruments

The analysis and interpretation continues at this point using the Cronbach's Alpha analysis. The observed Cronbach's Alpha is 0.84. Cronbach's Alpha is a measure of internal consistency, which is supposed to be an indicator of the reliability of a given data set and the instrument that was used to collect the data. The Cronbach measurement is supposed to reflect the relative association existing among the observed responses in scale form that shows the exactness in data-making by the instrument used to collect the data in question. Accordingly, the observed Cronbach's alpha, being higher than 0.70, demonstrates a high degree of consistency among the items on the instrument. The high value of 0.84 speaks to the data and its collection process.

Ethical considerations

Ethical clearance was obtained from the respective offices and departments before the commencement of the study. Thereafter, consent forms were given to the participating students.

Data analysis

Descriptive statistics (frequency distribution and percentages) were used to analyse the data.

Result

Table 1 shows the participants of the study. Two universities participated in the pilot study. The number of students who took part in the pilot study was 317. Furthermore the table shows that 1494 students took part in the entire study.

Table 1. Mean mark determination for 2017

The assessment comprised 50 marks. The scores were converted to percentages.

	<i>n</i>	Mean	SD
National	317	45.89	14.84

Longitudinal comparison

According to the information in the table above, as obtained by the researchers involved, 317 students participated in this study for the year 2017. The observed results showed that by using two analysis methods, the outcome depicted a significant and noticeable variability among the observed marks.

In view of the distribution percentile graph shown below, it is quite clear that three categories emerged from the data, namely:

Category 1 comprised quartiles from groups 0-9, 10-19, 20-29 and 30-39; category 2 comprised three quartiles, namely, 40-49 and 50-59 while category 3 comprised of 60-69, 70-79 and 80-89. The three categories can be described respectively as: poor performance, average performance and good performance, based on the marks attained.

The specific quantile procedure is the decile as a position average. According to decile procedure, decile demarcations show that the first decile constitutes 10%, the second decile constitutes 10% and so forth. The analysis shows that the highest percentage was for those in the 40-49 quantile mark, followed by the 30-39 and 50-59 quantiles.

The average performance for 2017 was established to be 45.89 with a standard deviation of 14.84. The output demonstrates poor performance with heavily scattered performances leading to a high standard deviation of 14.84. Another analysis tool used was a box-plot. The box-plot presents a quartile percentage distribution of the observed marks. Box-plots are used for percentage distributions and to determine the variability of the data and, in addition, show the associated outliers in the data. The quartile measure of presentation of analysis is a five-point indicator analysis: The largest mark, the lowest mark, the median, and the first and third quartiles. The quartile presentation shows the marks divided into four position groupings. They form quantiles of 25% each. From the quartile figure (box-plot), one notes regarding the output that:

- The first 25% of the participants represented those who obtained the quartile 1 mark or below. That is to say, 25% obtained a 23% mark or below;
- 25% obtained more than 23% but less than, or equal to, 44%;
- 25% obtained more than 44% but less than, or equal to, 70% mark;
- The last 25% obtained more than 70%.

Cumulatively, 50% of the participants obtained less than 44% and, equally, 50% obtained more than 44%. This means that 44% was the median mark (the average position mark). On the other hand, however, depending on the objective of the analysis of the quantile usage, it is often of practical importance that the researcher may be concerned with the cumulative capability of the distribution where the interest could understand the probability that a

randomly picked B.Ed student obtained less than a certain arbitrarily chosen mark. The best approach here is the specific use of cumulative percentages. Similarly, should one be interested in understanding the number of students who obtained between mark A and Mark B, then the best approach is the utilization of cumulative percentages. Here one could claim, for example, that there is a 75% chance of a B.Ed student obtaining less than a 70% mark. Equally, one may conclude that there is a 25% chance for a B.Ed student, in the population where the representative samples were selected, of obtaining a greater than a 70% mark. These and other probability statements are reminiscent of outcomes of these calculations.

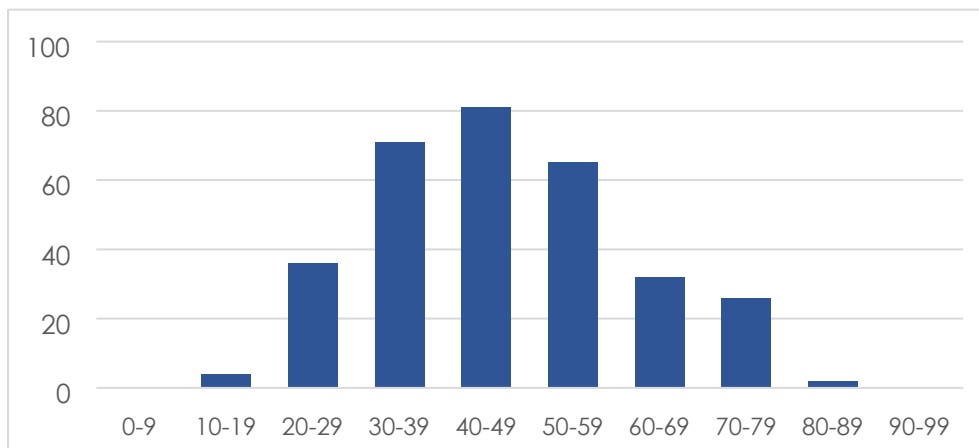


Figure 1. Figure presenting a decile distribution of the 2017 marks

Distribution: 5-point summary

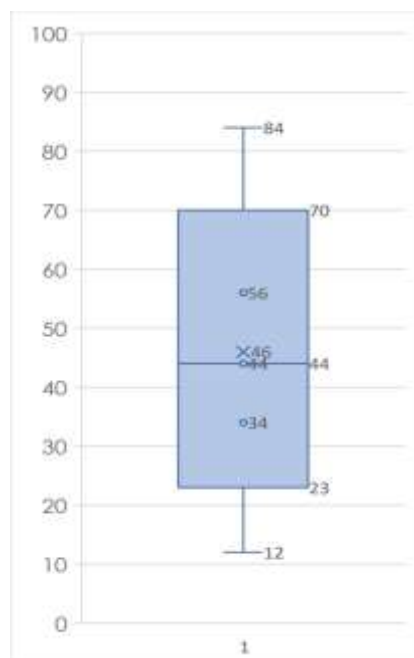


Figure 2. Figure presenting a five-summary distribution of the 2017 marks

Relative performance by topic, cognitive and pedagogy

Figures 3 and 4 show bar graph presentations of the mean marks obtained for the year 2017 against means of marks obtained under different mathematical concepts including: whole

numbers, geometry, rational numbers, algebra and general measurements. Clearly, greater topic comprehension was realized under the geometrical and algebraic mathematical concepts for this class of participants in the two topics where records showed comparatively higher performances. The two mean marks obtained were 66.50% and 58.40%, respectively. These two means were followed by whole numbers (48.94%) and rational numbers (43.80%).

Relative performance of students in each mathematical concept

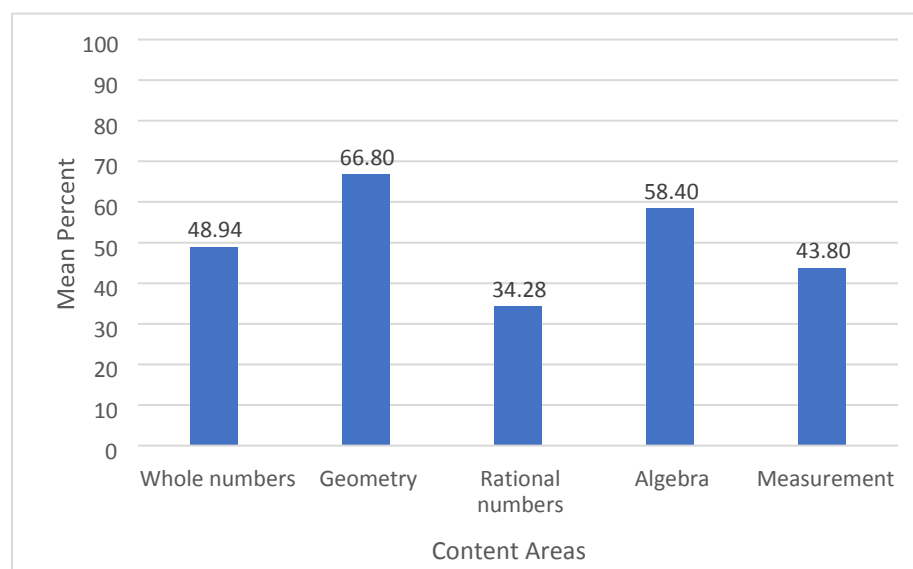


Figure 3. Figure presenting the relative performance by topic

Regarding the “relative importance based on topic considerations” shown in Figure 4, marked differences in terms of performance were expressed by cognitive demand levels. The figure further shows mean mark performances which demonstrate a high degree of variability where marks obtained ranged from significantly high percentages to low performance (56.01%); 40.32% for higher performance and a low rating for pedagogy performance of 17.54%. These were obtained by the participating university education degree students.

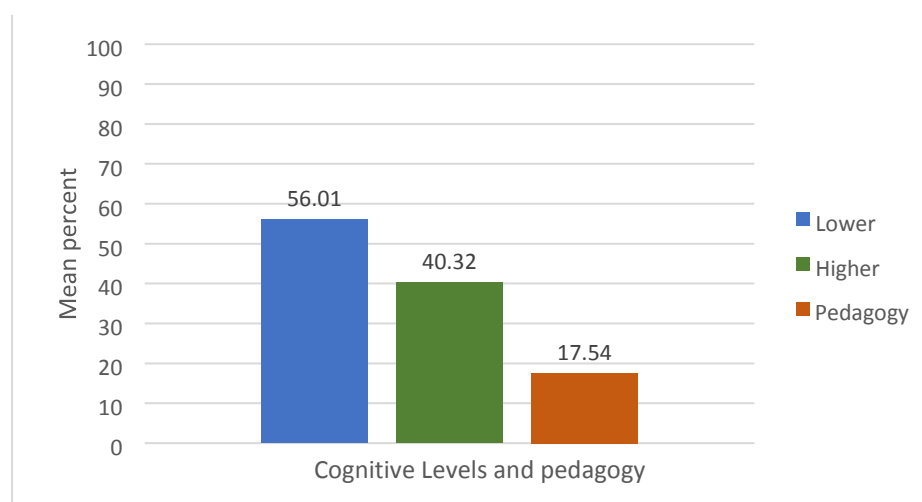


Figure 4. Figure presenting the relative performance by topic

A longitudinal comparison based on two-year data (2017 and 2018)

Comparison of means

The assessment comprised 50 marks. These were converted to percentages. The total numbers of participants for 2017 and 2018 were 264 and 1177, respectively. Table 3 shows that the average mark obtained for 2017 and 2018 was 51.80% and 48.46%, respectively.

Table 2. Mean mark determination for 2018

	<i>n</i>	Mean	SD
National	1177	48.46	16.18

Table 3. Comparison between 2017 and 2018 years

	2017		2018	
	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)
National	264	51.80	1177	48.46
Annual change			913	-3.33

Distribution Per decile

Figure 5 shows that of all the participants, the majority (260 thus 22.11%) obtained between 40% and 49%. This was followed by 228 (19.38%) who obtained between 50% and 59% marks. The third on the list was a group of 226 participants (19.22%) who obtained between 30% and 39%. This converts to a cumulative total of 46.77% of those who passed the programme if the pass mark was 50%, however, it could convert to 68.87% if the pass mark were to be 40%.

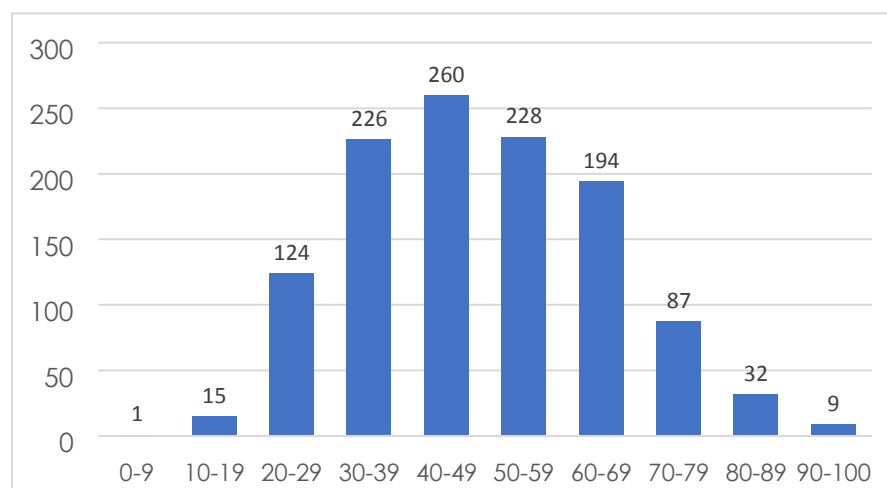


Figure 5: Decile frequency distribution of marks obtained

Distribution: 5-point summary



Figure 6: A 5-point summary

This figure reflects the following observations:

- The lowest mark obtained was 6% (the lower whisker).
- The lower quartile observed was 21% (quartile 1).
- The median mark was 48%.
- The upper quartile observed was 78%.
- The highest mark obtained was 96%.

Relative performance by topic (national mean)

Figure 7 shows that according to mathematical categories, the best performance was in geometry with a national average of 60.42%, followed by general measurements for which 56.15% was scored. The third on the list was whole numbers, for which an average of 53.47% was obtained. From the following figure, one therefore observes that the lowest-performing category was rational numbers, for which an average mark of 41.02% was obtained. Overall, these percentages reflected a low standard, particularly at a national level.

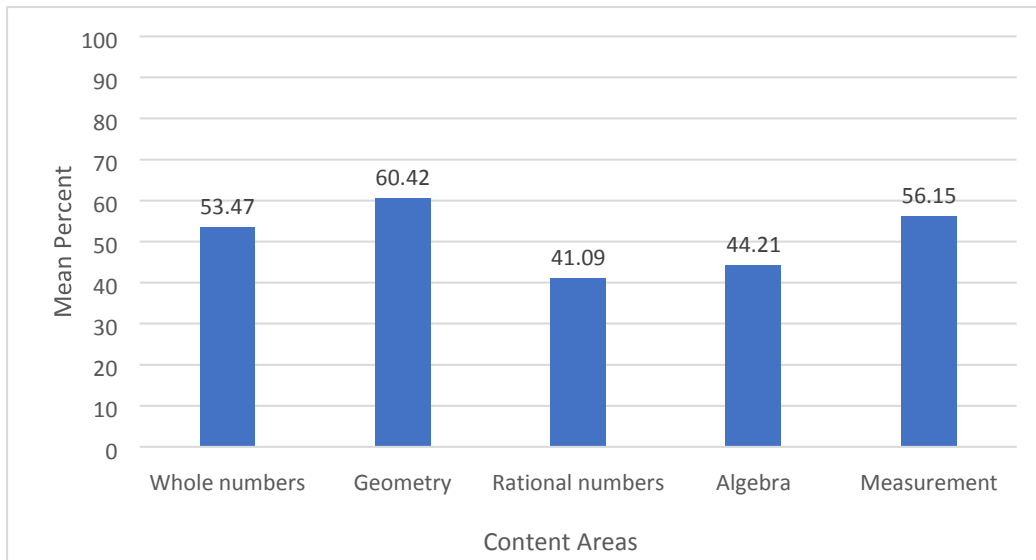


Figure 7. Relative performance by topic (national mean)

Relative performance by Cognitive Demand Level (national mean)

The relative performance by cognitive demand level as shown in Figure 8 indicates that “lower cognitive demand level” had the highest performance with 58.77%. This was followed by “higher cognitive demand level”, which scooped an average of 40.20%. The lowest performing was “pedagogy cognitive demand level” which scored a 30.02% average mark.

Comparatively, this means that choosing the “lower cognitive demand level” is more assuring than the other two demand levels.

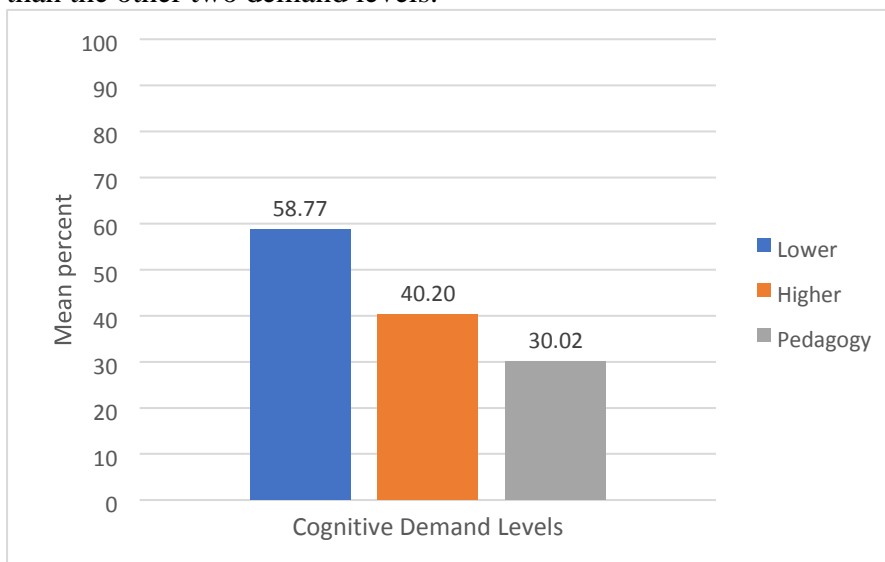


Figure 8. Relative performance by cognitive demand level (national mean)

Discussion

The study revealed that Foundation Phase students’ mathematical knowledge, demonstrated across selected topics, was average, and based on the marks obtained for different mathematical concepts. They being whole numbers, geometry, rational numbers, algebra and general measurements. However, it is clearly shown that greater topic comprehension was

realized among students for the geometrical and algebraic mathematical concepts for this class of participants in the two topics where records showed comparatively higher performances. This means that Foundation Phase students' mathematical knowledge should always be developed in order to overcome any correlating under achievement among learners. It is well known that the under achievement of learners in mathematics is not just a concern for a particular country, but has become a global concern over the years (Pisa, 2003), as stated in Mohamed and Waheed (2011). According to the Ministry of Education of the Maldives (MoE, 2011), only 28,4% of students who participated in the GCE "O" level Cambridge Examination in 2007, passed with above 50%. The results of 2008 also showed a similar trend, where 66,8% of students scored below 50% (MoE, 2011). In terms of quality, the current study revealed that most of the learners scored below the 50% mark. These results tend to compare with what other researchers have found.

Related studies have identified the fact that quality of teaching and learning is not achieved easily but depends on methods, content, and learner and educator attitudes (Bagarukayo & Kalema, 2015; Mlitwa, 2006). This means that teaching and learning of pre-service teachers in the colleges and universities should be a kind of participatory medium that improves knowledge and thinking abilities of students. Teaching and learning of mathematics at the Foundation Phase level requires specific mathematics knowledge which focuses on learners' understanding of mathematical knowledge (Adler, 2017; Usiskin, 2012). This, according to some researchers, should be based on the following three approaches that inform the teaching of mathematics in the primary school and which may be taken singly or in conjunction when organising the curriculum: topics approach, the process approach and the conceptual fields approach (Long & Dune, 2014; Webb, 1992). These lead to knowledge construction that supports new interventions during the training programme.

A number of studies indicate that involving pre-service teachers in different assessment strategies enhances their understanding of professional development; in turn, this gives them opportunities to be critical thinkers in the context of mathematics education and encourages them to think as teachers (Evans, 2014; Burroughs & Luebeck, 2010). These underpin the long-awaited campaign for educators to do their best to change classroom settings in order to bring about much-needed stronger mathematical reasoning. Thus, teachers should have sound subject knowledge when presenting both content and pedagogy to their learners. This is only possible when both leaders in education and subject teachers/lecturers devise a programme that promotes and facilitates the professional learning and development of their teachers in their schools (Friesen & Francis-Poscente, 2014; Evans, 2014). The training of pre-service teachers is a form of internship in which all teachers are required to prepare adequately for the profession and research activities in order to improve the quality of teaching and learning in our education fraternity (Gokalp, 2016). It is all about issues around teacher's knowledge in general and its implementation in the classroom situation. When presenting a lesson to learners, the teacher should develop a framework that represents the blending of both the content and pedagogy into an understanding of how a particular lesson and mathematical problem are organised, represented and adapted for successful instruction that brings meaningful understanding to a learner (Adler, 2017; Usiskin, 2012; Shulman, 1987).

The implementation of this programme at the Foundation Phase level was to establish whether or not this would be a successful model for implementing a new, centralised Foundation Phase mathematics curriculum, specifically impacting pre-service teachers' mathematics teaching habits and further developing their beliefs and attitudes to successful classroom teaching as well as learners' learning of mathematics (King, 2014). This, the

researcher believes will help solve the problem of misconceptions among learners in the learning of mathematics in schools.

Findings

The findings of the study revealed that there were variations in the performance of students nationally over all the areas of interest and over different periods of time. This is cause for concern: Foundation Phase lecturers need to re-design their programmes in order to improve the Foundation Phase students' knowledge of teaching primary school mathematics.

Conclusion

The study was undertaken to check initial teacher education programme design to assist Foundation Phase teachers' method of teaching mathematics to the beginners in the country. The data presented in this paper have been fully interrogated by the researcher, based on particular years. There has been a steady increase in performance of the task administered to this category of students in general but a decrease in "higher cognitive demand level" which is very sensitive to the acquisition of basic mathematical knowledge for the development of learners' thinking abilities in basic mathematics. This means that the impact on teaching and learning will be identified to the fullest when compared with the combined subsequent assessment scheduled for the period of this project, and changes, if possible, may be effected in the near future for the betterment of the PrimTEd programme in the country.

Recommendations

Based on the findings of this study, the research recommends that subsequent assessment schedules of this nature for the period of this project be compared in order to identify the impact of teaching and learning to the fullest. Changes ought to be effected sooner rather than later if possible, for the betterment of the PrimTEd programme in the country in the near future.

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