

**INTEGRATION OF DIGITAL MEDIA AND PEDAGOGY IN THE TWENTY FIRST
CENTURY CLASSROOM: A SURVEY OF SELECTED HIGH SCHOOLS IN
EASTERN CAPE, SOUTH AFRICA.**

BY

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**Submitted in fulfilment of the Doctor of Philosophy in Communication, to the
Department of Communication, Faculty of Social Science and Humanities,
University of Fort Hare**

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APRIL 2023

The financial assistance of the National Institute for the Humanities and Social Sciences, in collaboration with the South African Humanities Deans Association towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at are those of the author and are not necessarily to be attributed to the NIHSS and SAHUDA.

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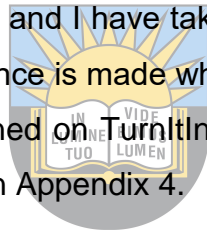
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DEDICATION

I am dedicating this thesis to a person that has meant and continues to mean a lot to me although she is no longer with us, my Grandmother Connie Vinah Maqolo. This is a woman that raised and taught me values and principles of life. She believed that in order to succeed you must carry yourself the way you want to be treated and give without expecting anything in return, that is having respect to yourself and others without studying their background. I pride myself in knowing I have become the woman you wished for and have achieved in my life and education. I thank you Maduna, Nokhala, Msuthu, your light continues to shine upon my life as I push more doors to open.



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ACKNOWLEDGEMENTS

I would like to thank my Supervisor, Prof O. Osunkunle for the support and patience he has shown towards the success of this research project. I would also like to thank the Department of Communication in the University of Fort Hare for giving me the chance to fulfil my studies without hardships.

I acknowledge the NIHSS/SAHUDA for funding my research project from 2016 to 2021. This has been a prosperous journey at the end as I have learnt a lot from the workshops and conferences that were designed for my development throughout this process.

I also thank my family, friends and colleagues for the support I have received thus far. I would also like to extend my appreciation to the Principals of the schools that I worked with in this project for ensuring that I receive all the necessary information and assistance. Hence, all the participants who availed themselves have made my journey less of a heartache.

Therefore, I would like to express my sincere appreciation to everyone for each contribution made in order to make this research project a success.



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ABSTRACT

The essence of this thesis was to study the effectiveness of integrating digital media technologies within the pedagogical approaches adopted and implemented in private and public high schools in a comparative manner. The study looked closely at private and public high schools of the Eastern Cape Province, to study the gaps of accessibility to technology by schools. The study identified the Eastern Cape Province as having a problem of poor performance in matric results at the end of each year as compared to other South African provinces. In order to select the relevant sample for the study, the researcher has utilized two secondary schools (private and public) in Makhanda (Grahamstown) and one public secondary school in Alice. The pragmatic paradigm was used to inform the study and used the mixed methods approach to data collection. The researcher distributed closed ended questionnaires to the learners in the three selected secondary schools and semi-structured interviews for the principals of the schools. The key findings reveal that the digital media tools are used for the teaching and learning purposes as well as communication to the schools' stakeholders. The findings also revealed that various online platforms are utilized for teaching and sharing of information. For example, D6 and Ibambisa School Communicator app, WhatsApp groups for learners, Facebook, Instagram and School website for potential stakeholders. Hence, the results of this study should contribute to the field of ICTs and education in the country to solve the problems facing the teaching and learning systems of private and public schools of the Eastern Cape. Most schools (especially the public) do not have access to digital media tools in their classrooms. Thus, they still depend heavily on the textbooks, which may be outdated or not enough for all learners. In response to the issues faced by the Eastern Cape secondary schools and the findings, the researcher has suggested a model named the Digital Media and Pedagogy Integration (DMPI) Model of Communication. This model will contribute to the body of knowledge by providing advice to the Department of Basic Education on how teachers and learners can utilize digital media tools effectively. Also, the study has recommended that there is a need for provision of computer literacy training for teachers in secondary schools in this digital age.

Key words; digital technologies, digital media, education, high schools, teachers and students.

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APPENDIX A: STUDENT QUESTIONNAIRE

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LIST OF ACRONYMS

App- Application

4IR- Fourth Industrial Revolution

CD- Compact Disc

CPS- Cyber Physical Systems

DOE- Department of Education

DVD- Digital Versatile Disc

E-Learning- Electronic Learning

FL- Flipped Learning

GDP- Gross Domestic Product

GNU- Government of National Unity

ICTs- Information and Communication Technologies

iPod- Interface Protocol Option Devices

IT- Information Technology

MDG- Millenium Development Goals

MLDs- Mild Learning Disability

MSN- Microsoft Network

MP3- Moving Picture Experts Group Layer-3 Audio

LCD- Liquid Crystal Display

PDF- Portable Document Format

SMS- Short Message Service

TL- Technology Literacy

VAK- Visual, Aural and Kinaesthetic

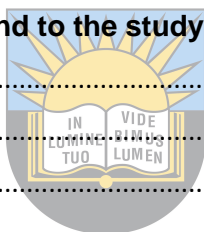
Wi-Fi- Wireless Fidelity



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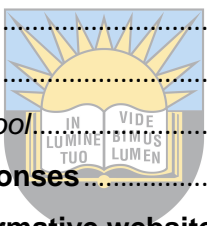
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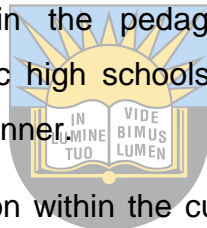


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CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

The advent of the twenty-first century has seen several technological developments, which affect almost every aspect of our lives. At the core of this is the ever-growing use of digital media or Information Communication Technologies (ICTs) in all realms of life from the workplace, schools, and personal levels. Hanimoglu (2018: 96) states that school reforms have focused on promoting interaction between teachers and learners to enhance the level of teaching in the modern-day era. Thus, new inventions have led to the use of digital media tools that enhance the teaching and learning approaches. The main aim of this thesis is to investigate the integrating digital media technologies within the pedagogical approaches adopted and implemented in private and public high schools of Makhanda and Alice towns in Eastern Cape in a comparative manner.



There are studies on ICT utilization within the curriculum in Eastern Cape schools. Researchers such as, Ford (2018), focused on high schools in the Cofimvaba circuit where the private schools have full access to ICT tools, while government schools mostly have school computer labs that are not operational. There is still resource constrained governmental schools that are still focusing on infrastructure and access challenges. Ford (2018) states that “Zamuxolo Junior Secondary School, became the first school to earn a projector via the “Earn as You Learn” system, despite being one of the most disadvantaged schools in the project”. According to Ojo & Adu (2018: 1), also studied the effectiveness of ICT embedded curriculum in the Eastern Cape states that “the development of education in South Africa has undergone various stages of transformation considering the development in the last two decades (Isaacs, 2007:2). The National Qualification Framework for schools based on Outcomes Based Education (OBE), is central to this transformation (Isaacs, 2007:2) as OBE has considered the 21st century as a period of dramatic change and development, with roles of teachers as learning mediators, curriculum interpreters, leaders, managers and administrators, facilitators of learning, subject experts,

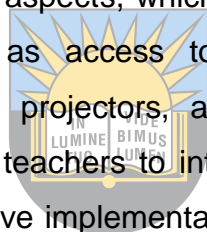
lifelong learners, learning designers, programme innovators, and teaching material developers and so forth. Similarly, Mdlongwa (2012) argues that ICT is a global network in which ideas are exchanged and information and knowledge is shared through devices such as cell phones or computers used to connect people. Bottino, 2003 cited in Ford (2018), states that the main reason for the introduction of ICTs in the educational curriculum is to enhance the effectiveness of teaching and learning. Furthermore, Oyeridan-Tidings et al. (2021) conducted a study around Fort Beaufort in Eastern Cape high schools use of technology in education and found out that “learners’ access to educational information is constrained by inadequate provision of ICT infrastructure, restricted access to ICT tools, regulations for use of personal ICT tools and absence of information literacy for high school learners”. The researcher believes that digital media tools in their nature have the potential to contribute to creative participation in an effective and appropriate integration.

Therefore, this study has addressed a phenomenon that has not been fully studied by previous researchers in the Eastern Cape. The researcher has identified the Eastern Cape Province as having a problem of poor performance in matric results at the end of each year as compared to other South African provinces. The researcher assumes that there is a gap of accessibility to digital media tools by public schools as compared to private schools. Therefore, this study is unique in the sense that, the researcher is focusing on comparing the teaching and learning that is integrated into technology in both school structures. The manner in which the researcher has conducted the study is to clearly state the effectiveness and need to properly incorporate the digital media tools into the curriculum. Hence, the results of this study will contribute to the field of ICTs and education in the country to solve the problems faced by the Department of Basic Education pertaining to issues of teaching and learning systems in private and public schools of Eastern Cape. Most public schools in particular do not have access to ICTs or any digital media tools in their classrooms.

Thus, according to Hanimoglu (2018: 98), the modern-day teaching and learning approaches allow the learner to be a problem solver, creative thinker, and innovator of new knowledge. Therefore, the researcher believes that by enabling learners to research more on their own and giving them real-life problems, they ought to learn to be independent and develop skills to work better within teams. This can be done by

having teachers trained in digital technologies, who would guide the learners through their learning and avoid giving too much information in class. This can be achieved by unlimited access to ICTs and the internet for studying.

Hanimoglu (2018: 98) indicates that this allows the teachers to shift away from teaching approaches whereby they are the sources of information in a traditional classroom to a more constructive approach where learners are active participants in knowledge production. Therefore, this study becomes very important to look at the use and effectiveness of digital technologies in private and public high school performance. The researcher believes that the integration of digital technologies in the day-to-day learning process creates an environment where the learners can achieve better results due to access and availability of information virtually (Schere & Brito, 2020: 2). Therefore, this contributes to education in the sense of digital culture that takes place in high schools. Schere & Brito (2020: 3) emphasises that it is necessary to consider two central aspects, which are; firstly, access to basic digital technology infrastructures such as access to the internet network, personal computers, laptops, cell phones, projectors, and digital whiteboards. Secondly, continuous training processes for teachers to integrate these technologies into the curriculum would ensure an effective implementation process and results at the end of each academic year.



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Simon & Ngololo (2015), cited in Hanimoglu (2018: 96), suggest that the computers are considered a practical approach to promoting technology use in high schools. Most public schools still depend heavily on textbooks which are outdated at times or not enough for all the learners. The education sector faces many challenges when it comes to the implementation and adoption of technology such as computers in the schools, lack of proper space, security, and training for the teachers. Therefore, the researcher in this study points out that using ICTs in the classrooms enhances the teaching and learning processes and eventually contribute to the pass rate of the end-year results.

Therefore, the researcher chose a sample from schools in two Districts, Makhanda and Alice, both small towns in the Eastern Cape. Makhanda has a population of about 73 267 in the year 2021. Makhanda is the biggest town in the Makana Municipality which is also home to one of the successful universities in South Africa,

Rhodes University. Learners from these towns face several challenges related to their studies, such as the absence of proper libraries, poor or no internet access, and shortage of study materials and ICT skilled teachers for public schools. Furthermore, there is also a high rate of dropouts, alcoholic and drug abuse by adolescents in the surrounding townships. Thus, the use and access of ICTs in their schools may mitigate some of these problems.

1.2 PROBLEM STATEMENT

Eastern Cape is perceived as underperforming in their matric results compared to other Provinces in South Africa as it always comes almost at the bottom. In 2018, it scored 70.6%, just ahead of Limpopo, which was at the bottom with 69.4%. In the previous year, 2017 it scored 65.0%. The region's performance dipped in 2016 to 59.3% and 56.8% in 2015. This was after a relatively encouraging score of 65.4% in 2014. The researcher aligns with the view that the poor matric performance may be associated with a lack of proper technological resources and support, such as appropriate funding and access to ICTs by teachers and learners for teaching and learning.

However, Hanimoglu (2018: 97) mentions that the application of computers, the internet, and other gadgets has affected learning, student-teacher interaction, student-student interaction, and quality of education, among others. Therefore, this could assist public schools as they normally fall in the cracks of schools that underperform due to the required materials and resources shortage. This thesis draws on the differences between private and public secondary schools, regarding the availability of digital technologies and the ability to utilise them to improve teaching and learning processes.

Hence, there is a great need for learner-centred classrooms and a shift away from the current approach of teaching and learning that considers the teacher as the primary source of information. The idea is for learners to gain access to digital technologies, which will enable them to search for information rather than relying on prescribed notes by the teachers. The researcher articulates that the traditional teaching method does not challenge the mental capacity, innovation and problem-

solving abilities of a learner, as this practice can be regarded as spoon-feeding. Therefore, this thesis will also seek to establish whether digital technologies and internet access can assist learners to be more active rather than passive participants in their learning process.

1.3 AIM OF THE STUDY

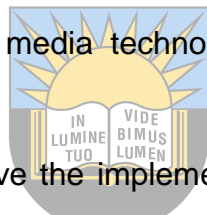
The study aims to analyse the effectiveness of digital media in pedagogy implemented by the Department of Basic Education for public and private high school learners.

1.4 RESEARCH QUESTIONS

1.4.1 How do learners and educators perceive the utilization of digital media for pedagogy towards improving learners' performance?

1.4.2 To what extent are digital media technologies for pedagogy influence the learners' pass rates?

1.4.3 What can be done to improve the implementation of integrating digital media into pedagogy regarding public secondary schools?



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1.5 OBJECTIVES OF THE STUDY

1.5.1 To determine the utilization of digital media for pedagogy towards improving the performance of learners and educators.

1.5.2 To establish the extent to which digital media assimilation into pedagogy impacts learners' educational performances.

1.5.3 To ascertain what can be done to improve the implementation of integrating digital media into pedagogy regarding public secondary schools.

1.6 DELIMITATIONS OF THE STUDY

The study investigates the effectiveness of integrating information and communication technologies in the pedagogies that govern the twenty-first-century teaching and learning processes and methods. The study assessed comparatively

three high schools situated in the Eastern Cape although the aim was to select four schools. The high schools selected for this study were St Andrews College, Graeme College, and Elukhanyisweni senior secondary school.

1.7 THE SIGNIFICANCE OF THE STUDY

The study makes an important contribution to the body of knowledge, specifically to information and communication technologies (ICTs) and education. The study investigated the gap between private and public schooling regarding the use and implementation of digital technologies for learning. This phenomenon is rarely studied from the perspective of public schools and their challenges concerning ICT usage and implementation. It is important that there is adequate technological equipment in both public and private schools. Irawan (2017: 2) mentions that the access and skill of computer literacy will benefit the learners in their careers, and the socio-economic standard of the province of the Eastern Cape, and the country.

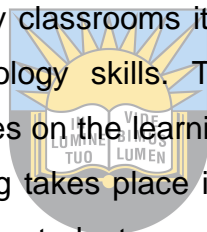
Thus, the study aimed to reveal the benefits and challenges encountered by public and private high schools when implementing ICTs into the curriculum. This study becomes essential in the body of knowledge, as it comes with solutions to the current issues hindering the growth of the use of ICTs in the Eastern Cape, as a province that is performing poorly in matric results. However, the researcher articulates that this research adds to basic knowledge in the spectrum of blended learning in high school education, how it improves learners' thinking, performance, and results.

The researcher believes in adopting a constructivist approach to teaching and learning whereby learners can navigate and produce knowledge and participate in problem-solving projects. Therefore, the study contributes to improved curriculum delivery to the selected high schools and the Eastern Cape as a Province. Hence, the researcher believes that the implementation and usage of digital technologies in education play an influential role in the teaching and learning process. Therefore, teachers and learners can use digital technologies available to them as means of knowledge production by searching for content on online platforms.

The usage of digital technologies in high schools contributes to the blended learning strategy, which is essential in the twenty first century. It enhances learner results and information sharing amongst learners. Therefore, Irawan (2017) suggests that

blended learning has four characteristics, namely: learning which combines technology; a combination of face-to-face learning, independent and online; the combination of effective learning, and teachers and parents as facilitators and supporters (Husamah, 2014: 16) cited in (Irawan, 2017: 3). Therefore, considering high school learners, teachers and parents have to be facilitators of the learning process, both online and face-to-face interactions. For example, during the Covid-19 pandemic, most private schools opted for distance or online learning in order to carry on with their curriculum delivery for the 2020 academic year. Teachers, parents, and learners can communicate through school applications, WhatsApp (and WhatsApp groups), and so forth.

Therefore, this is a cross-disciplinary study drawing from the education and information and communication technologies (ICTs). This is essential for this study because in the twenty-first century classrooms it is important for the learners to be equipped with the digital technology skills. This can be linked to the social constructivism theory which focuses on the learning processes of learners. Akpan et al. (2020: 49), states that “learning takes place in different ways at different levels” and learning theories describe how students process, absorb, and retain knowledge in the teaching/learning process.



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1.8 OVERVIEW OF THE RESEARCH METHOD

This study employed a mixed methods approach as the primary strategy to evaluate the role and effect of using digital media technologies in Eastern Cape high schools. The motivation behind using the mixed methods approach was to support the quantitative data obtained through questionnaires, with the qualitative data obtained through the follow-up interviews. This study focused on ICTs for education to identify the impact of using and accessing digital technologies and the internet for learning.

Therefore, a quantitative approach was employed using Likert scale questionnaires to collect data from the respondents (learners) to identify certain aspects contributing to digital media use in Eastern Cape high schools. In addition, the researcher found the qualitative approach to be relevant in the study as it enhances the nature of the findings and eliminate the chances of bias. Furthermore, the researcher has adopted

the thematic analysis to analyse the qualitative data while analysing the quantitative data through graphs. Chapter 3 provides a detailed discussion of the methodology process.

1.9 STRUCTURE OF THE THESIS

Chapter one focuses on the introduction and background of the study. It also covers the problem statement, research questions, aim and objectives, significance of the study, and as well as how the study was structured.

Chapter Two presents the literature review and the theoretical framework of the study. This section discussed topics such as; learning paradigms in the twenty-first century, blended learning in secondary school curriculum, The Fourth Industrial Revolution (4IR) and education, cyberbullying amongst learners, the flipped learning approach, and so forth.

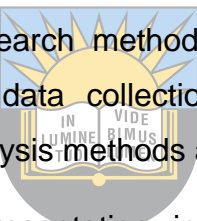
Chapter Three discusses the research methodology. The research methodology entails the detailed methods of data collection and procedures followed. The research instruments and data analysis methods are also discussed in this section.

Chapter Four contains the data presentation, interpretation, and discussion of the findings. The analysis and presentation of the data is according to each school studied. Thus, qualitative and quantitative analysis for each school is presented and discussed separately.

Chapter Five focuses on the conclusions and recommendations of the study. This section discussed the details of the findings providing a conclusion and suggestions that are necessary for future research. The researcher aimed to achieve the objectives of this study and present findings following (or perpetuated by) the problem and research questions.

1.10 CONCLUSION

This chapter focussed on the introduction, background of the study, problem statement, research questions, aims, and objectives of the study. It contains the significance of the study, an overview of the research method, and the thesis structure. Therefore, the chapter introduces the study to the reader as to what digital



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media is and how it contributes to the lives of people and especially learners in their learning environment. The next chapter focus on reviewing of literature related to the study, mainly having other authors found out.



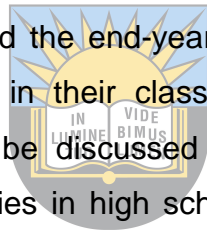
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CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter aims to identify, evaluate, and synthesise the relevant literature within the field of digital media integration in education in the twenty-first-century classrooms. It illuminates how knowledge has evolved within this field. It highlights what has already been done, generally accepted, emerging, and the current state of thinking around this topic. However, this study seeks to identify the gap in relation to the use of digital media technologies or relatively known as Information and Communication Technologies (ICTs), by private and public schools in the Eastern Cape.

Therefore, the literature that was reviewed in this study which identified related knowledge about incorporating digital media in the curriculum approaches in South Africa by the government. Also, how teachers and learners manage to enhance the teaching and learning process and the end-year results of students for the better, using digital media technologies in their classrooms. Thus, the researcher has identified the following topics to be discussed in detail; characteristics of digital media in the classroom, pedagogies in high school education, information society, and education.



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Other issues that were covered include the characteristics of an information society, the fourth industrial revolution, and education, blended learning in high school education, learning paradigms in the twenty-first century, Information and Communication Technologies (ICTs) and education, digital media integration into the curriculum, and misconceptions associated with ICT integration.

2.2 DIGITAL MEDIA IN THE SOUTH AFRICAN CLASSROOM

The government has implemented various strategies to close the digital divide between private and public schools in the country. However, the pressure to incorporate technology into the South African classrooms became a necessity in 1994 when it was announced that all schools must be connected by the year 2000 (Strawser, 2017: 149). The researcher articulates this as one of the strategies to improve the standard of education in the country's remote schools, especially the previously disadvantaged schools. Some public schools are still struggling with

access to basic education resources because of their location. The researcher believes that, with regards to public schools in the country, especially in Eastern Cape, the government to date has done not much. They are still facing many challenges related to ICT infrastructure and training.

Furthermore, Lesame et al. (2012) stipulates, “the internet as a medium has most of the characteristics of digital media, such as interactivity amongst individuals, convergence and hyper textuality. Hence, the researcher believes that implementing digital media technologies into the curriculum has various benefits for teaching and learning, such as two-way communication amongst learners. This is something of great importance because digital media includes other characteristics such as “digitality, dispersal and virtuality” (Lister et al., 2005: 14-34)” cited by (Lesame, Sindane & Potgieter, 2012: 10).

The various characteristics of digital media include but not limited to the following; digitality, which refers to the “use of new, fast and high bandwidth mediums such as the internet instead of the old, slow and low bandwidth mostly referred to as analog mediums (or technology) such as print, radio” and so forth (Lesame et al., 2012: 10). However, digitalisation and technology trends entail the combination of “convergence” of technologies for creating (or producing) and disseminating information to the audiences (or learners).

Thus, using digital technologies for teaching and learning is bound to assist in fast tracking the production of study materials and submission of study tasks such as assignments and research projects. Thus, interactivity will assume unlimited interaction between the teacher and learners about issues concerning their schoolwork. The learners are also able to navigate through the internet in order to be able to construct or assume their own perspectives around certain topics. Lesame et al. (2012: 12) suggests that this is allowed by hyper-textuality, which is “the language of the internet.”

Using the internet for learning also accommodates different individuals (or learners). Through the internet, people are able to produce and disseminate information that speaks to different people. Thus, one can navigate through what speaks to them, and that, Lesame et al. describe as dispersal (2012: 13). Furthermore, Lesame et al. argue that “activities that are carried out on the internet” can be referred to as “virtual

activities or virtuality” (2012: 13). The online platforms allow the learners to produce content or information shared amongst other learners through the same platforms. However, bringing digital tools in the classroom in this age is not overrated because it is a useful skill that learners require in order to make it (or survive) in modern South Africa. For example, daily tasks are created on computers using the internet in higher institutions and workplace environments. Also, the channels of communication, as well as sources of information have been converted into the internet (cyber) space (platform) because learners now access books online as well, and one has to bear in mind that it is a cost-effective and time-efficient platform.

2.3 LEARNING PARADIGMS IN THE TWENTY-FIRST CENTURY

Teaching and learning of the twenty-first century may be different and advanced but, other forms of learning served as the foundation for the learning and teaching paradigms before digital literacy (Strawser, 2017: 14). These included teaching and learning informed mostly by basic prescribed textbooks and study guides. Strawser further states that understanding the learning paradigms that have informed education to date is important in identifying the areas that need development concerning the digital media paradigm and secondary school instruction (2017: 14). Hence, Strawser (2017), argues for improvement on the paradigms and approaches of education used prior to the new media paradigm and not to eradicate or shift away completely. Thus, the researcher believes that this allows teachers and learners to benefit from the conventional learning methods while also using the digital media. For example, traditional methods of teaching and learning constitute the face-to-face engagement between teachers and learners.

On the other hand, the digital media paradigm encourages the teachers and learners to use digital technology and the internet while surfing online platforms. Furthermore, the researcher also believes that employing the digital media paradigm increases communication by means of social media, email, and school websites for current and potential stakeholders. It is also depicted that digital media literacy influences the following:

Traditional literacy	Digital literacy
Learners concentrate on finding information	Learners are able to vet the information they find
Learners take notes in class Translating what they are taught	Curating Linking to what they already know
Prose composition	Multimodal composition <ul style="list-style-type: none"> • Information design • Data visualisation • Dynamic storytelling (video) • Coding/programming
Static artifacts	Dynamic assets (multiple, diverse, reusable)
Learners only learn from teachers	Learners teach themselves
Knowledge is permanent (memorizing information and class notes)	Everything is prone to change (applying their knowledge and examples)

Table 1: Traditional and digital literacy (Strawser 2017:15)

2.4 CHARACTERISTICS OF AN INFORMATION SOCIETY

Antonijevic (2018: 1) suggests that connections and mutual dependence between the main characteristics of information society and education inside information society are very complex. Antonijevic (2018: 1) also argues that, education professionals and experts face enormous challenges when it comes to improving and modernising existing educational practices in today's information or knowledge society. However, these types of challenges and needs have always existed; they are not as new. Throughout history, in any society that had a stronger intention of its own development, this type was expressed through the need to improve the

effectiveness of education practice. Sometimes the spirit of the time is conditioned by radical social changes and the rapid development of science and technology. Then, a great responsibility for the fundamental re-evaluation of the existing education system's structure is imposed on certain generations. Undoubtedly, the need to introduce information technology into the education system and educational practice is increasingly being imposed. This is precisely because of the key improvements in the educational practice that can be achieved by using ICTs in the field of education (Antonijevic, 2018: 44).

However, Antonijevic (2018: 45) also states that, despite the undoubted advantages of digital learning and the realization of effective education process emerging from the implementation of information and communication technologies, in the practice of formal education, there is still a persistent tendency of domination and wider presence of classical methods of education, teaching, and learning. It is evident that a large number of students at home use the internet and educational multimedia for learning and homework assignments, as well as other types of obligations arising from the realization of school programmes.

Using these educational materials, students, without professional help and guidance, often come up with information that, by their actuality, goes beyond the knowledge of their teachers in this area. Based on this fact, the exceptional educational potential of the internet and educational multimedia can be seen (Antonijevic, 2018: 45). Thus, the time has come to begin work on the systematic implementation of ICTs into the mainstream educational practice. The researcher similarly believes that ICTs should be included as a subject of study as well.

This will enable the learners to capture the complexities of using technology at a young age and grow as they do with languages. Antonijevic (2018: 45) also adds that the potentials of information technology are rapidly increasing year after year, while the losses and consequences of ignoring these trends are growing. The gap in this sense in reality will be difficult to compensate in the future. Nevertheless, the implementation of ICTs in education is still viewed primarily as an easy, interesting alternative form of transferring and acquiring knowledge.

2.5 INFORMATION SOCIETY AND EDUCATION

The substantial expansion and accelerated development of information technology over the past 40 years has caused significant economic, social, political and cultural changes globally. Pelgrum (2001: 165) mentions that the industrial society of the 19th, 20th, and 21st centuries gradually but continuously gave way to a new form of socio-economic organization known as information (or post-industrial) society. The socioeconomic changes are radical, lasting, and irreversible. The new socio-economic, political and cultural reality necessarily implies different consequences in all areas of social life, and therefore in all areas and at all levels of institutional education.

The features of the education system in the information society, bearing in mind the complexity of new challenges and the potential of the newly created opportunities brought by post-industrial societies, require an extensive, pervasive multidisciplinary scientific analysis Pelgrum (2001: 167). Building an education system in the information society presents an extraordinarily complex and time-consuming process. It is important that in today's designing of education for the future, the course of its development should be placed on stable foundations.

In order to be a competitive and knowledge-based society, the economies of each country must become better at creating knowledge through research and development, in the distribution of knowledge by education, and apply knowledge through innovation. Pelgrum (2001: 168) suggests that this is imposed as one of the critical conditions for the development of society and the economy. Therefore, as one of the basic characteristics of the information society, that is the knowledge society. Pelgrum (2001: 168) further states that in order to keep pace with modern trends, which are crucial for economic development, society must have a large percentage of a highly educated population and large state investment in education, science, and research.

Also, as the imperative of modern society, there is a need to encourage and create conditions for lifelong learning, among other things, through the formation of a quality and accessible information and communication infrastructure (Pelgrum, 2001: 169), which should be directly a platform for broad and easy access to information. As mentioned above, education has a central social role in the knowledge society, and the education system is its vital institution (Drucker, 2001).

However, according to Rust (2017: 168), “the unpredictability of pedagogical design resonates loudly when digital media collides with official classroom spaces”. He argues, “Digital media is more than just a collection of digital or screen-based devices or platforms. Therefore, it encompasses a conglomeration of shifting tools, practices, norms, and expectations that help create particular kinds of spaces, activities, and ways of learning in the classroom” (p. 168). Tensions are present when classroom teacher’s aim to integrate digital media pedagogies and tools into English curricula, whether planning for student’s utilization of smartphones (Ehret & Hollet, 2014), multimodal forms of writing and production, or blogging and social networking. Furthermore, Roztocki, Soja & Weistroffer (2019: 1) indicate that the implementation and use of ICTs also play an essential role in socioeconomic development.

Liyoshi & Kumar (2008) hold that knowledge should include most of the society so each individual can use their knowledge to improve, select what is relevant in a given context and understand what has been learned. All this is a crucial precondition for adapting to rapid changes in the environment where individuals live and work. Knowledge is becoming more and more pronounced to represent a strategic social and economic resource, the only natural resource that society can build and improve (Jarvis, 2000). Countries that invest more in education and training have significant social and economic benefits, a higher level of GDP, and thus a better quality of life.

This is one of the main reasons education must be treated as an essential developmental resource in society and economy. The modern world is becoming richer in information that we receive through a variety of media and other sources of knowledge and information. Today, knowledge means not only knowledge of facts but also various types of abilities and skills to use this knowledge immediately to solve specific problems (Liyoshi & Kumar, 2008). Therefore, education today aims to acquire static knowledge and knowledge on the level of facts and developing different skills to apply it immediately to solve any particular problem in an individual’s professional or everyday life. There is a need for each individual to form the capacity to process information in order to gain any benefit from the knowledge and information they possess. In this context, it is very important to develop the activities of connecting information and creating knowledge from information. Problem solving and decision-making should be based on functional facing with

contradictory information and data. Liyoshi & Kumar (2008) also state that the information society is based not only on implementing ICTs in which knowledge is a worthy product but also on a society that imposes new ways of organizing to set new roles to the education system. The researcher believes these roles refer to teaching and learning remotely (or distantly) with the implementation of the ICTs into the classroom. For instance, during the Covid-19 pandemic, most schools have adopted the option of distance learning in order not to delay their academic year. Thus, different schools have been affected differently because private schooling operates differently from public schooling in terms of infrastructure and resources available to implement and adjust to the virtual learning system.

2.6 THE FOURTH INDUSTRIAL REVOLUTION (4IR) AND EDUCATION

The fourth industrial revolution is a term coined by Klaus Schwab, the founder and executive chair of the World Economic Forum. Schwab defines the 4IR as “a world where individuals move between digital domains and offline reality using connected technology to enable and manage their lives” (Xu et al., 2018). However, Oke and Fernandes (2020: 1) mention that business operations are undergoing radical changes that are necessary to survive. This is due to the disruptive effects of technological innovations. However, Oke and Fernandes (2020: 1) state that there is insufficient knowledge regarding the acceptability and consequences of the fourth industrial revolution (4IR) in the education sector.

While digital technology is advancing exponentially across many sectors, its ethical, pedagogical, and epistemological implications remain uncertain, especially in the education sector. This has become more salient especially with the impending fourth industrial revolution (4IR). Oke and Fernandes (2020: 1) further state that “even though the current knowledge regarding 4IR is still primitive and not clear for many sectors. 4IR is now a buzzword and gaining traction across different sectors of the economy”. Accordingly, 4IR, which is perceived as a fusion of many technologies and blur the boundaries between the physical, digital, and biological spheres, is now attracting increasing attention from policymakers, business practitioners, and academics. While the concept is increasing in importance and relevance across different sectors, there is no consensus on what it entails. Despite its existence since the start of the 21st century (Oke & Fernandes, 2020: 2).

A brief outline of the phenomenon at hand states that the first industrial revolution emerged in the 1780s, with steam power, making humans more productive. Then in the 1870s, the second industrial revolution emerged with the development of mass production and electrical energy (Gleason, 2018: 2). The third industrial revolution emerged with the development of IT and electronics, which enabled production that is more efficient. We are now in a new phase where the fusion of several technologies is automating production and knowledge.

There are many working to classify and name the phenomenon we are all experiencing. Fatar (2020: 8) mentions that 4IR discourse seeks to address the educational inequality of South Africa and the African context. However, it continues along a course of framing educational development in the neoliberal terms led by World Bank-mandated structural adjustments in the mid-1980s on the African continent. Therefore, since the 1990s, South Africa has embarked on educational reforms concerning educational access, qualifications, and curricula.

Fatar (2020: 8) also states that the socio-technical imaginary that 4IR discourse installs is oblivious to the dynamics of educational inequality. Instead, 4IR is based on the view that countries should pay closer attention to the vocationalization of education and training. Skills acquisition is posited as key to educational reform in anticipation of producing workers who are able to work in a changing labour market. The notion of digital skills has quickly become a core framer of policy for the post-school sector.

Furthermore, Fatar (2020: 8) suggests that in public policy, improved by popular media pronouncements, the emerging 4IR imaginary fails to account for the existing educational inequality in broader society. Instead, 4IR circulates the view that vocational and digital skills acquisition are the panacea for addressing such inequality. The changes that are occurring are happening now because humans have finally developed the computing capacity to store massive amounts of data, which in turn can enable machine learning. The outcome of this is the development of what are called cyber-physical systems (CPSs). The US National Science Foundation coined the term cyber-physical systems in 2006 with the hosting of several workshops on artificial intelligence and robotics and the declaration that CPS would henceforth be a major area of research (Gleason, 2018: 2). Gleason (2018: 2)

also states that the 4IR is ‘building on the Third digital revolution that has occurred since the middle of the last century.

2.7 BLENDED LEARNING IN THE SECONDARY SCHOOL CURRICULUM

Blended learning refers to the combination of the traditional learning systems with the digital media technologies or online platforms. Utami (2018) mentions that blended learning integrates some advantages of face-to-face learning and online learning to yield great results for the teaching and learning process. Utami (2018) also states that, the blended learning model encourages students to learn more actively as they have the opportunity to learn at their own pace. Thus, they can prepare themselves for the subject before attending a certain class lesson. Therefore, this provides for student-centred learning and reflects the value of twenty-first-century education (2018: 5).

However, Thorne (2003: 2) cited in (Irawan et al. 2017: 3), states, that “blended learning gives an opportunity to integrate the innovative and technological advances in online learning with the interaction and participation towards traditional learning.” Hence, learners are able to advance their knowledge and thinking by searching through the internet for advanced information on a topic taught in the classroom. Some learners tend to understand a phenomenon better when they see and visualize it.

Therefore, they can search for YouTube videos to see exactly what they were learning about in the classroom. It is also relatively important for some learners to hear (in terms of sound) what is taught in class for them to process the information and understand the phenomenon at hand. Additionally, it is imperative for learners to have access to digital technologies such as computers, tablets, or phones with internet connectivity (Wi-Fi, cable connection or data).

2.8 INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) AND EDUCATION

Information and communication technologies (ICTs) are simply defined as tools for managing information, a diverse set of goods, applications, and services that are used to produce, store, process, distribute and exchange information. For instance,

Nwokeafor (2015: 4) states that the old ICTs may be characterised by tools such as radio, television, and telephone, while new ICTs may include computers, satellite, and wireless technology, and the internet. Hence, these diverse and ever-changing tools are now able to work together and combine to form our networked world, massive infrastructure of interconnected telephone service, standardized computer hardware, the internet, and radio, and television, which reaches into every corner of the world. In many industrialized and more developed countries, ICTs have become part of the social fabric.

Therefore, it is hard to ignore that ICT is universal in different parts of developing nations. However, the access and efficiency of these phones in these places may not be comparable to those in more industrialized countries. Nwokeafor (2015: 4) further indicates that there is adequate evidence from sustained observation of exponential growth of this particular technology in developing countries in the last decade.



2.9 TEACHING AND LEARNING THROUGH SOCIAL MEDIA

There is a great need for creativity that a teacher has to grapple with when “incorporating digital media into their pedagogical plans” (Rust, 2017: 169). In essence, creativity comes in different forms, such as knowing which medium is suitable for which information and the advantages. Engaging students in critical digital tools requires that educators avoid unfairly re-appropriating their affordances for merely traditional purposes (Benson, 2010). By engaging through digital technologies, learners are able to consume and produce media content in their daily lives, which allows them to have flexible conversations and knowledge sharing.

According to Alvarez (2019: 74-75), digital age learners “are developing skill-sets outside of the classroom that have tremendous capacities to inform what and how they learn inside the classroom.” For instance, the use of social media in their learning allows them to share and discuss information on the platforms. An example would be the creation and use of WhatsApp and Facebook groups to disseminate valuable information regarding their educational material. This is beneficial for teachers and learners as information dissemination happens simultaneously and is cost-effective, and the group administrator manages the content shared. Alvarez

(2019: 75) suggests that having a group administrator for a social media group (especially for learners) is recommended to filter and decide which information must be shared with the group members. This also ensures proper rules or guidelines as to what should be posted in the group. This clarifies how the group members should conduct themselves towards each other. For example, no sensitive or unrelated information may be posted in the group.

2.10 DIGITAL MEDIA INTEGRATION INTO THE CURRICULUM

Integrating digital media into the curriculum does not only mean equipping classrooms with computers or using the technology in traditional teaching methods (Du Plessis and Webb, 2012). Therefore, Zhang et al. (2020: 1) suggest that technology enhances teaching and learning. For instance, students learn with or through ICTs. However, Zhang et al. (2020) also state that as the global village continues to be wired up electronically, the integration can be described in two ways; firstly, it can be associated with ICT adoption, while the second is associated with ICT use.

Zhang et al. (2020: 1) further define two types of ICT use; learning about computers' representational use and learning with or through computers, known as generative use. Zhang et al. (2020: 2) emphasises that generative use inspires or allows students to generate knowledge and practise new skills as ICTs are interlinked into curricula. However, on the other hand, representational use focuses on the learners perfecting their skills through learning how to use computers. While representational use is essential in providing students with basic computer skills, generative use allows students to learn independently, essential when building creative and competitive minds.

Unwin (2005) argues that ICT implementation that integrates both learning and technology use is relatively rare in schools around South Africa because most teachers are computer illiterate. Beemt et al. (2020: 1) mentions that teachers still struggle with the tension between possible pedagogical use and the tempting distraction of this technology. Hence, the older generation of teachers is likely to resist the technological changes in the curriculum. Furthermore, Unwin (2005) also states that this problem faces other countries across Africa, especially in developing

countries. Teachers lack the computer skills necessary for effectively integrating ICTs into learning. As a result, computers are often set aside for use only on special occasions, and they remain an object of curiosity, fear, uncertainty, and mystery rather than an enabling tool (Pelgrum, 2001; Unwin, 2005; Hew & Brush, 2007; Sherman & Howard, 2012). In addition to integrating ICTs effectively into teaching and learning (Song, Hannafin & Hill, 2007; Naicker, 2010), teachers' attitudes and pedagogical beliefs also play a critical role in the adoption and implementation. Similarly, Hew & Brush (2007) emphasize that teacher attitudes and beliefs towards technology can be a major barrier to the integration process.

2.11 THE IMPORTANCE OF DIGITAL MEDIA INTEGRATION INTO TEACHING AND LEARNING

The introduction of digital media technologies in schools is considered important to improve teaching and learning methods. This prepares learners for the higher institution and workplace environment where ICTs are becoming gradually important (Kozma, 2005). Hence, the effectiveness can be achieved through the motivation of teachers to integrate digital technologies in their classrooms to develop not only computer skills but also their communication skills in school within their communities and cyberspace because accessing the internet breaks boundaries.

On the other hand, integrating communication technologies into the curriculum delivery encourages constructive learning. The manner in which learners think can be developed in a more efficient way than traditional teaching practices (Bester & Brand, 2013). Learners grow different abilities that play a part in their success as digital age learners and innovators, such as reasoning, understanding, and creativity (Keong, Horani & Daniel, 2005). However, it is also argued that comprehension and problem-solving capabilities are better-learned using interactive media. This necessitates ICT integration into teaching and learning processes because it enables the process (Department of Education, 2004; Bester & Brand, 2013).

Hence, allowing interactive media a chance into the learning processes of the twenty- first-century generation would yield new possibilities to teaching professions (Bester & Brand, 2013). Research shows that ICT assists in the preparation of

learners by developing cognitive skills, critical thinking skills, information accessing, evaluation, and synthesising skills (Bester & Brand, 2013). For example, learners have access to learning materials that come in a CD, watch-learning programmes on television, and call in with questions and get answers instantly. Some of the shows or programmes have real-time solving of Maths or Physical science problems and equations). The way digital media operates is not only different from traditional learning methods but also innovative and allows two-way communication between the learner and teacher.

Furthermore, international research on learning has shown that the new paradigm is constructive (in nature) for teaching as opposed to the traditional teaching and learning paradigm. The Instructional approach offers the most effective way to assist learners in developing higher-order skills (UNESCO, 2002). Newhouse (2002), on behalf of the Western Australian Department of Education, argued that learning environments ICT supports could be suitable for the constructivist teaching approach. Thus, one of the most vital components of the constructivism theory of learning is the concept of proximal learning, which means that the learner constructs their own understanding of things for which scaffolding is initially required.

The assistance needed by learners for achieving learning through interactive media such as blackboard or computer simulations could be provided mostly by a tutor or computer applications. Thus, digital technologies help create learning environments and support for learning that are ideal and were ignored or were impossible in the past (Newhouse, 2002). In addition, ICT provides fast and accurate feedback to learners (Becta, 2003). Furthermore, Lau & Sim (2008) show that the use of ICTs in education could promote deep learning and allow schools to respond better to the needs of different learners. Educators could only achieve this integrating if they integrate the ICTs into their teaching.

2.11.1 SIGNIFICANCE OF DIGITAL TECHNOLOGIES IN THE SOUTH AFRICAN CONTEXT

The importance and use of ICT in education are well recognised and accepted to change things in the 21st century. Studies have shown that ICT tools open up exciting and innovative instructional techniques to overcome student passiveness

and enhance critical thinking skills (Tan, 2012; Laxman, 2010; Chiu, 2009; Yang & Chou, 2008). Unfortunately, the adoption and embedding of ICT tools pedagogically in the classroom in the South African context have been very slow and not widespread. There is still a strong focus on hardware and software in most cases and less on broad concepts of teaching and learning. The policy on ICT integration was first formulated in the Millennium Development Goals (MDG) Target 8.F, which states that “in cooperation with the private sector, digital technology benefits should be made available especially information and communications” (United Nations, 2012).

Therefore, the careful adoption and utilization of ICTs in schools could play an essential role in transforming learners’ educational experience and cognitive development. In South Africa, the White Paper on e-Education (Department of Education, DoE 2004) states that the introduction of ICTs in education represents an integral part of the government’s strategy to improve the quality of learning and teaching across education and training environments. The National Department of Education (2003), further explains that digital technologies will improve how educators teach and learners conduct their daily activities. This is based on the premise that pedagogical integration of ICT into teaching and learning provides a lifelong skill needed to sustain both the teacher and the learner, and mobilizing educators to use computers in their teaching will contribute to quality education.

However, according to Fu (2013: 116), quoting Tezci (2011) “teachers should learn not only to use technology to enhance traditional teaching or increase productivity but should also learn to implement a student-centred approach whereby digital technologies can be integrated into classroom activities in order to promote active student learning.”

2.12 THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) IN EDUCATION

Many teachers consider ICTs to have a great potential in the classroom, which is to support both the learning and the teacher’s work. Therefore, educators should view using ICT in the school seriously because it contributes to children’s education. Teachers acknowledge their responsibilities to equip children and young people to participate in economic and social life beyond school walls (Loveless, 2003: 1). ICT

can also be seen to be complicated or threatening to many people for many reasons. Loveless (2003:1) states that these reasons may range from anxiety about acquiring new skills to strongly held views about the educational worth of the activities themselves. Trying to support and encourage teachers in areas they feel to be of great potential is quite threatening. It is important to pay attention to these questions of why ICT is thought to be important and what challenges it brings to teachers (Loveless, 2003: 1). The use of ICTs in education was not prioritised in the past due to the availability and affordability of computers, especially in public schools. Thus, according to Loveless (2003: 1), as we began the twenty-first century, it was almost impossible not to integrate ICTs into teaching and learning in various secondary schools because of the high demand for ICT skills in our daily lives.

The researcher asserts that being computer literate in society has become a necessary skill. From the moment, you enter higher education institutions, students must adapt to technologically carrying out assignments and projects. However, this becomes very hard for those students who attended public schools with no or limited computer literacy skills. Loveless (2003: 2) also suggests that integrating ICTs into teaching and learning should be seen as providing a lasting skill that will be needed to maintain both the teacher and the learner. Teachers and learners both need to face the challenges that will change traditional teaching and learning, which focuses on the teacher's monopolistic activities in class to activities that learners influence, address the needs of individual learners, and include one-on- one tutorial practices.

Therefore, the researcher wants to note that it is challenging to separate ICT from current learning and teaching in South African education. The major obstacle is the lack of adequately employing qualified educators, especially in Mathematics, Physical Science, and Technology. This is the single biggest challenge in the South African education system especially for most public high schools. ICT plays a significant role in transforming education in South Africa from a teacher-centred approach into a more active practice where learners are fully involved in the activities. According to Loveless (2003: 114), the new technologies provide access to the retrieval and manipulation of information and networks of information. The information society collects, selects, and presents information to capture and divert attention, and children are showing promising capabilities as information handlers in a society.

2.13 HISTORICAL PERSPECTIVE OF DIGITAL TECHNOLOGIES IN EDUCATION

The use of digital technologies to enhance and promote teaching and learning has had a long tradition in educational discourses, with successive waves of technology positioned as a technical fix that will solve a wide range of problems and will breathe new life into educational practices (Robins & Webster, 1989). The educational expectations from current social media tools echo the claims of the ICT enthusiasts who foresaw the reinvention of teaching and learning with the introduction of digital technologies throughout the 1980s and 1990s. Still, these tools were mainly successful in delivering existing forms of education more efficiently rather than prompting an exemplary transformation of educational processes.

For instance, Cuban (1993) compared the implementation of microcomputers in schools during the 1980s with the introduction of film and radio in the 1930s and instructional television in the 1950s and 1960s regarding the pattern of blue-sky promises of the digital technology revolutionizing instruction learning. Cuban (2003) also argued that, although the number of computers per student in schools had increased steadily in the 1980s, the use of computers was an expanding but still marginal activity.

Similarly, Lankshear & Knobel (2006: 55) hold that the digital technologies during the 1980s and 1990s tended to merely disguise conventional practices without bringing about substantial changes. Yet, it is again being argued that the nature of social media can allow for further reconsideration of the possible use of technology in transforming education. In particular, social media have brought notions such as interactions, creation, sharing, participation, and collaboration to the forefront of digital technology use in formal and informal educational settings (Gouseti, 2014: 28). Although older technologies were also seen to carry such promises, it has been argued that only with social media were these promises materialised in education on a widespread basis (Gouseti, 2014: 29).

2.14 IMPLEMENTATION OF DIGITAL TECHNOLOGIES IN EDUCATION

It is without a doubt that the drive to implement the use of digital technologies in schools is at large influenced and led by a range of stakeholders, international

bodies, and individual governments. Like the drive to insert collaborative initiatives in education, politicians and policymakers have promoted educational technologies for the past decades (Gouseti, 2014: 34). In addition, Matos et al. (2019: 4) suggest, “in education, internal and external forces lead to ever-changing scenarios in the classrooms. New understandings of how children should learn outside the school and in the formal school settings as well as dynamic changes in curriculum and digital technology result in the need for pedagogic retooling”.

As such, over the past two decades, the influence of state policymaking has been central to how digital technologies have been implemented in formal educational settings. This has involved both an increase in funding with regard to technological resourcing of hardware, software, and network infrastructure as well as programmes for teacher training and changes in the curriculum to accommodate the use of the new technologies (Gouseti, 2014: 35).

In terms of infrastructure and availability, digital technologies now consist of a significant element of educational systems in most developed and developing countries around the world. National and international ICT strategies focus on ensuring that both computer hardware and internet connectivity are available in schools. Thus, significant amounts of funding are dedicated to achieving this aim by the government. The outcomes of these national efforts to support computer and internet access at schools often feature in a range of reports and statistical surveys (Gouseti, 2014: 35).

Additionally, substantial funding has been allocated to ensure that there is learning platform provision available in schools. These learning platforms can encompass a range of technologies such as virtual learning environments, resource sharing technologies, and management information systems with the aim of supporting teaching staff, students, and less often parents to access learning resources, communicate and collaborate as well as monitor, assess and report on student progress (Gouseti, 2014: 35).

2.15 INFLUENCE OF ICTS ON CYBERBULLYING AMONGST LEARNERS

There is a growing concern amongst parents, teachers, and learners regarding the rise of cyberbullying besides the existing and traditional forms of bullying whereby an

individual is victimised physically. According to Cilliers & Chinyamurindi (2020: 28), the prevalence of cyberbullying in South Africa among school learners is increasing at an alarming rate. Cilliers and Chinyamurindi (2020: 28) further state that Burton and Mutongwizo (2009) conducted the first cyberbullying study in 2009 in South Africa and found that 18.3% of learners reported bullying via voice calls and 16.9% via text messages. In 2011, Unisa's Bureau of Market Research reported that 36% of learners in primary and secondary schools had experienced some cyberbullying.

Similarly, Whittaker and Kowaski (2014:11) suggest that with the development, advancement, and availability of ICT's to the young adults in high schools, there has been a rise of cases reported about school learners committing suicide. This is mainly because of the abuse and pressure they face from their peers and through online communication platforms. Therefore, one would assume that ICTs influence bullying and have advanced to modern bullying mostly perpetuated through the internet. At times, the bully or perpetrator may know the victim.

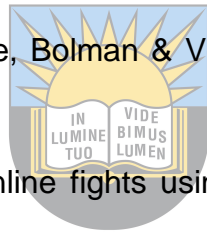
The bully enjoys anonymity as it hides their identity depending on the familiarity and expertise in using computers and the internet. Whittaker & Kowalski (2014: 11) also state that the last decade has witnessed a surge of research based on cyberbullying, which is the kind that occurs using ICTs or digital technologies such as email, instant messaging (SMS), social media for an example WhatsApp, Facebook, and online gaming.

According to Whittaker and Kowalski (2014: 11), cyberbullying is an act of aggression intended to cause harm to another individual and it is repetitive. Whittaker & Kowalski (2014: 11) also mention that bullying naturally occurs amongst individuals whose relationship is characterized by a power imbalance. However, it is important to note that whereas with traditional bullying, this power imbalance might reflect differences in physical strength or social status; with cyberbullying, it might also reflect differences in technological expertise. Therefore, this means that someone experiences bullying through the online platform in a manner where they could be sent inappropriate and hurtful content (messages or pictures on WhatsApp or Facebook inbox). On 19 February 2019, The Star Newspaper reported on an incident of a 13-year-old girl from Sinoville, Pretoria, who committed suicide after experiencing ill-treatment from one of her classmates who distributed her naked

pictures to the whole school. The girl was distraught and reported the bullying towards one of the teachers and parents due to this incident, but unfortunately, nothing was done until it was too late. This should be a wake-up call to parents. It highlights the need to ascertain and question school policy against any form of bullying. However, from the above report, it is evident how brutal and cruel school learners can be towards one another. Hence, the community, schools and the department of education, should clearly define what measures and policies are put in place to curb bullying in schools, bullying is not a new phenomenon in our society. It has always led one to feel alone and depressed, not enjoying being in the school environment, and quitting because parents and teachers do not understand the extent of its damage to one (developing) self-esteem and self-confidence (The Star, 19-02-2019).

2.15.1 FORMS OF CYBERBULLYING

Cyberbullying, as stated by Dehue, Bolman & Vollink (2008: 217), can take on the following forms:



- a) Flaming, which refers to online fights using electronic messages with angry and vulgar language.
- b) Harassment, which is sending mean and insulting messages;
- c) Cyberstalking, which refers to repeated, intense harassment that includes threats, denigration referring to spreading rumours online such as sending and posting gossip about a person to damage their reputation.
- d) Impersonation which refers to pretending to be someone else and sending or posting material to get that person in trouble; trickery which refers to tricking someone into revealing secrets or embarrassing information then sharing it online; and
- e) Exclusion means intentionally and cruelly excluding somebody from an online or social media group.

2.15.2 PARENTAL PERCEPTIONS ON CYBERBULLYING

Based on the above discussion, the researcher believes that it is important for parents to find solutions related to cyberbullying. Thus, according to Dehue, Bolman

& Vollink (2008: 218), cyberbullying must be regarded as a serious health problem because recent literature reveals that being cyberbullied can ultimately result in serious physical, social, and psychological problems. For example, a learner may end up suffering from serious stress, depression, and anxiety. It has also been reported that youngsters with depressive symptoms experience more emotional stress because of being cyberbullied than do youngsters with or more minor no depressive symptoms. Scientific research on cyberbullying, however, is limited.

Therefore, the present study sought to describe the prevalence and nature of cyberbullying. It examined the reactions to cyberbullying among youngsters and their caregivers' estimation of the prevalence of cyberbullying and their children. Hence, parents should be aware of the following characteristics; possession of and skills in handling computers; use of and knowledge and house rules about the internet and text messaging; the prevalence of bullying and being bullied; efforts by parents to stop bullying behaviour; and communication on bullying and being bullied (Dehue, Bolman & Vollink, 2008: 218).



2.15.3 THE CYCLE OF BULLYING AMONGST LEARNERS

Three prominent roles have been identified within the bullying cycle: the bully, the victim, and bystanders. Memoh (2013) mentions that usually, the bully is the strongest among peers and has a strong need for power. The main primary purpose of bullying behaviours is to undermine the social status of the victim and their sense of personal security, while at the same time raising the bully's self-esteem and social status. Consequently, bullying actions usually take place in front of an audience. Bystanders can support the bully, defending the victim, or serve as passive onlookers.

In most cases, bystanders attend without intervening, but still they are considered an integral part of the bullying situation. The victims are of lower status than their aggressors are and tend to isolate themselves due to bullying, appearing unable to defend themselves and in need of protection. The school has been identified as a context where bullying behaviours frequently occur. Sometimes persecution also occurs on the way to and from school, but cyberbullying can happen anywhere. Finally, the prevalence of victimization and bullying changes in different age groups.

Furthermore, Memoh (2013) emphasise that cyberbullying is at a peak level in South African schools. The researcher believes that this is due to the advanced use of digital technologies, ownership of smartphones, and internet access. Rigby (1996: 71-72), cited by Memoh (2013: 2), suggests that there are different causes of bullying, which may be the result of “hereditary factors, family and cultural influences and school- based factors.” Thus, bullying actions are influenced by factors within the school environment, learners’ home conditions, and the learners’ natural characteristics.

2.15.4 EFFECTS OF BULLYING OR CYBERBULLYING ON THE VICTIM

According to Cantone et.al. (2015: 59), research also indicates that being the victim of bullying contributes independently to children's mental health problems. The persistence of the phenomenon for prolonged periods may cause the development of low self-esteem and depressive symptoms that can persist into adulthood. Bullying victims have reported various psychological, physical, and social suffering, such as sleep disturbances, enuresis, abdominal pain, headaches, self-destructive behaviour, sadness and isolation, and depression and anxiety. They experience greater social marginalization and lower social status, and the effects of the bullying experience appear to last over time. In fact, along with their bullies, victims have a significantly amplified risk of anxiety, depressive symptoms, and suicidal ideation than children who are not bullied or bully.

Cantone et.al. (2015: 59) also mention that a recent meta-analysis has confirmed the strong correlation between being bullied and psychosomatic disorders in adolescents and children. Thus, bullies are also frequently involved in crime and substance abuse than other children and adolescents. Studies in school settings reported that victims showed problems of adjustment and bonding and difficulties in completing homework, while bullies showed increased school absenteeism. Therefore, in this context, Cantone et.al. (2015: 59) argued that it seems particularly important to analyse how the different variables involved in the process of victimization and bullying influence each other. Considering this has become imperative. More so, some studies have only looked at bullying and victimization outcomes while others only assessed associated mental health and social outcomes.

2.16 DIGITAL MEDIA IN EDUCATION AND ECONOMY

The South African department of education has made enormous intervention programmes to improve the quality of education for the learners in a manner that will be skilled to work well in virtual and face-to-face environments. Hence, there is an assumption articulated in the UNESCO report for Education that ICTs can be perceived as the means for growth and empowerment of the country with profound implications for improving education and its standards (UNESCO, 2011: 8). Therefore, this suggests that an ICT- embedded education system plays a vital role in the economy of any given country.

Thus, the researcher believes that it is the responsibility of the government to invest its resources to improve the education standards for South African learners. This is because the computer and internet skills that the learners will gain through ICT will not only exist in their classroom. These skills will also enable the learners to have the capacity to do better for their communities. Furthermore, they will be able to work at young ages because any employment nowadays requires computer literacy. For example, this plays a role in reducing unemployment and poverty, which usually result in violence and crime amongst South African youths.



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2.16.1 THREE FACTORS OF ECONOMIC GROWTH

Traditional economic models associate growth in economic output with increases in input factors. Most companies make a point of purchasing more equipment and employing more workers, which economists call capital accumulation (UNESCO, 2011: 9). This is something that the South African government could try to implement, especially in the education sector, to yield better results and create more skills and qualifications for its country and young people and train more ICT skilled teachers. It is argued that early in its development, Singapore used this approach by providing inexpensive labour to assemble electronics components for multinational companies, and China is still using this approach. However, Singapore has realised that this approach is not sustainable for growth because eventually, there is additional capital, which makes smaller gains in output.

Thus, another way to ensure economic growth for a nation is by increasing the economic value generated by its citizens. New growth economic models emphasise the importance of new knowledge, innovation, and human capacity as the sources of sustainable economic growth. According to (UNESCO, 2011: 9), education and human capacity development enable individuals to add value to the economy, contribute to the cultural legacy and participate in social discourse. Furthermore, education enables them to improve their family and community health and conserve the natural environment. Hence, these personal contributions are multiplied, and the benefits of growth are equitably distributed and enjoyed through access to high-quality education for all, regardless of gender, ethnicity, religion, and language.

Economists identify three factors that can lead to economic growth based on increased human capacity. They include capital deepening, which refers to the ability of the workforce to use the equipment that is more productive than earlier versions. Higher quality labour, which means having a more knowledgeable workforce able to add value to economic output. Finally, technological innovation, which is the ability of the workforce to create, distribute, share, and use new knowledge (UNESCO, 2011: 9). However, the country's citizens can achieve this if they have the opportunities to better education that incorporates the use of digital technologies for teaching and learning. Thus, the focus should be on public high schools because they were previously neglected when it comes to quality education and the provision of digital tools for learning.

2.17 APPROACHES OF THE ICT FRAMEWORK

The productivity factors listed above serve as the basis for three complementary but overlapping approaches connecting the education policy with economic development. Incorporating technology skills into the curriculum, termed the Technology Literacy approach (UNESCO, 2011: 9), might increase how students, citizens, and the workforce use new technology. Similarly, Grant & Dale (2014: 1) argue that digital tools can fuel student-centred learning by allowing students more control over a sense of ownership and accountability for the learning methodologies that fit their particular learning styles.

Hence, various processes that best fit these styles primarily focus on the content areas of their interests. Thus, if used accordingly, digital tools also assist students in absorbing and effectively demonstrating 21st-century skills such as communication, collaboration, problem- solving, critical thinking, and creativity through the creation, consumption, manipulation and sharing of digital content. Therefore, students' needs to master these skills as they are the key in their future job markets as millennial adults will likely perform more than a dozen jobs. Moreover, most of these jobs do not exist today, meaning that mastery of 20th-century skills, including rote memorisation, performing repetitive tasks, and general knowledge will not suffice (Grant & Dale, 2014: 1).

Solomon & Schrum (2007: 8) further suggest that nowadays, we live in a wired, globalized world whereby communication and collaboration are possible day and night. Thus, corporations have become multinational, and their workers can be anywhere and work any time. Fast connections and standardised software link these corporations with workers wherever they are. Some members of this workforce are exposed to low salaries with no benefits whatsoever that serves as a reward for good work performance. Companies use technology for purposes of being effective because they can track their goods and services from the point of origin to delivery. Furthermore, Solomon & Schrum (2007: 8) also state that these companies are aware of what they need at any moment and can adjust the supply flow in real-time using technology from a distance.

Thus, there is a need to increase the ability of learners (or students), citizens, and the workforce to be innovative, produce and share new knowledge, which can be called the Knowledge creation approach (UNESCO, 2011: 9). Furthermore, Burke & Hughes (2014: 29) argue that instructional innovation can range from ensuring the alignment of curriculum, instruction, assessment, and technology standards to monitoring multiple sources of student data to assess how students are using technology to enhance learning.

Hence, in order to transform the curriculum by integrating sound pedagogy with digital technologies to improve learning and empower teachers to enact positive change in the classroom (Hughes & Burke, 2014: 29). Solomon & Schrum (2014: 7) further suggest, that learners can now write directly online in a blog or other virtual

platforms and get immediate feedback from peers and others who could be anywhere in the world. They can also collaborate with peers in a distance or a wiki, which is also directly online. They can post photos, videos, podcasts, and other items online. Therefore, the learners control production and publication tools, which means there are no more gatekeepers. With these tools, people are changing the way the real-world works, business practices as well as social activities. Thus, why not use them to transform private and public schools' teaching and learning processes.

2.18 BRIDGING THE DIGITAL DIVIDE WITH DIGITAL TECHNOLOGIES

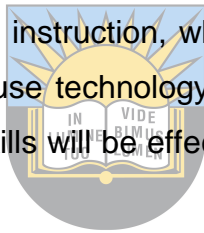
The need for digital tools has long existed in the education system, but lacks the proper funding, and implementation necessary to cater to curriculum change. Hence, Grant & Dale (2014: 11) argue that at the beginning of the educational technology movement, when schools provided just a few computers for student use, the digital divide between the computer have and have nots was frequently discussed. Learners with computers at home had access to resources unavailable to their less affluent peers. In contrast, mobile learning is now available to most of the poorest school districts in the US and teachers and students worldwide wherever access to the internet, and broadband connections exists. Hence, mobile learning is considered the ability to provide or receive educational content on personal electronic devices such as smartphones and tablets. It is often self-paced and informal in its presentation. Mobile learning can make learning more accessible and assist those schools that are financially unstable (Grant & Dale, 2014: 12).

However, the researcher believes that most schools in South Africa are still struggling with the implementation and use of digital technologies incorporated into their teaching and learning. They struggle mostly with funding the digital resources and training needed to integrate ICTs into the curriculum or teaching and learning. Furthermore, according to Sheninger (2014: xvii), advances in technology have led to changes in the way people communicate, collaborate, solve problems, create projects and consume content. These changes have shifted how key stakeholders in education prefer to receive information and communicate with schools such as parents, learners, and community members. For instance, the researcher agrees with this because parents may create groups on social media networks like

Facebook or WhatsApp mainly to organise events in their children's specific schools. Most schools have seen the need and relevance to have their own website and Facebook page where potential and current stakeholders can get the necessary information. The increasing dominance in technology in our lives can easily be experienced through behavioural observations of professionals, businesses, parents, children, and even grandparents. This is because the number of adult internet users keeps increasing as technology advances (Sheninger, 2014: xvii).

2.19 BENEFITS AND CHALLENGES OF USING DIGITAL TECHNOLOGY FOR INSTRUCTION

Everything has its advantages and disadvantages. Thus, nothing is impeccable, so the researcher would like to highlight some of the benefits and challenges encountered by teachers and learners undertaking this shift in their learning environment. Rogers (2013: 10) has identified eight core pedagogical benefits of using mobile learning devices with instruction, which are as follows: First, improved pedagogy; this is when teachers use technology as part of learning, they increase the likelihood that their teaching skills will be effective, and that student achievement will improve.



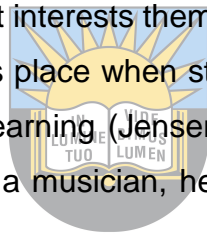
Second, deeper student motivation, it is assumed that mobile learning devices are fun to work with; therefore, they tend to encourage student motivation and participation. Students use their mobile learning devices to play games independently and with friends. They use laptops to communicate with friends via social networking sites like Facebook and Myspace. They may also publish self-created art forms to social networking sites like YouTube, including poetry, music, and skits. The feedback they get from their peers assists them in improving their skills and enhances their motivation to improve performance in their studies. This feedback increases what Guy (2009) refers to as social capital and, in turn, can motivate all learners, especially those who are doomed to be at risk.

Third, access to content and decreasing the access gap. Since many low-income families cannot afford the monthly cost of internet service, many students have cell phones, iPods, MP3 players, or handheld gaming devices that allow access to outside research via text messaging or Wi-Fi. Thus, mobile learning devices provide extremely convenient access to material inside and outside the four walls of schools.

For example, students can use MLDs while on field trips to extend learning, ask questions and clarify information. The potential for narrowing the access gap is tremendous, it blurs the inequity lines and students can solve problems in the environment where they happen to be. For example, students can use their cell phones or iPod touches to video short public service announcements to discourage bullying or encourage recycling. The videos can be shared on student announcements.

Fourth, easy review of content; MLDs provides a convenient way to review material for busy students and teachers and can be used to contain training modules to teach a specific skill. McDonald's uses iPod touches in training its staff (Springs, 2010). Hence, a student on a bus ride to or from school can review vocabulary words while listening to his favourite music.

Fifth, augmented student-driven learning, with MLDs, students have convenient access to content and material that interests them and when it interests them. One of the highest forms of learning takes place when students have a vested interest in or a buy-in to the content they are learning (Jensen, 2008). For example, if a student who plays the piano learns about a musician, he might likely use his device to find out more about that musician.



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Sixth, personalised, differentiated learning; in some cases, learners can use their gadgets or digital devices to personalise their learning or choose a media that relates better to how they want to learn. For example, for a visual learner, then a video will be best suited because for that learner to understand accurately, his needs to see. Perhaps, another learner is spatial, and then playing a game will be best suited, in other words, it is heavily believed that learners' ability to understand varies from learner to learner; they are not the same.

Seventh, increased collaborative learning is whereby a classroom may not have enough learning devices for every learner; thus, in those situations, learners are forced to work and communicate in groups or pairs to plan and produce a product assigned to them. Eighth, improved communication; further, Rogers also states that teacher and learner relationships ought to be improved due to the teacher embracing student's culture. This is because communication barriers are broken, then teachers

learn to talk the talk and text the text (Brown, 2003; Cavus, Bicen, & Akcil, 2008; Deubel, 2009; Rismark, Solverg, Stromme, & Hokstad, 2007).

2.19.1 CHALLENGES OF USING MOBILE LEARNING DEVICES

Rogers (2013:11) further identified ten challenges that affect the use of digital technologies for learning and teaching, which are as follows: affordability, while mobile learning devices are deemed nearly universal, not all students can afford them; thus, educators need to consider this. Mobile learning devices can be expensive. For example, some cell phones are bought on a contract, which means a monthly payment has to be made for a certain period.

Besides, there are accompanying applications, which are costly to procure. Another challenge of mobile learning devices lies in their portability. Rogers argues that portability comes with a price. Because mobile device screens are smaller, learning from them can be difficult, as learners has to scroll more. This challenge is considered to be important for educators and requires to be addressed (Dodds & Mason, 2005; Duke Center for Instructional Technology, 2008; McNeal & van't Hooft, 2006; Prensky, 2005; Shuler, 2009).

Therefore, these tools rely on rich media that combine text, graphics, audio, and video to compensate for small screen real estate. However, connectivity issues dictated by the technology available such as Bluetooth and Wi-Fi, affect the effectiveness of these compensations. For instance, watching a YouTube video may be subject to download times and connectivity speeds, making viewing choppy with poor sound quality.

Hence, the researcher believes that if learners could afford tablets with larger screens, they could have better access to content searching engines and content creating applications. According to Rogers (2013:12), the third one is device security, because mobile devices are small, it may be easy for them to get lost. Since they are the school's property, it is usually wise to assign numbers to them with the school name. Each student will have their number recorded against their name to ensure safety of the devices. However, if a learner is using his own device that may be unnecessary.

Fourth is the variability of devices, this is when learners use their own cell phones, and it is often like having a melting pot of technology in class. Some cell phones have different peripherals, such as voice recorders, video cameras, and calculators. Teachers need to consider these things when designing or creating their lessons and having a rule that says no phones in the classroom. Fifth is digital citizenship (appropriate use). Most educators stress heavily whether they are using mobile devices appropriately.

Hence, students do not have a good concept of what they should or should not be doing when it comes to using these devices. For example, some learners may take a video of their social life or perhaps fights of their fellow learners and post it to a social networking site like Facebook or YouTube. Sixth is the issue of cyberbullying, which affects almost any young person on social media sites. While cyberbullying is almost the same as regular bullying, most teachers, students, and parents are unaware of it or what it is (Strom & Strom, 2005). Seventh is sexting, which is usually normal for teenagers, especially in high school. Many do not think there is anything wrong with sending pictures to each other. Very few teenagers actually consider the possible consequences of those actions. There has been an incident of a learner committing suicide because their nude photo was posted online (Celizic, 2009).

Eighth is the issue of cheating. Using mobile devices may also increase the likelihood of cheating in classwork, tests, and assignments because some also cheat with pen and paper, making it even easier with digital devices. Teachers also fear that students will take pictures of answers or test contents and send them to their friends (Stansbury, 2008). Thus, teachers need to find ways of controlling the problem by making tests a bit tricky instead of multiple-choice questions. It could be a problem-based assessment or ask the students to create a product that demonstrates a skill taught in class. Another way is to collect all cell phones before writing a test or having all learners put their phones on their desks.

Ninth is distraction, Rogers (2013: 13), states that technology can distract learners when instruction is being delivered by traditional methods. For example, some learners listen to music during class or play a video game instead of working on an assignment. Some studies suggest that the knowledge attained is not as deep when students focus on too many things at once (Ritchel, 2004; Stansbury, 2008). This

means younger learners should be limited to multitasking. Even though some are more productive when listening to music, to achieve more concentration, it is better not to listen to any music or play games in class times, especially if it is not part of the lesson.

Lastly is the digital divide, students who are more technologically advanced because of having more access may have an unfair advantage over those who are not as tech-savvy. This advantage may transfer into differences in student achievement. A related challenge is that technology changes so rapidly that by the time a student masters a skill or programme, it may be already outdated (Rogers, 2013: 13).

2.20 LEARNING AND INNOVATION AMONGST LEARNERS

The young people are under enormous pressure of success and getting the necessary skills needed for the workplace they ought to pursue. Such skills involve critical thinking and problem solving, which can also mean expert thinking, communication, collaboration, and creativity and innovation (Trilling & Fadel, 2009: 49). According to Trilling & Fadel (2009), the above skills are keys to unlocking a lifetime of learning and creative minds at the workplace and in the classroom. Hence, the new world of work is demanding ever-higher levels of expert thinking and complex communicating. The first two skills, critical thinking and communication, and collaboration are the key learning and knowledge work skills that address these new work skill demands.

2.20.1 CRITICAL THINKING AND PROBLEM SOLVING

Critical thinking and problem-solving are considered by many to be the new basics of 21st-century learning. Recent research in cognition, which is the science of thought has punctured a time-honoured tenet of teaching that mastering content must come before attempt to put it to good use. And as it turns out, using knowledge as it is being learned by applying skills like critical thinking, problem-solving, and creativity to the content knowledge increases motivation and improves learning outcomes.

It is further argued by Trilling & Fadel (2009: 52) that students should be able to reason effectively and according to the given situation (inductive or deductive); be

able to use systems thinking such as exposing them to more teamwork in order to solve problems. Make judgments and decisions that allow them to reflect critically on their learning experiences and processes, and solve different kinds of problems that are not familiar in conventional and innovative ways.

2.20.2 CREATIVITY AND INNOVATION

To succeed in the 21st-century, young people must continuously innovate new services, better processes, and assist in improving products for the benefit of the world's global economy. Creative knowledge work is required more and more of the world's better-paying jobs. It should come as no surprise that creativity and innovation are skills in very high demand in the 21st-century. Many people believe that the knowledge age is quickly giving way to an innovative age. - In the new age, what is highly prized and emphasised is on the ability to solve problems in new ways like the greening of energy use. Inventing new technologies like bio and nanotechnology, or creating the next killer application of existing technologies like efficient and affordable electric cars and panels, or even discovering new branches of knowledge, and inventing entirely new industries (Trilling & Fadel, 2009: 57). However, Goodwin and Sommervold (2012: 50) suggest a clear distinction between creating and creativity. Creativity emerges when the idea, innovation, or invention comes from the creator. For example, the learners' work will all look the same when a teacher gives out a task in class, perhaps to create an African pot with clay and provide specific guidelines and exact characteristics. Thus, that is not creativity in any form. Hence, learners must be given the platform of thinking for themselves to show their own potential as individuals.

2.21 EFFECTIVE ICT INTEGRATION INTO TEACHING AND LEARNING

A road map to successful ICT integration may involve different and complex issues having to consider. For instance, the why and how the ICTs will be implemented cannot be neglected before the actual work. Hence, it may involve policies directing educational authorities as to their roles and functions in introducing ICT into existing and yet to be developed educational curricula (Wang & Woo, 2007). However, Ojo and Adu (2018: 1) state that, "the effectiveness of the use of information and communication technologies (ICTs) in teaching and learning in high school is

germane to the recent educational development and innovation in Africa.” Furthermore, Isaacs (2007: 2), cited in Ojo and Adu (2018: 1) suggest that education development in South Africa has undergone various stages of transformation, considering the development in the last two decades. Thus, to strengthen institutionalization of ICT, there is the need for a strong inspectorate division. Its responsibility will be to supervise and report the progress of ICT integration to an appropriately established centre for evaluation. While education authorities contemplate ICT integration into teaching and learning, they should provide curriculum reforms that envisage ICT integration.

Areas such as development of subject syllabi, topics to be included and preparation of lessons have been suggested to be crucial to ICT integration (Wang & Woo, 2007). In an integration model suggested by Wang & Woo (2007), a seven-point plan has been listed for execution. The seven points are as follows: problem statement; learning objectives; technology required; rationale for using the technology; strategies for implementation; assessment of students and reflection after implementation. The suggested model seems plausible to be tried out by any educational system needing ICT integration into teaching and learning. Even though ICT integration into education is not a recent phenomenon, it assumes great importance as a tool for learning in the information explosion age. However, no one can afford to remain ignorant of the existence of information splash around the globe.

2.21.2 ICT TEACHING MATERIAL AND LEARNING RESOURCES

The diffusion of ICT pedagogical innovations is dependent on suitable textbooks, teaching materials, and learning resources that adequately address the underlying methods, principles, concepts, and ideas. However, theoretical study material and textbooks are insufficient to provide practical experience and skill development when trying out an innovative ICT teaching method based on contemporary learning theories (Hsu, 2004). Teaching material developed by textbook publishers does not have a sufficient degree of flexibility.

Cohen (2008) further argues that teachers need to change the study materials such as their examples, problems they give out to be solved by learners, and background

information to make it more flexible (Volman, 2005). Hence, this may assist learners in being aware of their capabilities when they are learning; perhaps in a manner that they will know their strong points and weaknesses. For instance, some learners may excel in Math while others are good at languages or Agricultural sciences. However, Cohen further states that existing textbooks do not entirely cover fundamental concepts. They fail to address the connections between concepts using analogy by transferring concepts from the known to the unknown, which is to say to new situations.

2.22 REASONS FOR INCORPORATING DIGITAL TECHNOLOGIES IN EDUCATION

There is a growing use of digital technologies across the world, and the reasons for their usage vary from environment to environment. Hence, Ng (2015: 4) emphasises that in this context, they include the subset of electronic technologies encompassing hardware and software used by individuals for educational, social, and entertainment purposes in the formal and informal contexts of their everyday lives. Digital technologies in education are also called educational technologies as they include desktop computers, laptops, tablets, mobile phones, etc.

However, the reasons provided by educational institutions and policymakers for the incorporation of these digital technologies in learning fall into three categories. Firstly, to support learning for the achievement of successful learning outcomes. Secondly to support the development of the twenty-first-century skills to prepare students for the workplace and lastly to create responsible digital citizens and lifelong learners (Ng, 2015: 5).

2.22.1 SUPPORTING LEARNING THROUGH DIGITAL TECHNOLOGY

Ng (2015: 5) further states that digital technologies play an enormous role in the success of learning in many ways. This may include increasing the learners' motivation and promoting cognitive development, contextualizing learning through highly interactive resources that embrace real-life experiences. For instance, virtual laboratory work and frequent formative feedback to engage learners in the learning process. Also, providing the means of facilitating students' demonstration or

presentation of what they learnt in their previous classes, works as a revision to assist them in understanding their lessons better.

However, communication and collaboration are deemed necessary through learning management systems, blogs, and wikis for assigned group tasks or interacting with the broader community to obtain support during learning. Ng (2015: 6) also identifies the need to cater according to the pace of each individual learning capacity by increasing their self-management and self-assessment of their own learning. This can best be achieved through simulations and quizzes that include scaffolding like prompts, questions, hints, and tutorials. In addition, it enables research through the collection, collation, analysis and display of primary data gathered through real-time experimentations or the manipulation of secondary (simulated) data in virtual laboratories. Lastly, it also enables continuity of learning outside of the classrooms using mobile phones and the internet to access information.

2.22.2 DEVELOPING TWENTY-FIRST CENTURY SKILLS

The use of ICTs is considered to be affecting what, how, where, and when people access information. Hence, technology's ubiquity (simultaneous presence) provides new opportunities to fulfil individual learning needs (Gros, Kinshuk & Maina, 2015: 3). Therefore, the standardization (setting) of traditional teaching and learning systems does not respond to the demands of the globalized world (Gros, Kinshuk & Maina, 2015:3), where everything and everyone is interconnected through the use of digital technologies and the internet.

However, Gros, Kinshuk and Maina (2015) further outline that formal education should provide more flexible learning systems to accommodate learners' different needs and demands. Thus, a holistic change is required urgently in order to implement a fundamental shift in the learning paradigm for the twenty-first century. The potential of ICT for promoting learning opportunities depends on the skills used to design learning activities that align pedagogy and technology for the benefit of learners.

The twenty-first century faces vast challenges almost every day. Learners have to worry about schoolwork and their future jobs. I believe these challenges should not

be seen as just difficulties but opportunities to succeed in tomorrow's world where competition within and without is becoming increasingly tough.

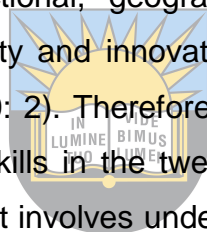
Hence, South Africa should implement ICT strategies based on the country's peculiar needs and not adopt what is being done elsewhere. Like in the case of a good example is Operation Phakisa, where President Jacob Zuma saw it fit. South Africans because Malaysia did it. What could work for the country is something original that is brewed here by South Africans. Because I believe, South Africans know the social and economic capabilities better. Hence, I align my view that setting up a committee to review ICT use in South African schools especially public schools would be of a great advantage. This is where most of the young people are. Therefore, talking to the learners and their teachers to find out exactly what they are lacking would guide the design and implementation of effective ICT strategy.

Ng (2015) states that the processes of shaping today's contemporary society are easily recognisable in the integration of technological development in all sectors of life. In the corporate world, the impact of technology has seen many routine tasks in both administration and production, streamlined and reduced for time required. He further outlines in the discussion that twenty-first-century workers focus on tasks requiring higher-order thinking skills (Weil, 2002). Therefore, the transformation of the workplace activities from the industrial era to the current knowledge or information age has meant that a different skillset is required in today's workforce. This is already manifesting in the job market where many young South Africans are struggling to get employment even with the degrees and skills accumulated in higher institutions (Ng (2015: 14).

Thus, there has come a time where young individuals have to learn to be creative and produce work for their own. Expertise in ICTs presents a veritable opportunity for innovative ideas and job creation. For instance, Mark Zuckerberg, founder of Facebook- has used his unique ICT skills to create a social network platform, accessed by millions worldwide. Zuckerberg has used his idea of ICT knowledge to create wealth for himself and empower millions of others through social media. Therefore, improving learners' digital technology skills has immeasurable benefits. It is a skill set that learners will continue to use even outside the classroom.

In the industrial era, the workplace was very much hierarchically structured so that workers could be told what to do, which means that their jobs were routine and stable. Hence, workers dominantly used the same set of skills throughout their careers because they did not require any thinking skills or even asked why they performed the tasks at hand. For example, the army operates a hierarchically structure where soldiers simply carry out instructions from the top. When a superior asks them to shoot or kill, they must do so and do not ask why. Similarly, teachers' work can be repetitive. They often teach the same syllabus as the year before and do not have the liberty to teach what is not in the syllabus. In the hierarchically era, retraining and lifelong learning were not common features (Oxbrow, 2000: 1).

There has been a move away from the hierarchy structure over the years. In the twenty-first-century, hierarchies have been broken, and networked organization have emerged instead (Oxbrow, 2000: 2). There is a significant focus on teamwork because it is often cross- functional, geographically displaced, and changing frequently, and stimulates creativity and innovation, enhances communication and knowledge sharing (Oxbrow, 2000: 2). Therefore, various authors argue that digital literacy is one of the distinctive skills in the twenty-first-century (Chinien & Boutin, 2011; Wynne & Cooper, 2007) that involves understanding multimodality and its use for learning in the workplace.



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The ability to use digital technologies to solve problems, innovate, collaborate, and communicate responsibly in the workplace is a central tenet of twenty first century skills. However, although it is generally believed that digital technologies can empower teachers and learners to foster the development of twenty-first-century skills, there is still not enough evidence to support these beliefs.

However, according to Gros, Kinshuk & Maina (2015), technology is something external that should be perceived as an instrument to support different activities. Technology is either a replacement or a substitute for an already existing function to ensure tasks are completed at ease. Consequently, technology can be introduced using the same teaching methods, and there is an empirical determinism in how to evaluate the role of digital technologies in education. This determinism is a result of simplistic notions of technology as a vehicle of efficiency. Therefore, much of the research on ICT use in education takes a somewhat naïve view on the idea that

technology transforms educational practice. What is clear instead is that no technology impacts learning in its own. Rather, its impact depends on how well it is being used as a tool of assistance.

2.23 SOUTH AFRICAN HIGH SCHOOL EDUCATION AND DIGITAL MEDIA INTEGRATION

Nowadays, it is almost impossible to conduct and carry out communication activities without using online platforms. This has also affected the work and school environment because teachers, learners, and parents can now engage using social networking sites such as Facebook and WhatsApp. The researcher believes that South Africa has seen the effectiveness and challenges of incorporating digital media within the teaching and learning process during the Covid-19 pandemic.

Both private and public schools had to shift their teaching and learning activities to online platforms such as Zoom, Microsoft Teams, and WhatsApp. Tarantino et al. (2013: 3), cited in Mbodila et al. (2014: 4), argues that the “rapid development of ICTs has sparked the creative incorporation of social media into current pedagogical applications and processes. This is corroborated by Badge et al. (2012: 2), who argue that social networks are rapidly moving beyond their original purpose and are inevitably becoming part of the learner experience”.

These social networks make it easier for teachers and learners to share and discuss information simultaneously via groups created with admins that control who joins and for the right purpose. Information sharing in affordable data usage platforms is not limited. Teachers and learners can share videos, PDF, Word document files and pictures on these platforms. The researcher believes that sharing information through social networks saves time for all involved because at times there is no need to meet in person as that can also be done virtually. Mbodila (2014: 1), cited in (Jan & Hermkens 2011), stipulates that the most important aspect of “social media is that it uses mobile and web-based technologies to create highly interactive platforms through which individuals and communities share, discuss, and modify user-generated content”.

2.24 DEVELOPING DIGITAL CITIZENSHIP AND LIFELONG LEARNING

Lifelong learning implies that schools and universities need to prepare their students to engage in self-directed learning processes that will benefit them with vast amounts of information and resources available on the internet for learning (Ng, 2015: 6). Also, the ownership of digital devices is increasing among students. Hence, educators need to prepare the learners to enter the workforce and become informed and active digital citizens who embrace lifelong learning. For instance, given that a lot of information is readily available on the internet, there are also online courses individuals can take up even from the comfort of their home and improve their skills in different ways. Hence, educators would also be responsible for teaching learners about using the internet responsibly and ethically (Ng, 2015) because young people can be reckless at times, for example posting inappropriate videos and photos of themselves or other learners.

This will enable them to leave positive digital footprints and be good digital citizens (Ng, 2015: 7). Ng (2015), further states that digital citizenship acknowledges young people as stakeholders in the use of the internet and empowers them to manage online risks better and grow their online presence in order to shape the world in safe and creative ways. According to Churchill, Lu, Chiu & Fox (2015: 4), mobile technology offers a variety of tools for teachers that provide educational opportunities of the twenty-first-century and new options for student-technology partnerships in learning.

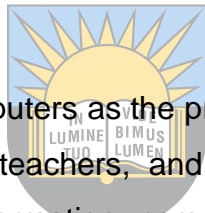
Because mobile technologies are empowered with interactive multimedia presentational capabilities, they enable the delivery of a range of multimedia material such as video, audio, graphics, and integrated media. If appropriately designed for the context, educationally useful digital resources for learning can be effectively delivered through mobile technologies to students at any given time, whether inside or outside of their classrooms.

Furthermore, features of mobile technologies and available mobile applications powered with social media and cloud computing enable new forms of learning platforms that can serve in a variety of educational contexts (Churchill, 2008; Evans 2008; Lai et al., 2007). These are frameworks whereby learners can learn without depending heavily on study materials provided by their teachers. They can search for relevant information on their mobile phones if outside of classrooms. Hence, this

promotes active participation in learning where learners are no longer passive recipients of information but rather can generate knowledge on their own.

2.25 MISCONCEPTIONS ASSOCIATED WITH DIGITAL MEDIA INTEGRATION IN EDUCATION

Misunderstanding and confusion trailed the decision to implement ICTs as curriculum delivery tools in most South African schools. Salmons (2008: 121) states that there are two forms of misconceptions among policymakers regarding ICT in education in South Africa and other African countries. The first one stems from the meaning of the acronym ICT, which most people automatically assume that the 'c' stands for Computers. Hence, from the time computers are installed at a certain school, they are seen as a vitamin whose mere presence in schools can simply result in better educational outcomes. However, another issue is that ICT is often seen as another subject that has to be taught separately rather than teach any other subject using ICT.



The misconception of ICT for computers as the primary source to feed information to learners. Hence, most learners, teachers, and parents actually believe that the computer is the only viable information communication technology needed to improve education in the region. Salmons further argues that there is an emphasis on providing schools with computer laboratories to teach students computer skills. Thus, policymakers generally misunderstand the use of ICT as a tool in educational development and computer literacy as skills vital to surviving in the working environment nowadays.

The conception of ICT and the focus on computers has made governments to neglect the potential of other ICTs such as radio and television in the transformation of secondary education in Africa. However, Salmons (2008) further states that ICT in education should be understood to be more all-inclusive, according to Salmons, the broadening of the concept, in a sense, should include both new (for example, computers, tablets, smartphones) and old technologies (such as radio and technologies, perhaps newspapers for some subjects).

Similarly, Ndlovu and Lawrence (2012: 3) state emphatically that the misconceptions about ICT in education lie with implementing and integrating ICTs in South African

schools. South African learners, particularly in schools with limited resources, have continuously under-achieved in the gateway subjects like Mathematics and Science. The government has turned to modern technology to strengthen teaching and learning and redress past inequalities in its schools. This intervention has made little or no progress despite the availability of Information and Communication Technologies (ICTs) in these institutions (Pan African Research Agenda, 2008-2011). The teachers in these schools are still in the phase of using ICTs to merely transmit subject content rather than utilise the technologies to enhance learning (Ndlovu & Lawrence, 2012: 1). Many teachers are unable to employ innovative ideas in delivering lessons in the classrooms because they lack computer literacy, especially the older generation of teachers who did not need any computer literacy skills to attain their qualifications in the past. Thus, there becomes confusion when they have to partake in using ICTs for teaching their lessons because it is not as if they do not know how to operate a computer at all; hence they tend to teach their learners how to use technology instead.



2.25.1 ACCESS TO INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) AND PROPER USAGE

The introduction of information and communication technologies (ICTs) in South African schools has been driven by the inclination to give everyone access to education. Teachers and learners generally misinterpret access to education as having access to information from the internet and using it (Pan African Research Agenda, 2008-2011) to prepare educational tasks. Oppenheimer (1997: 61) argues, “schooling is not only about information, but making learners “think about information. It is about understanding and knowledge and wisdom.”

Learners must interact with the information to the extent that they are able to manipulate and use it to come up with strategies that are critical in addressing individual or societal challenges. Such an experience demands that the teacher creates a learning environment that promotes and equips learners with advanced thinking capabilities through the effective use of appropriate digital tools. Thus, access without an intention to improve the user’s status deems the instrument redundant or rather useless.

2.25.2 REPRESENTATIONAL ICT USE FOR TEACHING AND LEARNING

The type of ICT use in the classroom depends on the teacher's capacity to integrate the new tools into their subject teaching. It is important to understand and determine the level of South African teacher ICT use to emphasise the need to empower them for quality usage. There are five teacher capacity levels to illustrate the development of ICT usage in subject teaching. Ndlovu & Lawrence (2008) describe this as teacher development framework, including innovation level, appropriation level, adaption level, adoption level, and entry-level.

This framework describes the highest level as the innovation stage where a teacher is able to develop entirely new learning environments that use ICT as a flexible tool so that learning becomes collaborative and interactive. For example, the use of a WhatsApp group created either by a teacher or by a learner for a specific subject or module and schools' growing use of Facebook and Instagram accounts. ICT is integrated as a flexible tool for whole-school development through redefining classroom environments and creating learning experiences that leverage the power of technology (Hennessy et al., 2010).

This entails that such teachers have strong pedagogical and content knowledge and are able to transform the classroom environment into an exciting and rich knowledge generation for learners. It is not so much the tools they use but their ability to structure content using suitable teaching methods that can stimulate the advancement of learner thinking processes and draw the best out of learners. In other words, through the use of ICTs, they equip learners with what it takes to develop their thinking skills to such an extent that they can independently search, analyse and synthesise information to help them solve authentic problems using available technology (Hennessy et al., 2010).

The lowest two levels in the framework denote teacher abilities that are restricted to using ICTs for limited generation or interaction with knowledge. The reasons range from the teacher not having skills to tailor-make learning activities that will promote advancement in learning abilities with the new teaching tools or simply not having appropriate knowledge to integrate them into their teaching. However, as the levels ascend, teachers are able to adapt ICT use to suit learner educational needs and thus be able to extend their thinking skills. Most South African schoolteachers with limited ICTs are at the entry and adoption stages (Wilson-Strydom and Thomson,

2005). Their use of ICTs is not at a level where they are confident with the new tools to use them to enhance learning.

The power of technology manifests when learners are able to can engage with complex tasks successfully. Although the guidelines (DoE, 2007: 6) suggest is frustration at the entry-level, empirical evidence indicates s that the frustration emerges at that stage where the quality use of ICTs is compromised. This is because the teachers do not possess the attributes that enable them to achieve educational goals that will be discussed later in subsequent sections.

Other prominent factors that hinder teachers' readiness and confidence in using ICTs include teachers' attitudes, expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICT in teaching (Hennessy et al.:2010). Therefore, it is expected that quality use would be a challenge if the teacher is not in a position to decide what and how content should be taught as the teaching tool's affordances are not maximised.



2.25.3 BASIC ICT TEACHER TRAINING VERSUS QUALITY ICT PEDAGOGICAL INTEGRATION

Teachers in most South African public schools have attended ICT training, and generally, these sessions constitute basic computer skills. These acquired abilities have proved inadequate to equip teachers with the skills to instil ICTs into their subject teaching (PanAf, 2008-2011). Research carried on ten South African schools by PanAf (2008-20011) shows that most teachers cannot go beyond using ICTs to type lesson plans, tasks, and tests for their learners. They are not maximizing the computer's potential, especially for enhancing their subjects' actual teaching and learning.

Moersch (2002) has criticized such initiatives emphasizing that the basic skills are not enough to prepare teachers to integrate ICTs pedagogically. Such initiatives have resulted in the integration of ICTs that are limited to what Strydom & Thomson (2005: 4) describe as a mere representation of information in another medium. This type of ICT use implies that the teacher is still using the old teaching methods, and the difference is that they are using a different tool. For instance, using slide shows for presenting notes on a screen instead of the board for learners to copy does not make it superior and more effective in improving learning (Salmons, 2008: 121).

The fact that teachers struggle to innovatively use the skills they acquire from the trainings to adapt and make lessons that will extend or improve learning is evidence that these interventions might not be addressing the classroom needs of teachers. Teacher support in the form of material resources is important but beyond that, their capacity to deal with challenges is what needs to be developed. Above the use of ICTs, teachers need to be trained in the skills and knowledge they need to produce good results. They can achieve this if their learners' thinking skills are developed to enhance learning. Furthermore, Salmons (2008: 122) mentions that the following discussion highlights approaches that need to be understood and considered when thinking about what South African teachers need to improve their use of ICTs to enhance learning.

2.25.3.1 LACK OF COMMUNITY INVOLVEMENT

The involvement of the surrounding school communities in the planning and implementation of the ICT projects is minimal. Planning and implementing ICTS in schools should not be a matter of the policy-makers or the government alone. The surrounding communities should be the most influential because they are potential beneficiaries of the implementation. In addition, the communities could best tackle the issue of security if they are informed beforehand of the development. Due to the top-down technology planning and minimal involvement of the school community in these interventions, the community may see mindset kits as handouts, which needs little or no commitment from the community. Hence, communities need to have a sense of belonging and engagement to sustain implemented technology projects over time (Salmons, 2008: 122).

2.25.3.2 LACK OF ICT DEVELOPMENT PLANS IN SCHOOLS

As Younic (2006) remarks, the school is the one division of planning for successful integration of ICTs in teaching across the curriculum. Unfortunately, such plans and arrangements are not available in schools where MSN projects are running. However, in some schools, the principals tend to act as ICT leaders and co-ordinators, which depicts the lack of proper ICT leadership required to ensure

maximum results. Hence, due to the lack of solid and coordinated school plans, constant technical issues of connectivity, reliability, access, and technical support were mishandled. Thus, the lack of school ICT planning transforms to limited use of MSN equipment on pedagogy and classroom practice. The top-down approach of planning in the MSN projects disempowers and discourages schools from leveraging existing training and professional development programmes to formulate long-term ICT professional development plans (Salmons, 2008: 122-123).

Hence, the researcher argues that the lack of sufficient skilled employees or teachers equipped with the knowledge and expertise of computer literacy in the school environment is one of the reasons that some schools are lagging in integrating the implementation of ICT in teaching and learning or integration into the curriculum. Thus, this puts unnecessary pressure on most teachers, especially the older generation because they never really focused on their digital expertise. For example, even at our homes, there are times when a parent asks you to do something on their phones or laptops because they cannot catch up with the changing times or even operate their digital tools properly.



2.26 THE SOUTH AFRICAN EDUCATION SYSTEM

South Africa as a country has experienced political change, which was driven by policy. In 1994, the Government of National Unity (GNU) was established to generate policies drawn from the new constitution to ensure equity in terms of access, reconstruction, development, and reconciliation. However, due to a shift in different aspects in the education system, Maddock (2018: 194) states that the Curriculum and Assessment Policy Statement (CAPS) has replaced Outcome-Based Education (OBE), which focuses on excellence, subject knowledge and demands a higher standard of performance from students. In 2012, the Minister of Basic Education Angie Motshekga referred to challenges encountered between “apartheid” and “transformation” in education.

According to Maddock (2018: 194), the Minister also mentions that “ongoing implementation challenges resulted in another review in 2009 and 2002 document] to produce this document had to be revised” (Motshekga 2012). This policy (CAPS) focuses primarily on English First Language Grades 10–12, the most important stage

in a learner's school career. Therefore, this has the potential to open the doors to future academic studies and training programmes to ensure "fundamental human rights and improve the quality of life of all citizens and free the potential of each person" said Minister Motshekga in 2012). Maddock (2018: 195) further state that the general aims in the policy issued during 2012 include the following; providing access to higher education, facilitating the transition of learners from educational institutions to the workplace, and providing employers with a sufficient profile of a learner's competences (Motshekga 2012).

Therefore, in the light of South Africa's twenty-eight per cent of the unemployment rate, three of these are aims are valid although they are not being achieved. Thus, the policy promotes certain principles such as critical learning, which is the creation, production, and training of critical thinkers.

2.26.1 OPERATION PHAKISA ICT FOR EDUCATION

The South African government launched an ICT integration programme into the education sector called Operation Phakisa in October 2015. This programme was meant to ensure all learners regardless of their background, benefit from the education that will enable them to obtain the technological skills in the learning environments. The Operation Phakisa ICT in Education programme is believed to act as a guide in fast-tracking the technology integration and connectivity into teaching and learning activities. However, the new programme Operation Phakisa is expected to bring tremendous results to South African education sector and is considered a problem-solving methodology (Odendaal, 2017).

The programme was patterned after a similar Malaysian programme aimed at improving performance in various sectors. It was unveiled in 2014 with the implementation of the opening Oceans Economy Phakisa segment (Odendaal, 2017). This was followed by the implementation of Operation Phakisa in the Department of Health, with plans underway to launch Operation Phakisa Mining in due course. Therefore, it seems almost feasible that the government plans and efforts will not be in vain because it has developed a systematic and detailed rollout plan for the delivery the curriculum through ICT infrastructure to schools across South Africa.

The strength of the Phakisa project lies in the involvement of critical stakeholders in its design and implementation. Odendaal (2017) states that more than 120 key stakeholders and decision-makers organised timelines for deploying five streams identified as; digital content and curriculum, ICT teacher professional development, e-administration, information technology lifecycle management, and connectivity. Thus, with the efforts and plans being met on time in each of the provinces, this vision could be a success because there are schools that need proper maintenance and internet connectivity for their computers. For instance, President Zuma told delegates at the launch “it is of no use to have computers sitting in a laboratory without the necessary software’s for them to operate properly because these are mostly underprivileged public schools in remote areas. Thus Operation Phakisa ICT in the education lab marks an overdue turning point in the quest to transform teaching and learning through the appropriate use of ICTs as envisioned by the 2004 White Paper on e-education” (Odendaal, 2017).

However, as stated by Odendaal (2017), building on the experiences and lessons of large-scale provincial and national ICT deployments, such as the Gauteng online project, the Western Cape Khanya Project and the current school connectivity project through the universal services and access obligation, the Operation Phakisa lab presented tangible ways in which ICT could be leveraged for educational development. Therefore, the Department of Basic Education aspires that learners leave the schooling system as ethical, discerning, and responsible users of information and ICT capable of making meaningful contributions to society.

Thus, teachers would be able to access the resources necessary to create effective learning opportunities for all learners. At the same time, ICT strengthens school data collection through rapid, reliable, and transparent information flows. The ICT in education lab tabled a rollout plan that included a costed implementation plan for all schools; professional development programme for all teachers and administrators; documented change management plan for ICT integration, and monitoring, and evaluation plan including the indicators for successful ICT use in all schools (Odendaal, 2017).

Therefore, when a school has an ICT administrator or ICT leader, it is likely to operate properly in the department and have a website and communication network

between teachers and learners, for example, blackboard. Hence, at times, this would make it easier for learners to submit their assignments online.

2.27 EDUCATIONAL POTENTIAL FOR AN INFORMATION SOCIETY

There is a widely accepted belief that developments in our societies should reflect in education and the organisation of learning. For an information society, this implies that learners must acquire productive skills, problem-solving skills, independent learning skills, and skills for life-long learning. This is only possible when schools enable learners to become more active and more responsible for arranging their own learning process. However, Plomp (2003: 18) argues that the learning process in high schools has been traditionally organised. Learners receive support in the form of well-adapted subject matter content, learning activities organised by a teacher, adequate curriculum materials, and technical infrastructure.

While ICT can be and is widely applied to enhance education using a traditional pedagogy bringing about the learning outcomes desired for an information society requires essential changes in the pedagogy, which is a key aspect of the implemented curriculum. Therefore, an emerging pedagogy for an information society should reflect changes on all these components of the learning process (Plomp, 2003: 19). Thus, researcher agrees with Plomp (2003: 19) that integrating digital media technologies into the curriculum should reflect teaching and learning that enhances problem-solving skills.

2.28 CURRENT ICT POLICIES AND PRACTICES IN SCHOOLS

Usually, policies that govern ICT in the curriculum in most countries focus strongly on secondary education, which is have an ICT infrastructure even when there are no strong policy directives on curricular aspects. Generally, the use if ICT is encouraged or expected, and schools are free to decide the place of ICT in the curriculum and how to organise it. According to Ghavifek et al. (2016: 40), most countries consider ICT skills fundamental skills that all students need to acquire. They all differ in how they operationalize this policy goal. However, during the 1990s, computer skills were taught in courses that focused on the instrumental use of computers and general-purpose software. Ghavifek et al. (2016: 41) states that today the focus is on how to

use the internet and the WWW in assignments and tasks performed inside and outside schools. However, all students are taught programming skills at the secondary school level in only a few countries, such as Bulgaria, Chinese Taipei, and the Russian Federation. Hence, quite a few countries offer computer science as an elective for secondary school learners to prepare them for higher education. However, it is interesting to observe how policies on ICT as a school subject in the curriculum are conveyed in certain regions.

2.29 INTEGRATING ELEARNING INTO EXISTING EDUCATIONAL SYSTEMS

Educational systems are thus looking to e-learning programmes to help address challenges and substantially improve their education's quality and content (Biswas, 2016). Integrating eLearning into an existing secondary educational system, however, can be a significant challenge. Secondary educational systems in developing countries are undergoing rapid change, particularly an increase in the number of schools and a rise in student enrolment related to the recent emphasis on universal primary education. A consequence of this development, being experienced in Tanzania and elsewhere, is a significant shortfall in the number of teachers, particularly subject-specialty teachers, a declining student and teacher ratio, a lack of learning materials, and declining or stagnating test scores. Infusing technology into this context could be a powerful method to address these shortfalls partially (Biswas, 2016).

Also, according to Biswas (2016), investments in e-learning and integrating e-learning programmes into existing educational systems can promote a transformed education system. Thus, implementing a comprehensive e-learning programme would mean changes to the curriculum, infrastructure, teacher professional development, textbooks, and exams. A major benefit of integrating eLearning into governmental educational systems would be a long-term commitment to growing and maintaining the programme, with fewer eLearning initiatives ending when donor funding stops. Furthermore, Biswas (2016) states that many studies of e-learning programmes have concluded that the key to ensuring successful outcomes is to blend more traditional classroom approaches with those that use technology. E-Learning approaches should be treated as a powerful tool that teachers can use. Still, teachers need to learn how student learning changes with eLearning, and how

to alter their teaching methodologies with pedagogical approaches that take advantage of the opportunities afforded by eLearning. Therefore, a blended approach mixing face-to-face classroom methods with technology-mediated activities seems to provide the highest learning outcomes. This can be a significant undertaking in African countries where secondary teachers have little prior experience with computers or similar technologies. In-service and pre-service e-learning teacher training programmes have been designed and tested.

2.29.1 E-LEARNING TECHNOLOGIES IN SECONDARY SCHOOLS

Many e-learning settings and technologies are available to use in schools, each with its advantages and applications (Kituyi & Tsubira, 2013: 20). Often the best solution is a combination of technologies depending on the particular need and learning environment. In a multi-media classroom, educational content is delivered to students in a one-to-many approach. This is cost-efficient per pupil and can provide a large number of educational resources to students. Classrooms would be equipped with a projector, screen or large LCD, speakers, and a classroom computer. The teacher could display various types of content housed on either the classroom computer or the teacher's laptop, or other devices.

Kituyi & Tsubira (2013: 20) further mentions that the teacher would be able to adapt and project various content, for example, videos, PowerPoint slides, augmented reality, multimedia presentations, the teacher drawing a graph, and so forth. A connected classroom would have wireless or wired communications to a cloud of resources. The teacher would then have access to a wide range of content from the library on the cloud. The computer housing the content could be locally based at the school, which would prevent the need for inter-school communications and be reliable at a district or national educational headquarters elsewhere.

Kituyi & Tsubira (2013: 21) also suggest that connected multi-media classrooms permit distant classroom teaching. A teacher in one school or studio could deliver live and interactive lectures to classrooms in other schools. The remote classrooms would need to be equipped with video cameras, microphones, and projectors and speakers in order to communicate with the distant teacher.

Therefore, a *computer lab* is among the most recognizable form of e-learning technologies, and it usually consists of many single personal computer stations (Al-adwan & Smedley, 2012: 123). This is a common arrangement found in schools throughout the world. Many educational software packages available could be installed for student use. However, computer labs can be more expensive per student due to the individual computers and software licenses. The computer or device may also have higher power consumption demands necessitating low-cost power solutions.

However, Al-adwan & Smedley, (2012: 124) states that multi-seat computing consists of using one powerful personal computer with extra video cards to support up to eight independent seats, each with its own monitor, keyboard, and mouse running separately. They can be put in a computer lab for students or teachers to use or in classrooms. There are several commercially available multi-seat operating system software options, including Microsoft and Linux. Either of the systems mentioned above has the advantage of using much less power than other options. It is usually the least expensive per user (Al-adwan & Smedley, 2012: 124).

A *personal computer* is the most common approach for using computers in homes and offices and consists minimally of a computer, one or two monitors, a keyboard, and a mouse. Thus, each computer has its own operating system and software programmes (Kituyi & Tusubira, 2013: 25). Hence, it is easy to maintain and does not require a specially trained computer technician to fix most hardware and software problems. However, if each student were to have a computer, this would be amongst the costlier options to implement, particularly in rural areas reliant on solar power. This would be useful particularly for teacher stations or single stations in the back of classrooms.

A *microcomputer* is similar to a standard single station but it uses a small form factor case with a generally slower processor. Power consumption can be much lower than a single station and appropriate when power is limited. However, the computers are difficult to repair and may be prone to theft and overheating; the lifespan of these devices is not yet known, and software maintenance is similar to a standard single station.

Kituyi and Tusubira (2013: 28) hold that laptops or notebooks are among the easiest educational solution to set up. They usually come with preinstalled software and needs only a power outlet to begin using the system. The power consumption is low compared to a personal computer. Hardware maintenance can be difficult, but software maintenance is standard. One of the disadvantages is product lifespan; they are easy to steal and are prone to accidents. New design and battery technologies are lengthening battery life in some machines.

Laptops may be an excellent solution for teachers because teachers can bring a laptop to work and then connect it to the classroom projector. Small and personal devices such as *tablets, smartphones, and e-readers* are similar in that they are all relatively new technologies. They are rapidly gaining popularity due to their declining price, many web-based software applications, powerful graphics, and enjoyment of use. Educational uses could include listening to audio lessons or audiobooks, gaming, watching videos, and reading. Thus, writing could be more complicated if the device does not have a keyboard. Schools and teachers can develop teaching material applications for mobile devices using existing software (Kituyi & Tusubira, 2013: 28).

According to Biswas (2016), a tablet or a personal computer is similar to a laptop, although it is a touch screen and often has a smaller hard drive and screen. Thus, tablets may or may not have a keyboard, and the touch screen permits a new form of interaction between humans and the machine. Hence, the uses are becoming increasingly apparent. As educational software is developed to take advantage of touch screens, tablets may become helpful in eLearning.

Mobile Phone or smartphone cellular internet coverage is often available even in rural areas especially compared to broadband. With the rapidly declining cost and increasing features of mobile phones, there is potential to use mobile phones as a web-based e-learning technology. For example, students can use them as a virtual clicker to answer questions teachers ask in class or for games and quizzes by using text messaging interfaced with an instructor's computer or phone. They may be used as an e-reader or for communicating with other students or teachers.

Al-adwan and Smedley (2012: 129) also suggest that e-Readers are becoming popular as a relatively low power, inexpensive replacement for traditional textbooks. Their purchase price is declining because one e-reader could contain multiple textbooks or other readings and the content could be easily updated. E-readers often have high resolution, monochrome screens, making them suitable for reading text but not for multimedia applications. E-readers may be very useful where books are expensive, hard to find, or need to be updated frequently. It would be easy to upload in-class handouts to student e-readers as well. Therefore, copyright agreements and revenue sharing would need to be arranged with the publisher of the book.

2.30 THE FLIPPED-LEARNING CONCEPT/ APPROACH

The flipped learning (FL) approach refers to a present instructional model of teaching whereby the educator incorporates technology into the traditional learning methods (Tomczyk, 2018: 70). Therefore, the FL “is an instructional model, which is enhanced by technology with several key elements” (Akçayır & Akçayır, 2018; Cabi, 2018; Lo & Hew, 2018) and focussing mainly on the three factors mentioned below cited in (Tomczyk, 2018: 70). Firstly, Tomczyk (2018: 70) states that the teacher has the ability to transform the teaching mode, traditionally designed to that which is virtual and constitutes access to learning materials through the online platforms available. (Akçayır & Akçayır, 2018).

Secondly, the FL model makes use of technology to “increase the accessibility of class content and to increase its engagement potential,” (Cabi, 2018; Lo & Hew, 2018). Therefore, this is practised so that the learners have access to more content related to their school subjects and able to engage with other learners and teachers through the online platforms that are made available. There may be different online platforms that are made available to learners depending on each school. For example, some schools and educators make use of the D6 School App, WhatsApp, Facebook, YouTube, Skype, and so forth.

Lastly, in the FL model, the use of technology serves to attend to personalized individual needs in terms of content in order to keep the learners engaged (Bergmann & Sams, 2012). Thus, the researcher believes that incorporating digital technologies for learning activities is imperative as it reaches different learning with

various learning needs and capabilities. Therefore, having access to video, audio, or textual content assists the learners understanding clearly, what they are distinctly taught in their subjects.

2.31 THEORETICAL (OR CONCEPTUAL) FRAMEWORK

This section discusses in detail the theories that the researcher used to address the research problem. Therefore, the researcher has used the Diffusion of Innovation Theory, Uses and Gratification Theory, and Cognitive Learning Theory. According to Chang (2018: 1), the diffusion of innovations theory, entails the notion of improving or developing the way people engage with their tasks in the modern world. The cognitive theory of learning is concerned with the learning process, which is what is going on in the individual's head (Pachler & Leask, 2013: 8), while the uses and gratifications theory is concerned with the satisfaction, an individual gets from using a certain media to access information. Thus, all these three theories blend and are consistent with the research title, which focuses on studying the use, implementation of digital technologies for teaching and learning and how this affects the process. Specifically, the diffusion of innovation theory explains the relevance and need to incorporate digital technologies in the twenty-first-century curriculum.

On the other hand, the cognitive learning theory explains the processes of learning, how the learner becomes a more creative and independent thinker using digital technologies. The uses and gratifications theory was used to understand learners and teachers' gratifications by using different media platforms to communicate and search for information (Korhan & Ersoy, 2016: 1). The researcher saw it relevant and needed the use of different theories as this an inter-disciplinary study. This means that this study draws and focuses on different fields, which are communication and education as it seeks to encourage the use of technology by high school teachers in the classroom especially in public schools. These technologies assist the learner's in possessing articulation skills and being problem solvers in their classes. Having the ability to search for information and be part of knowledge creation and sharing allows the learner to be independent and think critically. Therefore, these theories each of the theory contributes a specific perspective to the research study, as discussed in detail below.

2.31.1 DIFFUSION OF INNOVATIONS THEORY

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1961). Innovation is an idea, practice, or object perceived as new by an individual or other adoption unit (Rogers, 2010). Thus, Chang (2018: 1) mentions that the choice is always based on choosing standardization or innovation when it comes to information management. Therefore, the theory links to this research in the sense that the integration of digital media is regarded as a new phenomenon in the twenty-first century. It is regarded as new because of the developments and advances in social media and other digital technologies. Chang (2018: 1) describes the theory as one that helps to explain the adoption process of innovation by modelling its entire life cycle according to the aspects of communications and human information interactions.

The diffusion of innovation theory analyses how the social members adopt the new innovative ideas and how they arrive at the decision to adopt the innovation. Both mass media and interpersonal communication channels are involved in the diffusion process. According to the theory, innovations should be widely adopted in order to attain development and sustainability. In this case, the development concerns implementing and using information and communication technologies in secondary school classrooms. In real-life situations, the adaptability of the culture played a very relevant role wherever the theory was applied. Rogers (2010: 10) proposed or outlined four elements of diffusion of innovations. They are, innovations, communication channels, time, and social systems. Innovation is an idea, practice, or object perceived as new (with the aim of bringing about development) by an individual.

It can also be an impulse to do something new or bring some social change. Communication channel refers to the communication channels that take the messages from one individual to another. It is through the medium of communication that innovations spread across the people. It can take any form like word of mouth, SMS, any sort of literary form. Time refers to the length of time it takes for people to adopt the innovations in society. It is the time people take to get used to new ideas. For example, consider the research at hand, it is the department of education,

principals, teachers, learners, parents, and the entire community that have to adjust to the changed methods of teaching and learning that include new media. The social system interrelated network group join together to solve the problems for a common goal. Social system refers to all kinds of components that construct society like religion, institutions, groups of people and so forth.

Furthermore, Rogers suggests that diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication in that messages are concerned with new ideas. Communication is a process in which participants create and share information with one another in order to reach a mutual understanding (2003: 5). Communication is a process of convergence or divergence as two or more individuals exchange information in order to move toward each other in the meanings that they give to certain events.

Thus, communication is seen as a two-way process of convergence rather than as a one-way linear act in which one individual seeks to transfer a message to another in order to achieve certain effects. For instance, in this case, the government and the department of education make solemn implementations to encounter the problems of learners in secondary schools, especially lead them to more productivity than there already is. This determination, which is embodied in operation Phakisa intervention (ICT for education), will make a huge difference in the teaching and learning system of the Eastern Cape secondary schools. Because not only will the learners be able to operate computers and tablets but also be able to learn independently, which stimulates creativeness amongst the learners.

Diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of a social system. Rogers further argues that when new ideas are invented, diffused, and adopted or rejected, leading to certain consequences, social change occurs. Such change can happen in other ways, for example, a political revolution, government policy, and so forth (Rogers, 2010: 6).

2.31.2 USES AND GRATIFICATION THEORY

The uses and gratification theory refers to the effects of media on people or recipients. In the case of this study, the recipients or people in question are the

learners exposed and use the different learning platforms to acquire relevant information for their subjects. In this regard, information can be acquired through digital technologies and the internet by accessing different search engines such as Google. Korhan & Ersoy (2016: 1) suggest that the uses and gratification theory is a media use paradigm from mass communications research that guides the assessment of consumer motivation for media usage and access.

This means that the theory is relevant to the study in the sense that the teachers and learners can incorporate different media platforms in their teaching and learning process to get the information they need, and that is satisfactory for their subjects. The media platforms can be used to communicate information to relevant stakeholders in a way that is satisfying to both the sender and the receiver of the message. The theory suggests that individuals can choose to seek information that speaks to them. Hence, learners use online search engines or books to access information and knowledge relevant to their subjects.

However, the uses and gratification theory is one of the theories that focus on social communication. Thus, the theory blends in this study as teachers and learners use different media, including social media to communicate. This theory adopts a functionalistic approach to media and communication. It states that the media's most important role is to fulfil the needs and motivations of the audience. The theory focuses on two main questions; why are people attracted to certain media, the kind of satisfaction media provides for people. It initially focuses on the motives of the audience (Seekhiew, 2009) and then analyses the message and social system (Sarkisia, Nikoo, Saeedian, 1997).

According to Amiri, Noori & Basation (2012) this theory concentrates on understanding how users seek media, the type of media they seek, the content they seek, the method they use in seeking the media, and the degree of satisfaction they derive from their preferred media. For example, due to the Covid-19 pandemic some schools have embraced the WhatsApp platform for communicating with learners and parents. This, communication is not limited to disseminating learning materials but also important news updates. Therefore, the WhatsApp groups have added to the use of emails to communicate electronically, but WhatsApp is seen to be more effective and instant.

2.31.3 COGNITIVE LEARNING THEORY

The cognitive theory focuses more on what goes on in people's heads, and, in particular, the learner instead of focussing on observable behaviour. For instance, mental processes rather than the actions of individuals. Thus, this theory links to the study as the notion is to shift the instruction of the twenty-first-century classroom from passive learners to active learners engaged in knowledge creation and sharing. Therefore, knowledge is no longer seen as a passively absorbed behavioural repertoire such as giving out notes to be memorised for tests and assignments (Pachler & Leask, 2013: 7). As a result, the learner is outlined as a mentally active participant in the learning process. The researcher believes this is possible through digital technologies because the learners will also research to broaden their knowledge and better understand a topic.

Therefore, two leading schools of thought can be distinguished concerning theoretical conception of cognition. They are information processing and constructivism. The latter (constructivism) sees knowledge as consisting of symbolic mental representations. In other words, knowledge is something that learners actively construct based on their existing cognitive structures and learning as a process of active discovery. What this means is that knowledge is relative to the learners' stage of development and existing mental representations (Pachler & Leask, 2013: 6). Thus, learners in high school are capable of doing their own research especially with the proper and adequate resources provided to them and internet access.

Research on intelligence or intelligence behaviour indicates that the information-processing model of cognitive psychology behaviours significantly informed behaviours seen as appropriate use of cognitive skills and strategies within specific contexts (Williams & Burden, 1997: 20). The ability and capacity to learn in different ways has given rise to interest in so-called learning styles, for example, in the notion that students have different learning preferences such as visual, aural, and kinaesthetic (VAK).

In terms of educational technologies, the theories of cognitive psychologists appear to inform software implementation. This follows the revelatory paradigm of discovery-

based and problem-solving oriented learning and simulation. Pachler & Leask (2013: 7) as cognitive psychologists are the most notable proponents of using the potential of new technologies to help learners construct new understandings through their exploratory activity. Generic software such as word processors, databases, spreadsheets falls into this category.

There is some consensus amongst commentators that these applications liberate and empower users to engage in cognitive and creative thinking (Pachler & Leask, 2013: 9). Therefore, this theory is relevant to this study as it promotes creative thinking whereby learners can adapt to a new culture of learning enhanced by ICT use. For instance, learners can be assigned to do a specific task or project by their educator and through the use of the internet; they are able to get information on their own without being told exactly what to do.

Thus, implementing digital technologies in teaching and learning assists in making the work of educators less cumbersome. It also prepares and equips learners with the skillset that they will use outside the school. Learners who are computer literate and able to solve problems or think independently have better chances of employment. Thus, by implementing and using these digital technologies, the Department of Education aims to improve the learning conditions of the learners in the Eastern Cape. Specifically, the programme targets to improve matric pass rates improve learners' computer skills in education lacking as most schools in the Eastern Cape lack useful resources for education.

2.30 CONCLUSION

To conclude, it seems virtually reasonable that more schools need to adapt to the use and implementation of digital technologies in their classrooms and pedagogy to achieve maximum pass rate and computer skills development that aids in closing the digital gap that exists in society. Hence, the South African government is making efforts to make the country's learners more equipped with computer skills to be globally competitive. There are different types of digital technologies available for learners to access the software needed for learning purposes, such as tablets, laptops, smartphones, etc.

Furthermore, in a school environment that adopts a technologically advanced curriculum, learners will have access to online platforms such as Google, YouTube, Facebook, or WhatsApp for communication purposes that concern schoolwork between learners, the teachers, and other school stakeholders.



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CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This study employed a mixed methods approach to investigate the implementation of digital media in pedagogy in public and private high as implemented by the Department of Basic Education. This chapter describes in detail the research methodology employed in this study. This section focuses on unpacking the methodological framework, including research approach, research design, data collection methods, research instruments, the population of the study, sample and sampling technique, data analysis and ethical considerations. It provides a detailed description of the data collection instruments, including questionnaires for obtaining information from learners and purposive or judgemental interviews for the Headmasters (or Principals).

3.2 RESEARCH PARADIGM

This part will discuss the research paradigm employed in this study. As described by Kuhn (1970), an American philosopher, a research paradigm refers to a set of common beliefs and ideologies between scientists about resolving problems encountered in a scientific inquiry. Kuhn was the first to use the term paradigm to refer to a philosophical way of thinking in 1952. There are various paradigms to research that a researcher may employ depending on the nature of the study. The next section provides an overview of four research paradigms; positivism, constructivism, pragmatism, subjective and critical worldviews. After that, the underlying research paradigm for this study will be outlined, providing justification for the choice.

3.2.1 THE POSITIVIST PARADIGM

The positivist paradigm exists with the notion that there is only a single truth, and that this truth can be measured or observed using the quantitative method of knowing. According to Richards (2003: 37), the positivism paradigm refers to “a branch of philosophy that rose to prominence during the early nineteenth century because of the works of the French philosopher Auguste Comte”. Rehman and Alharthi (2016: 2) suggests that positivism follows the assumption that reality exists

independently of humans and is not mediated by our senses as undeniable laws govern it. Furthermore, the ontological position of positivists is that of realism, in other words, positivists strive to understand the social world like the natural world.

Thus, in nature, there is a cause-effect relationship between phenomena and once established, it can be predicted with certainty in the future. However, Rehman and Alharthi (2016) also state, “the epistemological position of positivists is that of objectivism. Thus, researchers come in as objective observers to study phenomena that exist independently of them and they do not affect what is being observed”. Positivists focus on the quantitative method of research, which emphasises numerical data or empirical evidence. There has been criticism of the nature of the positivist paradigm, leading to the “emergence of post-positivism” paradigm (Grix, 2004: 86) cited in Rehman & Alharthi (2016: 2). Post-positivism was an attempt to address the weaknesses of the positivist paradigm.

Thus, the ontological position of post-positivism is that of critical realism. It assumes a reality that exists independent of the observer. Rehman & Alharthi (2016) also suggest that it also recognises the researcher's own beliefs, opinions, and values that may affect what is being observed or studied. In other words, post-positivism allows the researcher to apply their knowledge as opposed to the positivism approach. However, in this study, the researcher was not in a position to employ this paradigm. The nature of this study required a paradigm that does not restrict the research into a single truth, as it used a mixed-methods approach.

3.2.2 CRITICAL OR TRANSFORMATIVE PARADIGM

The critical paradigm focuses its research on social justice issues. It seeks to address the political, social, and economic problems, which lead to social oppression, conflict, struggle, and power structures at whatever levels these, might occur (Kivunji & Kuyini, 2017: 35). Thus, the paradigm focuses on solving matters affecting the well-being of individuals in society. Critical or transformative paradigm can be applied to a research study mainly concerned with social or political injustice in society.

3.2.3 CONSTRUCTIVISM OR INTERPRETIVIST PARADIGM

The main aim of this paradigm is to understand a phenomenon from the perspective of the subject being studied using human experience and perception. In other words, by applying this paradigm, “it is to understand the subjective world from a human experience” (Guba & Lincoln, 1989) cited by Kivunja & Kuyini (2017: 33). This paradigm is not suitable for the quantitative research approach, which requires inquiry to be conducted in a manner whereby the truth can be measured or observed. Therefore, the constructivism or interpretivism paradigm is most suitable for research studies where a researcher studies victim in a certain situation.

3.2.4 PRAGMATISM PARADIGM

Pragmatism as a research paradigm embraces a plurality of methods, which is often associated with mixed-methods or multiple-methods (Kaushik & Walsh, 2019: 2). Philosophers who were against the nature of the positivist paradigm formed this paradigm. The positivist paradigm argues that a single scientific method can access the truth about the real world. Thus, the pragmatism paradigm suggests that the truth about the real world can be accessed using different research methods. Therefore, this paradigm is suitable for the research study at hand, as it employs both qualitative and quantitative methods, which is called the mixed methods approach. Commonly used methodologies in pragmatism include narrative inquiry, case study, ethnography, action research, experimental methodology, quasi-experimental methodology, and casual comparative methodology (Kaushik & Walsh, 2019: 2).

3.3 RESEARCH DESIGN

Research design is described as the logic or primary research strategy that shows how the study will be conducted. It shows how all of the significant parts of the research study, the samples, measures, and programmes work together to address the research questions. The research design can be seen as a set of techniques or actions that improve the data validity for a given research problem. According to Mouton (1996: 175), the research design functions as an approach to complete the research as well as ensure the validity of the findings. It provides guidelines from the important philosophical assumptions to research design and data collection.

Yin, (Yin, 2003: 19) describes a research design as a plan for achieving set goals, for instance getting from here to there. The “here” can be well defined as the original set of questions to be answered and “there” representing the answers provided by respondents. Thus, the researcher employed both the qualitative and quantitative approaches also called a mixed-method (or triangulation) approach. A mixed-methods approach can be carried out in the social sciences to ensure that the data collected interrelates and is free from participants’ biases.

Therefore, the researcher made use of questionnaires to gather information from the learners, while interviews were used to collect data from the principals. The qualitative data was analysed using themes, which is known as thematic analysis. On the other hand, the quantitative data was analysed through graphs accessed by a computer programme called Microsoft excel.

3.4 STUDY POPULATION

The study’s target population consisted of secondary schools that have integrated the learning process with new media technologies in their classrooms in South Africa. The accessible population of this study comprise three secondary schools, two in Makhanda previously known as Grahamstown, namely, Graeme College and St Andrews College, and one in Alice, Elukhanyisweni Senior Secondary School, all in the Eastern Cape. These abovementioned schools were accessible to the researcher because two of them use digital technologies. The population parameters considered when the researcher executed the research were mainly the learners’ grades, age, and gender.

3.5 RESEARCH METHOD OR APPROACH

There are three known research methods used to carry out research study; qualitative, quantitative, and mixed methods. The research methodology employed for this study was the mixed-methods approach, which constitutes both the quantitative and qualitative methods of research. According to Mukherjee (2019), a methodology in research refers to an approach or a protocol that has followed in a specific sequence detailing the tasks involved in the study.

The researcher has selected the mixed-methods approach in order to respond to the research questions posed in this study, as they require both numerical and textual data (Williams, 2007: 65). Employing qualitative and quantitative research methods was based on the notion that using different research instruments, which were self-administered questionnaires and semi-structured interviews, would provide a more nuanced understanding of the problem. Therefore, the sequence of the tasks undertaken in the research will be outlined in detail as required.

3.5.1 MIXED-METHODS APPROACH

A mixed-methods approach involves combining or integrating both qualitative and quantitative research and data in a research study. Qualitative data tends to be open-ended without predetermined responses, and quantitative data usually includes closed-ended answers as found on questionnaires or psychological instruments. However, a mixed-methods approach has different forms; convergent parallel mixed method, explanatory sequential mixed method, and exploratory sequential mixed-method (Creswell, 2013: 15).



This study has made use of the convergent parallel mixed-methods design. This is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design, the investigator collected both forms of data at roughly the same time and then integrated the information to interpret the overall results. The design helps to explain contradictions or incongruent findings and further probes inconsistencies (Creswell, 2013: 15).

3.6 SAMPLING AND SAMPLE SIZE

Sampling involves following a rigorous procedure when selecting units of analysis from a target population (Du Plooy, 2010). The term population refers to people and can be defined as any group of individuals, groups, organisations, social artefacts or objects, or social interactions and events. A sample is a subset of the population being studied. It represents the larger population, and is used to draw inferences about that population. It is a research technique widely used in the social sciences to

gather information about a population without having to measure the entire population.

There are several different types and ways of choosing a sample from a population, from simple to complex. Therefore, the sample for this study consist of three different high schools, with different sample sizes depending on the population. For instance, in Graeme College, 123 learners were accessible. In St Andrews College, 156 learners were available, while 91 learners were accessible at Elukhanyisweni Secondary School.

3.6.1 SIMPLE RANDOM SAMPLING

Simple random samples are selected so that each member of a study population has an equal probability of selection. Conventionally, to select a simple random sample, you need to have a list of all members of your population. Then you randomly select elements until you have the number you want, perhaps using the blind drawing technique or a random number table, and the starting point is randomly selected (Clark & Adler, 2007: 114). The researcher numbers all the elements in the sampling frame and then uses a systematic procedure for picking corresponding numbers from the random numbers table. For a large sample, a computer programme can produce a random sample of any size quickly and easily by generating a random selection of numbers within the desired range.

The key characteristic of truly random sampling is that each element's probability of selection is equal. For instance, if a sample of 40 learners is to be chosen from a population of 600 that is a sampling frame of 600, the probability of selection for each element is $40/600$ or 0667. Every element has an equal chance of being selected, just like the odds in a toss of a coin ($1/2$).

Likewise, Medhi (1992: 377) suggests that all the units in the population are thoroughly mixed up and then a sample is drawn at random. A basic way to do this is by using the lottery method, in which one uses the tables of random numbers. Many such tables are available such as; Tippets tables, Fisher and Yates Tables, and Rand Corporation Tables. Such a table can be used to prepare a sampling frame listing the units in the population and number them from 1 to N (N is the population

size). Suppose $N=5000$, and we wish to take a sample of size $N=1000$. We take any random number table and choose any page from the table.

Starting at any row or column, we write down the numbers in groups of 5 (as N is a five-digit number). Excluding the numbers which exceed 5000, we can get the set of numbers less than or equal to 5000. The units, which correspond to these numbers, will be the units to be sampled. Better methods are available for increasing the speed of selection (Medhi, 1992: 377). Thus, a simple random sampling method affords an equal probability of selection (Engel & Schutt, 2009: 89). Therefore, the researcher used a table of random numbers to select the elements and distributed questionnaires in each school for Grade 10, 11 & 12 learners to fill in. This was made possible by getting the names of learners in Grades ten to twelve from the administration offices of each school.

3.6.2 *PURPOSIVE SAMPLING*

Purposive sampling, which falls under non-probability sampling comes in various forms and can be ideal for exploratory and qualitative studies. In purposive sampling, the researcher selects sampling units they feel can best facilitate their investigation (Adler & Clark, 2007: 121). In other words, purposive sampling is based on a researcher's judgement. In purposive sampling, each element is selected for a purpose, usually because of the unique position of the sample elements.

Purposive sampling may involve studying the entire population of some limited group or a subset of a population. Purposive sampling may be used to examine the effectiveness of some interventions with clients who have particular characteristics such as a specific diagnosis. A purposive sample may be used in a key informant survey targeting particular individuals knowledgeable about the issues under investigation (Engel & Schutt, 2009: 96). Thus, the researcher conducted one interview with the Principal in each school to determine whether integrating new media platforms with pedagogy in the twenty-first-century classrooms positively impacts the learner's performance as the main reason they were adopted.

3.6.3 SAMPLING ERROR

Sampling error is the error caused by selecting a probability sample from a population that is not representative of that population. However, according to Babbie (2007: 288), a sampling error can be reduced by two factors in the sampling design. First, a large sample produces a smaller sampling error than does a small sample. Increasing the sample size allows for the collection of information from a wider cross-section of a heterogeneous population, thus reducing the sampling error (Webb, 2002: 45). Second, a homogeneous population produces samples with smaller sampling errors than does a heterogeneous population. The confidence level for the population of the sample of 370 school learners was set at 0.5 or 95 percent. Thus, as Webb (2002: 45), stated this study allowed for a cross-section of a heterogeneous population by comparison in terms of their grades, age, and schools.

This inaccuracy may be termed as sampling error or error variance (Kothari, 2004: 153). Kothari (2004: 154) further argues, that sampling errors are those errors that arise because of sampling, and they gradually happen to be random variations in the sample estimates around the true population values and are equally likely to be in either direction. Thus, the sample of this study includes learners from Graeme College, St Andrews College, both in Makhanda (Grahamstown), and Elukhanyisweni Secondary at Alice. The researcher distributed the questionnaires to the learners during their schooling hours, left them with the Principal and educators to fill out at their convenience, and brought back. Furthermore, the interviews were only conducted with the Principals or Head Masters of the selected schools.

3.7 DATA COLLECTION METHODS

Data collection methods are the techniques or practices taken into account to gather the relevant information from the research project participants. There are different methods for collecting data, and each type has its benefits and implications. The methods are observation, interviews, questionnaires, focus groups, and so forth. Data collection methods are considered to affect the quality, quantity, adequacy, and appropriateness of data. Researchers' selection of data collecting methods is often dictated by practical considerations such as the nature of the research problem, cost in terms of time, money, and availability of data and access to it (Pawar, 2004: 03).

Therefore, the data collection methods employed in this study are Likert scale questionnaires and open-ended interviews discussed in detail below.

3.7.1 JUSTIFICATION OF USING QUESTIONNAIRES

A questionnaire is essentially a structured technique for collecting primary data. Generally, it is a series of written questions, which the respondents have to provide the answers (Beiske, 2007:3). A questionnaire can be completed in one of two basic ways. Firstly, respondents could be asked to complete the questionnaire with the researcher not present. Secondly, respondents could be asked to complete the questionnaire by verbally responding to questions in the presence of the researcher. Therefore, questionnaires are restricted to two basic types of questions, which are closed-ended questions and open-ended questions.

In close-ended questions, a researcher provides a list of responses such as yes or no. On the other hand, in open-ended question the researcher does not provide the respondent with a set of answers from which to choose. Rather, the respondents are asked to answer in their own words. Therefore, the researcher distributed 123 questionnaires to respondents at Graeme College, 156 questionnaires at St Andrew's College, and 91 questionnaires at Elukhanyisweni Senior Secondary School to fill in the questions. For this research survey, participants filled questionnaires in the absence of the researcher because of time constraints and distance to the schools.

3.7.2 JUSTIFICATION OF USING INTERVIEWS

There are distinctively three types of research interviews; namely structured, semi-structured and unstructured interviews. Structured interviews are those in which questions are predetermined, thereby giving clear guidance about topics to talk about. Hence, it is not easy to diverge from the topic at hand. Semi-structured interviews have several key questions prepared by the researcher by the interviewer or interviewee is allowed to diverge from the topic.

Then, unstructured interviews are those in which the researcher bases the entire interview questions from the first questions allowing the interviewer or interviewee to diverge from the topic and are considered difficult to manage. There is little guidance

and direction. Also, it is considered to consume the longest time than necessary. Hence, to keep the interview in line and avoid losing unnecessary time, the researcher prepared the interview questions before the actual interview. Therefore, the researcher has conducted structured interviews with predetermined questions. The researcher interviewed the headmasters (or principals) from the three schools in order to find out their views regarding the use, exposure, implications and effects of new media and digital technologies that teachers and learners face.

3.8 DATA ANALYSIS

The researcher has analysed the data through different phases, given that the study adopted a mixed-methods approach, which entails both quantitative and qualitative data. Thus, the questionnaires were analysed using a computer programme called Microsoft Excel, and for the interviews, the researcher used thematic analysis, which is best suited for qualitative data.



3.8.1 MICROSOFT EXCEL GRAPHS/ ANALYSIS

The researcher has analysed and presented the data collected in a numeric form using graphs. The graphs used to analyse are able to depict the number of responses through percentages calculated manually and enter in the programme. The data presented in each graph reflects the number of answers according to the categories and characteristics that the researcher has identified to be studied. Therefore, this analysis is presented numerically. The researcher explains the nature of the question or item, what it seeks to establish or find out from the respondents. However, it would have been better to use SPSS (which is a Statistical Programme for Social Sciences) because it is a software used for the analysis of numerical or statistical data in social science research. Thus, I have tried to present the quantitative data through Microsoft Excel because due to financial and time constraints as well as the Covid-19 pandemic, which led to a national lockdown and lack of movement, has hindered me from getting the assistance I needed in order to present the findings through the SPSS programme.

3.8.2 *THEMATIC ANALYSIS*

When data is analysed by theme, it is called thematic analysis. This type of analysis is highly inclusive. The themes emerge from the data, not imposed by the researcher (Dawson, 2002: 115). In this type of analysis, the data collection and analysis took place simultaneously. Therefore, even background reading forms part of the analysis process, especially to help explain an emerging theme (Dawson, 2002: 116). Furthermore, Guest and Mac Queen (2008: 138) states that thematic analysis is more involved and nuanced as it identifies and describes both implicit and explicit ideas. Hence, codes that were developed for ideas or themes were then applied or linked to raw data in order to make a summary for later. This may include comparing the relative frequencies of themes or topics within a data set, looking for code co-occurrence, or graphically displaying code relationships. Hence, the interviews of the participants were analysed using themes according to their responses.

3.9 **ETHICAL CONSIDERATIONS**

This study focuses on information found by the researcher to answer the research questions and carry out the objectives. All participants were presented objectively and all information was being reported as such. The researcher observed the ethical considerations and regulations governing research conduct in the University, and the First, the researcher applied and obtained ethical clearance before proceeding with the research. The ethical clearance certificate for the study is attached as appendix (). Below are the researcher's specific steps to ensure the research conforms to the University's research ethical protocols.

3.9.1 *ANONYMITY AND CONFIDENTIALITY*

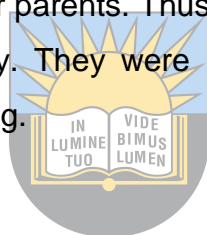
The issue of anonymity and confidentiality were strictly observed during the data gathering and analysis stages. The identities of all participants, including the high school learners and Principals of each selected school, were kept anonymous. The information obtained from them were utilised solely for the study. Thus, the participants were not required to fill in their names but only their grades and age to ensure anonymity. Furthermore, the participants were also assured of the confidentiality of the information they have provided and that it will be for this study only.

3.9.2 PROTECTION FROM HARM

In the process of conducting, the research there was no potential harm, or any process that could have put the lives of the participants at risk. The study required the learners to fill in the questionnaire, and the Principals were required to answer the structured interview questions from the researcher. Thus, the individuals who chose to participate in this study were not exposed to harm.

3.9.3 INFORMED CONSENT

The researcher obtained an Ethical Clearance certificate and a letter from the Supervisor. The letter, which was attached to the questionnaire asking for permission to conduct research with the identified sample and outlining the purpose of the study and what is expected from the participants. The researcher has pursued consent from the learners and their parents. Thus, the participants were made aware that their participation is voluntary. They were not obliged to participate and that there are no rewards in participating.



3.10 CONCLUSION

To conclude, the purpose of this section was to provide a clear, logical plan of the study, explain how the data was collected. The chapter provides details about the research methodology, research design, research approach, data collection methods, and sampling and sample size, data analysis, and ethical considerations of the targeted population for the study. Thus, a mixed-methods approach was most applicable for studying the integration of new media and pedagogy in twenty-first-century classrooms. Therefore, data were collected using questionnaires for the learners, while structured interviews were used to collect data from the Head Masters of the schools. Therefore, the quantitative data was analysed and presented numerically in the form of graphs, while the qualitative data was analysed and presented thematically. The next Chapter focuses on discussing the analysis and interpretation of the data collected.

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CHAPTER FOUR: DATA ANALYSIS

4.1 INTRODUCTION

This study investigated the phenomenon of integrating new media and pedagogy in the classrooms of public secondary schools, from grades ten (10) to twelve (12). Thus, as mentioned in the previous chapter, the study employed a mixed-methods approach, consisting of qualitative and quantitative research approaches. Likert Scale questionnaires were distributed to the participants (learners) of the following schools, Graeme College and St Andrews College (both in Grahamstown), Elukhanyisweni Secondary School in Alice. Masiphathisane High School, situated in Port Elizabeth, was selected for the pilot study. Interviews were further conducted with the Principal or Head Master in each school.

The data was analysed accordingly using graphs generated through Microsoft, although the researcher had initially intended to use SPSS (Statistical Package for the Social Science) for analysis. The researcher began by analysing the results of the pilot study carried out before the actual study to ensure the research questions and methods were indeed correct. The study was piloted/ or tested using 20 (Grade 11) learners through a Likert scale questionnaire at Masiphathisane High School in Port Elizabeth, Eastern Cape. The data collected from the pilot study was analysed and presented using graphs and tables.

4.1.1 ANALYSIS OF PILOT STUDY

A pilot study is perceived necessary for a quantitative research approach to ensure validity and reliability of the study. This then ensures that other researchers can replicate the study. The goal of the pilot study for this research was to explore the tools and strategies that the learners in secondary schools use for executing their schoolwork and explain the outcomes of using such tools and strategies. Considering that the researcher is working with minors as participants, it was necessary to seek signed consent from the parents. Therefore, parental consent was sought and obtained from the learners' parents before the execution of the study. The researcher distributed 20 Likert Scale Questionnaires containing 27 items to Grade 11 learners of Masiphathisane High School. The pilot study's feedback helped

the researcher identify the gaps in the questionnaire leading to the reconstruction of some questions and the overall structure of the study's questionnaire.

4.2 QUALITATIVE DATA ANALYSIS

Analysis of qualitative data (interview with the Principals) from Graeme College, St Andrews College, and Elukhanyisweni secondary school.

1. SCHOOL COMPUTER LABS AND THEIR FINANCES

1.1 GRAEME COLLEGE

The researcher wanted to find out if the school has a computer laboratory where the learners are able to learn computer-related subjects. A computer lab can also be accessible to learners for doing their assignments and researching their projects. This is important to understand how technology influences learners' independent learning and cognitive outcomes. This is consistent with the cognitivism theory. The theory focuses heavily on "individual's thought processes and has the teacher emphasize reflecting on experiences with metacognition, whereby learners have to think about their thinking" (Ghandi, 2021).

It was found that the school has a computer lab that is only accessible to the learners of the school. The school computer lab has a coordinator who is responsible for everything and everyone attending classes there. However, there is a computer literacy teacher responsible for each phase in the school. It is important to note that Graeme College is a government-funded school. Hence, they get a government subsidy, learners pay fees, and the school has and maintains sponsorships from outside businesses. In addition, it was noted that the school has a clearly defined procedure on how learners can use computer lab. The Principal agrees:

"Yes, we have a school computer lab which is operated by a coordinator who runs everything that has to do with the computers such as the maintenance besides the teaching and learning that is concerned with the learners and timetables of using the facility" (Principal, Graeme College, Makhanda, April 2019).

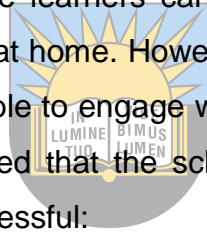
1.2 ST ANDREWS COLLEGE

The principal confirmed that their learners have access to a computer lab. Additionally, the learners have internet access in their hostels or residences, as this is a boarding school. Hence, the financing of the equipment depends heavily on the school fees that are payable by the learners and other external sponsorships. Because of the need for external support, the principal said the school ensures that it maintains high standards:

“The image of our school is very important as this is how we generate the school finances... the more learners we enrol from all over South Africa, the better” (Principal, St Andrews College, Makhanda, May 2019).

1.3 ELUKHANYISWENI SECONDARY SCHOOL

The school does not have any computer lab or digital equipment provided by the school to the learners. Hence, the learners can only use their own computers or laptops, smartphones and tablets at home. However, because this is a public school in a rural area it is almost impossible to engage with sponsors and for them to get to see the school. The principal noted that the school have made efforts to procure computers but have not been successful:



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“We have tried as the school teachers and SGB to acquire computers from the department of education as well as from different sponsors, although we have not been fortunate. The major element that plays a role in the lack of recognition and development in our school is that it is very remote which makes services to delay especially from the department of basic education” (Principal Elukhanyisweni Secondary School, Alice, August 2019).

1.4 SUMMARY OF THE PRINCIPALS RESPONSES

In this question, the researcher sought to ascertain who is responsible for funding the schools' technology resources. It is clear from the above responses that these schools have different strategies in place regarding their finances, as St Andrews College is an independent (private) school, while Graeme College and Elukhanyisweni secondary school are government-funded (public) schools.

Therefore, St Andrews College is responsible for its own funding of resources through its school fees. Furthermore, Graeme College and Elukhanyisweni get a government subsidy for their funding. However, Elukhanyisweni does not afford the technological resources as they have any other way to generate fees from their learners.

2. WHO MANAGES THE SCHOOL SOCIAL MEDIA ACCOUNTS AND ADMIN responsibilities?

2.1 GRAEME COLLEGE

The result revealed that Graeme College has a visible social media presence. The school has Facebook and Instagram accounts accessible to learners, teachers, and prospective learners. An Admin manages the social media accounts

Having a dedicated staff manage the social media accounts ensures accountability and smooth flow of information. The school's headmaster alluded to this.

“Our school website and social media pages are managed by one of the teachers in order to ensure that there is proper communication in all the channels of communication” (Principal of Graeme College, Makhanda, April 2019).

The Principal stated that the social media platforms help the school maintain effective communication with its internal and external stakeholders. This is consistent with the view of Hossain (2019: 16) that “Social media such as Facebook, WhatsApp, YouTube, Instagram, LinkedIn, and Google, etc., are changing the manner in which people communicate through their innovative features and services. Most of these social networking sites (SNS) offer users the opportunity to present individuals and connect to existing and new social network users”.

2.2 ST ANDREWS COLLEGE

The principal expressed that they identified the need to appoint a learner to handle the school's social media pages' content. This assists them in providing relevant content and engaging in an understandable language for social media. Hence, it is better to have someone who understands the online platform to be at the forefront of

things. Although the headmaster acknowledged this was problematic, he maintained the arrangement was expedient:

“We as the school management thought it would be the best idea to let one of the learners head up the responsibility of Admin for the social media accounts.... This is someone who knows the way of thinking and content that would interest their peers, especially to invite potential learners from other schools. We aim to attract learners from other schools, and they do come especially after going through our website and social media pages” (Principal of St Andrews College, Makhanda, May 2019).

2.3 ELUKHANYISWENI SECONDARY SCHOOL

According to the Principal's response, Elukhanyisweni Secondary School do not have any active social media accounts. Thus, there are no admin responsibilities, as they do not have any online accounts to manage. The principle attributed the school's lack of social media platforms to the absence of funding and requisite human resources to manage them.

“At the moment, we do not have any social media accounts that are specifically dedicated to the school. We are not against having them, though, but the issue would be that there would have to be someone who is designated to manage it”, the Principal mentioned. (Principal of Elukhanyisweni Secondary School, Alice, August 2019).

2.4 SUMMARY OF THE SCHOOL'S HEADMASTER RESPONSES REGARDING WHO MANAGES THE SCHOOL SOCIAL MEDIA ACCOUNTS

The findings show that Graeme College and St Andrews have active social media platforms such as Facebook, WhatsApp, and Instagram. Only Elukhanyisweni secondary school does not have any form of social media presence. Regarding who manages the social media accounts, both Graeme College and St Andrews have different administrative strategies. While at Graeme College, dedicated staff is responsible for managing information flow on the social media platform; St Andrews uses one of its students knowledgeable in social media to select and manage content on the school's social media platforms. This arrangement has implications for the student's performance. The time the student uses in attending to the social

media, issues could impact their study and leisure. In addition, it has implications for the sustainability of the social media platforms because if the student graduates, it affects continuity. Again, contents can only be uploaded at the student's convenience, which could affect the timeliness of materials on the pages and the time for providing feedback.

3. WHAT IS THE SCHOOL POLICY REGARDING CYBERBULLYING OR ONLINE BULLYING?

3.1 GRAEME COLLEGE

Cyberbullying has become a topical issue in society because of its devastating effects, especially on young people. Safaria (2016: 82) suggests that learners exposed to cyberbullying in their school life can experience deep, long-lasting impacts such as mental health problems, substance (drug and alcohol) abuse, and suicide.

When asked about the school policy regarding cyberbullying, the Head Master of Graeme College stated that the school takes the issue of bullying seriously. Learners who defy the school's policy are dealt with and punished according to the severity of their offence. Why the school endeavours to discourage bullying, the headmaster said they appreciate the fact that some of the bullies could be having psychological issues: "We, as teachers, have noticed over the years that learners who bully others most likely come from abusive homes or a child is at times experiencing some sort of crisis. Sometimes it happens that they are dealing with a serious situation at home, which might cause them to act out abusively towards others. Either that affects them directly, or a close family member, and you can only find out once you as a teacher give yourself time to listen and allow them to be open", said the Principal of Graeme College, Makhanda, April 2021.

3.2 ST ANDREWS COLLEGE

The headmaster of St Andrews College admitted that the school frowned upon cyberbullying because it can cause victims to have reduced levels of self-esteem. According to the headmaster, the school seriously takes bullying or victimization of a learner by another learner. This could cause the bullied or victimized learners to

withdraw from social activities and reduce their studies or schoolwork performance. When asked about the specific policies or programmes to curb cyberbullying,

The headmaster said the school has counsellors and therapists to attend to learners should they experience anything traumatic and need to talk.

Additionally, the headmaster stated that the school introduced the Guardian App to the learners. The Guardian App is virtual and accessible online. Thus, the learners can speak to someone whom they do not know and do not see. The choice of an APP was to provide anonymity for learners and encourage victims to speak up, the headmaster, said:

"This was seen as necessary in our school because we saw that we have so many cases of bullying whereby the learners end up falling into the trap of being exposed to suicide and at times committing suicide in response to the inability to cope with the stress that comes with bullying or abuse by others (Principal of St Andrews, Makhanda, May 2019).



3.3 ELUKHANYISWENI SECONDARY SCHOOL

Since there is no known or acknowledged use of social media platforms by the school, there have not been any cyberbullying cases involving learners of Elukhanyisweni Secondary School. Although the school does not have any written policy regarding bullying, the principal stated that learners who commit such acts and are found guilty receive severe punishment. He added that:

"Our policy regarding bullying is non-tolerant, and although we ensure to punish the one who suppresses the other, we have learnt that we should first find out the root cause of these despicable actions towards others and teach humanity in the process" (Principal of Elukhanyisweni Secondary School, Alice, 2019).

3.4 SUMMARY OF PRINCIPAL (S) RESPONSES

This question addressed the issue of bullying and cyberbullying that seems to be on the rise in high schools nowadays. The acts are mainly facilitated by increasing access to and use of social media platforms. At Graeme College and Elukhanyisweni, the principals stated that they have policies to deal with bullying,

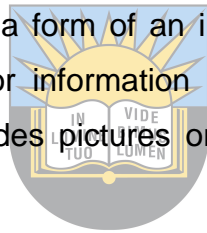
including punishing learners found guilty of bullying another learner. While Graeme College has its bullying policy spelt out in written form, the management of Elukhanyisweni secondary school operates an unwritten policy that treats every case on its merit.

While the authorities at St Andrews College take bullying and cyberbullying seriously, they attempt to address the underlying factors fuelling the perpetrators' actions. As one of the principals noted, it could be that the bully “is dealing with a serious situation at home”, and bullying becomes a way to release their emotional stress. All three principals agreed that physical or online bullying could affect the learner’s academic performance and emotional wellbeing.

4. DOES THE SCHOOL MAINTAIN AN INFORMATIVE WEBSITE?

4.1 GRAEME COLLEGE

This question sought to establish whether the selected schools maintain an informative website. A website is a form of an information hub where people from outside the school can search for information about different things and browse through the website. It also includes pictures or images of events that are taking place in the school.



When asked whether Graeme College maintains an active and informative website, the headmaster stated that the school has a functional website that informs its stakeholders about events that are happening and are will happen. The finding is consistent with Matos (2019:11), who emphasises that digital technologies are considered cultural items. According to Matos (2019: 11), students and teachers cannot be perceived as detached from their cultural environment. Instead, the focus should shift from integrating technology in the curriculum; rather, technology should be directed into a certain dimension. Furthermore, people can refer to the website when looking for contact details for the school's relevant departments and teachers.

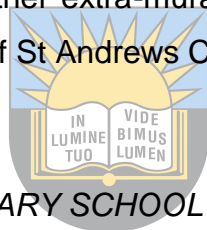
“We encourage our stakeholders to constantly check the school website because this is where we ensure that we shine as a school as we publish every event that our learners participate in as a point of attraction” (Principal of Graeme College, Makhanda, April 2019).

4.2 ST ANDREWS COLLEGE

“We as the school actually maintain a website for our stakeholders to access information easily. The website gives detailed information as to what takes place on the school (events), their way of doing things, admission information, gallery of the school, events information and headmasters and teachers’ information” (Principal of St Andrews College, Makhanda, May 2019).

Field observations and interview with principal revealed the college maintains a website for its stakeholders to access information easily. The website gives detailed information about what takes place at the school, their way of doing things, admission information, school gallery, events information, headmaster, and teachers' information. The principal has stated that the website provides an excellent platform to display the school's selling points:

“This is where we pride ourselves because we get to showcase the love that we have for academics, sports and other extra-mural activities that learners participate in throughout the year” (Principal of St Andrews College, Makhanda, May 2019).



4.3 ELUKHANYISWENI SECONDARY SCHOOL

Lastly, the school does not have an active website as it does not have the necessary logistics to carry out such activities. For the school to be able to do such, they would have to have school computers as well as internet access.

“Our school does not have a website, although it is a wish that one day we would have such a luxury and expose ourselves to the outside world. We lack even the basic resources such as computers. Learners use their phones and internet cafes to access the search engines that allow them to get information regarding their projects and assignments”, said the Principal of Elukhanyisweni, Alice, August 2019.

4.4 SUMMARY OF THE PRINCIPAL (S) RESPONSES

A website is whereby an institution communicates information that is relevant to their activities to their stakeholders, both internal and external, as well as potential. Thus, the researcher wanted to find out whether these schools have or use websites. According to the principals’ responses, it is clear that the schools consider the use of

a website important for information dissemination, image building, and attracting potential learners and sponsorships.

“It is very important to keep a positive image of the school as this is a way to attract potential learners from all over South Africa” (Principal of St Andrews College, Makhanda, May 2019).

4.3 QUANTITATIVE DATA ANALYSIS

4.3.1 ANALYSIS OF QUANTITATIVE SURVEY DATA COLLECTED FROM GRAEME COLLEGE

4.3.1.1 AGE DISTRIBUTION

The age distribution for the learners of Graeme College was as follows; there were 61 (52%) in the age bracket of fifteen to sixteen years, while there were 46 (39%) respondents on the age bracket of seventeen to eighteen years and 10 (9%) in the age bracket of nineteen and above.

However, only six questionnaires were returned empty or not filled. Age Distribution from St Andrew’s College is as follows; there were 84 (63%) respondents in the 15-16 age bracket, while there were 50 (37%) respondents in the 17-18 age bracket.

At Elukhanyisweni, 25 (28%) respondents were within the age bracket of 15-16 years, while 53 (58%) were in the age bracket of 17-18 years and 13 (14%) in the age bracket of 19 years.

The age distribution depicted in this section refers to that of the respondents of the study. Hence, the researcher had access to different age groups in the schools. Thus, this information is further depicted in the figure below:

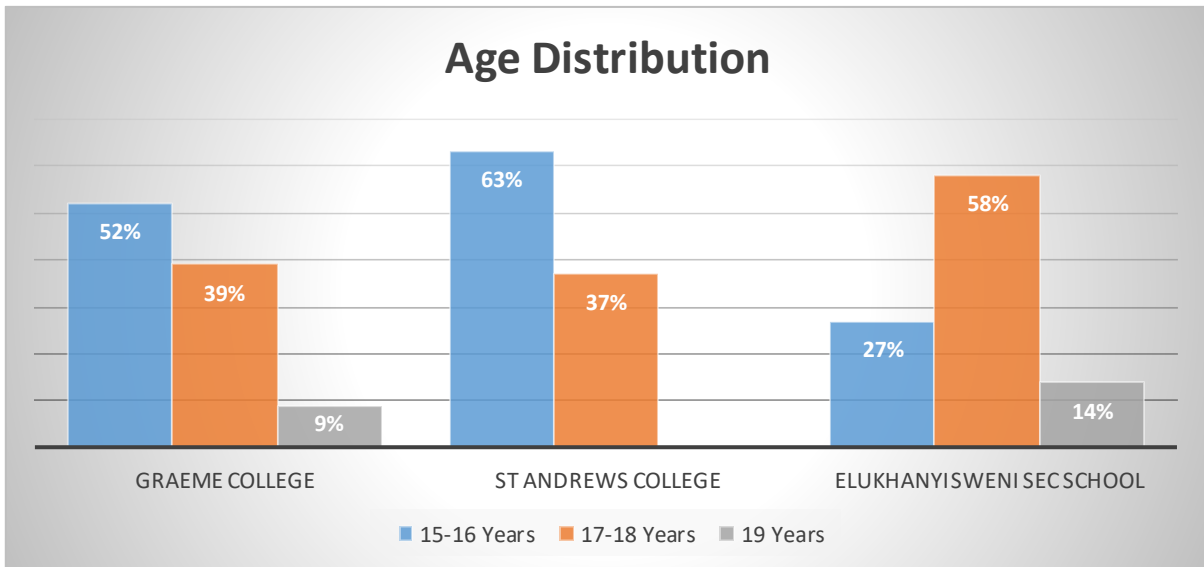


Figure 1: Age Distribution (St Andrews College)

4.3.1.2 GENDER DISTRIBUTION

At Graeme College, there were a total of hundred and seventeen (117) Male respondents, while there were zero (0), female respondents.

Similarly, at St Andrews College, there were 134 male respondents, and there were zero females as well. Both Graeme College and St Andrews are boys-only colleges.

In contrast, at Elukhanyisweni secondary school, there were 43 (47%) male respondents, while there were 48 (53%) female respondents across all the grades included in the survey.

This study focussed on three schools, two boys-only schools (Graeme College and St Andrews College) and one mixed college (Elukhanyisweni). The gender distribution of the participants is shown in the graph below (Figure 2).

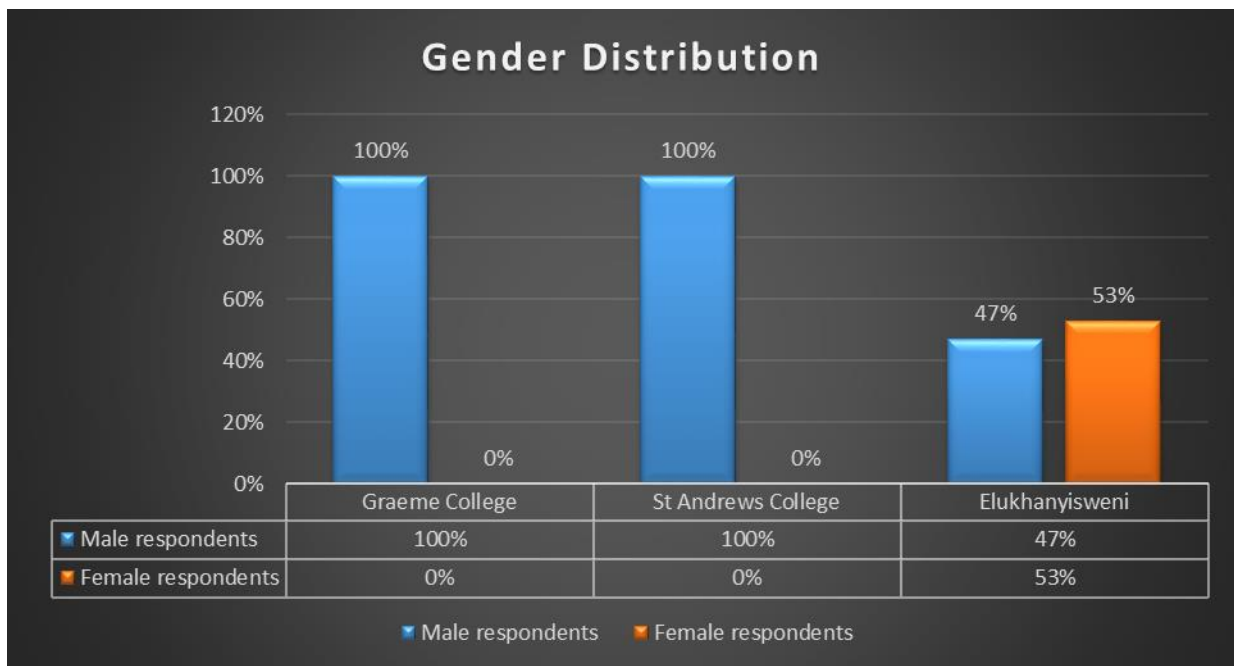


Figure 2: Gender Distribution

4.3.1.3 LEVEL DISTRIBUTION: GRADE (S)

At Graeme College, the majority of the respondents 70 (60%) were in Grade 10, 34 (29%) respondents were in Grade 12, and 13 (11%) respondents in Grade 11, the level distribution asks the participants about their grade (s) as this study focuses on learners of grades 10-12, depending on their availability.

Therefore, at St Andrews College, there were 69 (51%) respondents who were in Grade 10, while 65 (49%) of the respondents were in Grade 11. There were no participants available from Grade 12.

In Elukhanyisweni, 28 (31%) of the respondents were Grade 10 learners, while there were 34 (37%) of Grade 11 learners and 29 (32%) of Grade 12 learners who participated in the survey.

Therefore, the researcher required grade (s) 10-12 to include as the sample of the study. However, this information is clearly depicted in the figure below:

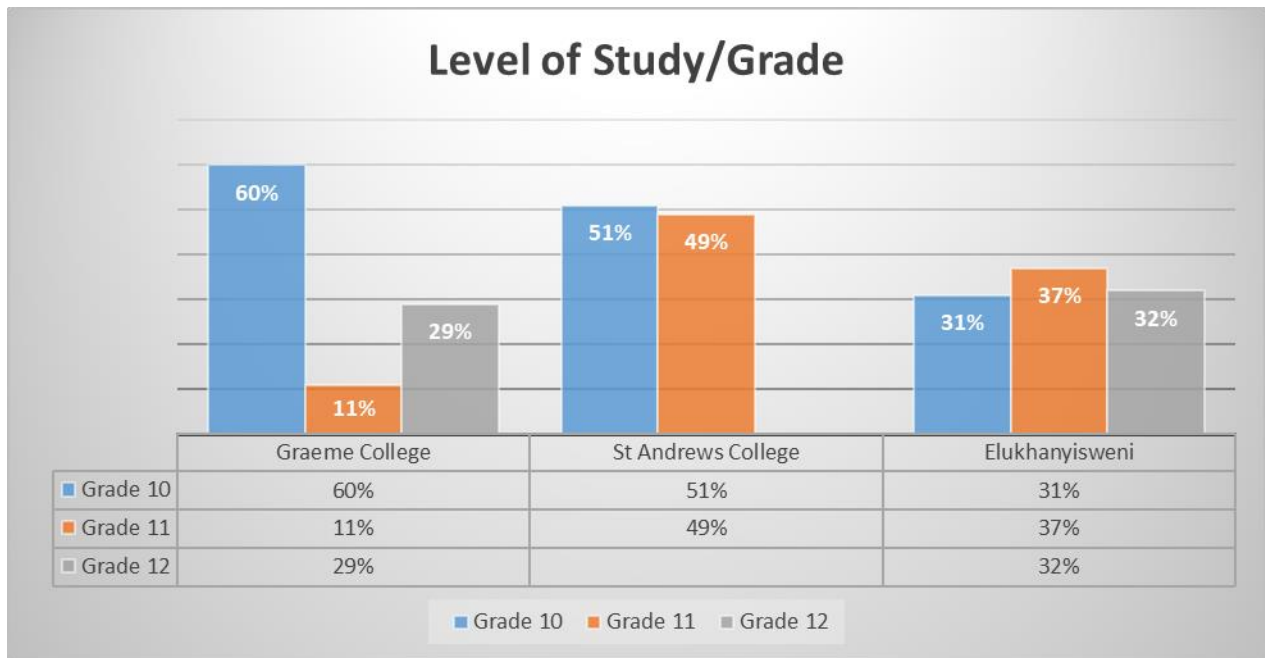


Figure 3: Level of Study/Grade

4.3.1.4 RESPONSES OF THE RESEARCH STATEMENTS

ITEM 1: FREQUENT ACCESS TO THE INTERNET

This item asked the respondents whether they are able to access the internet frequently either from their phones or at school and having internet connections. The respondents from the participating schools provided a mixture of responses to the question. The information is depicted in the Figure 4 below:

Majority of respondents 43 (37%) at Graeme College, strongly agreed that they have regular or frequent access to the Internet, 35 (30%) respondents agreed, and 29 (25%) respondents were neutral. Only 6 (5%) respondents disagreed, 3 (3%) strongly disagreed. The aggregation of those who strongly agreed and agreed to the statement indicates that Graeme College learners have regular access to the internet.

At St Andrews, 94 (74%) respondents strongly agreed to have frequent internet access, while 35 (26%) agreed. Only 4 (3%) respondents were neutral. No respondents disagreed with just 1 (1%) responding disagreeing strongly with the statement. Like in Graeme College, the result suggests that St Andrews learners can access the internet frequently.

There was a marked difference in Elukhanyisweni, were 34 (37%) respondents agreed to have frequent internet access. Those who strongly agreed to have regular internet access were 15 (17%), while 7 (8%) respondents were neutral. More than a quarter of the respondents, 25 (27%), disagreed that internet access was regular, and 10 (11%) strongly disagreed.

When asked if regular access to the internet provided any benefit, majority of the respondents from across the three schools stated that having regular internet access helped them in conducting independent research regarding their class assignments. Therefore, the finding agrees with the view of Antonijevic (2018: 45), that using the internet, students without professional help and guidance, often come up with information that, goes beyond the knowledge of their teachers in this area. Based on this fact, the exceptional educational potential of the internet and educational multimedia can be seen (Antonijevic, 2018: 45).

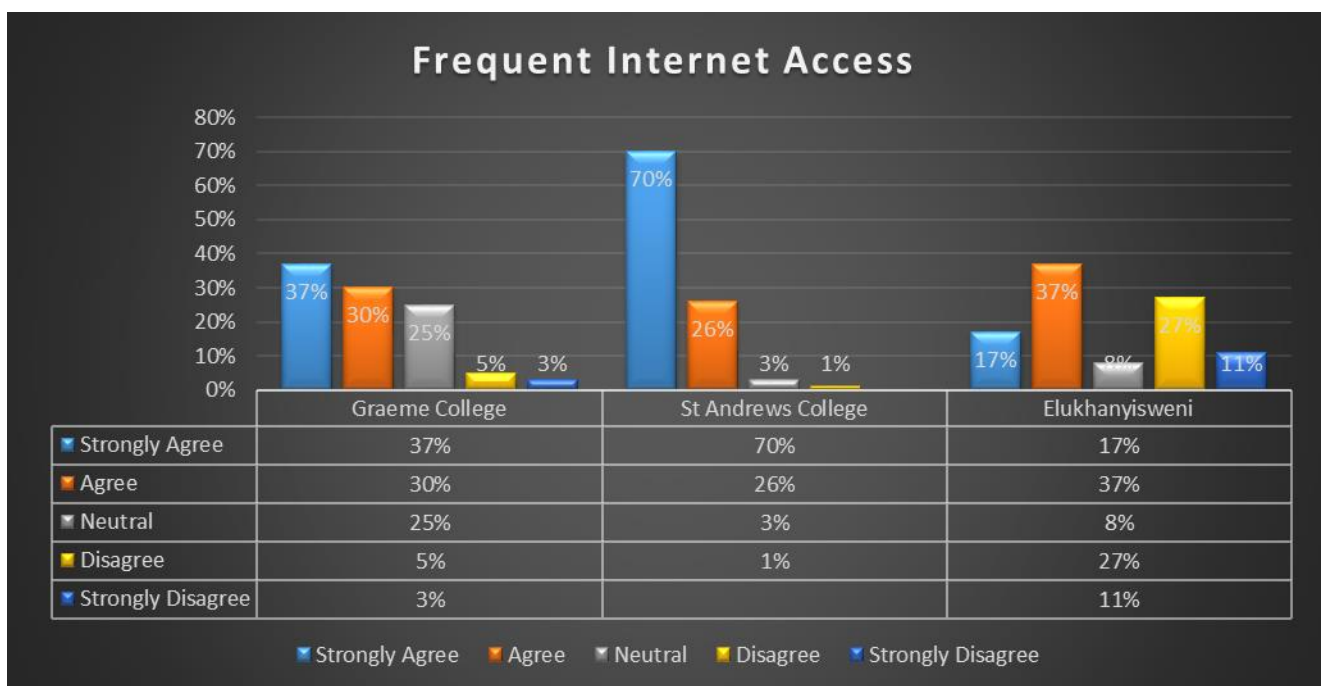


Figure 4: Frequent Internet Access

ITEM 2: ACCESS TO SCHOOL COMPUTER LABORATORY

This item sought to find out if the learners of selected schools have access to a school computer laboratory. Nearly two-quarter of Graeme college respondents, 53 (45%) strongly agreed to have access to a computer laboratory, 23 (20%) disagreed, and 21 (18%) were neutral. Furthermore, Respondents that disagreed were 13 (11%), while those who strongly disagreed were 7 (6%).

In St Andrews College, nearly half of the respondents 65 (49%) strongly agreed that they have access to computer laboratory, 39 (29%) agreed, and 19 (14%) were neutral. Those who disagreed and strongly disagreed to have access to computer laboratory were 10 (7%) and 1 (1%), respectively.

However, compared to Graeme College and St Andrews, respondents from Elukhanyisweni: secondary school differed sharply when it comes to access to a school computer laboratory. There were 14 (16%) respondents that agreed that they have access to a school computer lab, 4 (5%) strongly agreed, and 8 (9%) were neutral. 39 (43%) disagreed, and 26 (29%) strongly disagreed. This means that most of the respondents (72%) do not have access to a computer laboratory in their school. The findings indicate that Graeme College and St Andrews learners have greater access to school computer labs than Elukhanyisweni, where access appears limited. Figure 5 below presents a graphic illustration of the access to school computer laboratories across the three colleges.

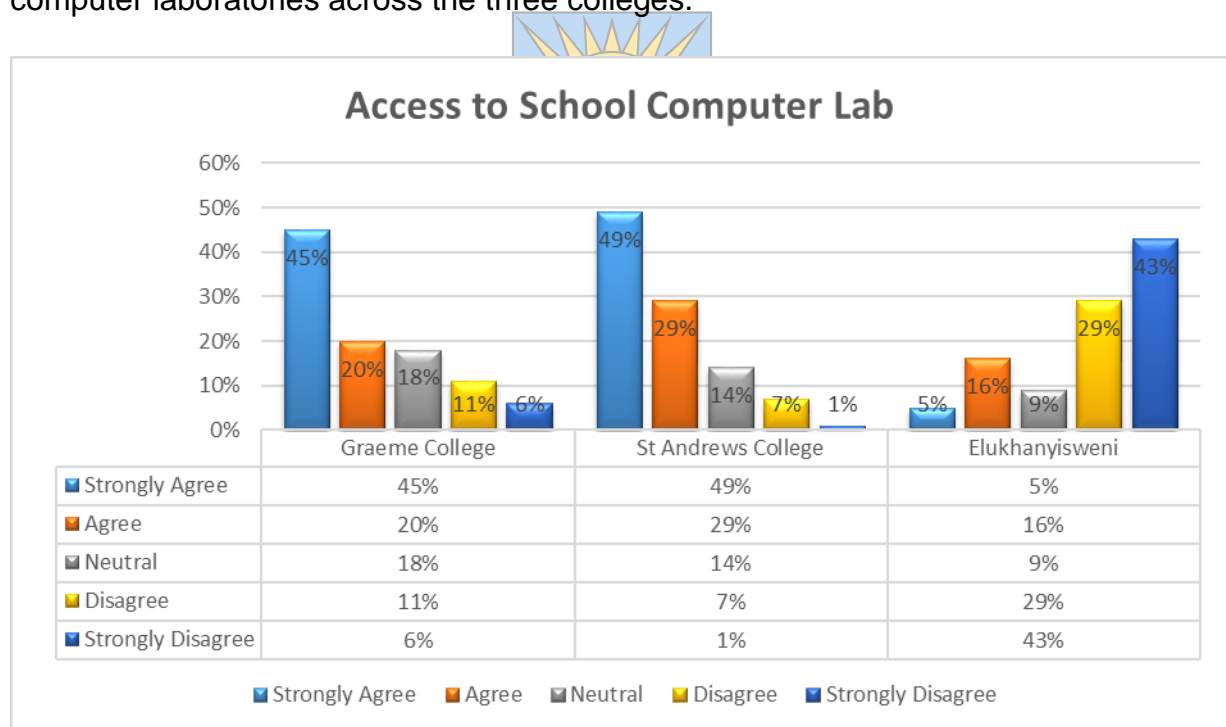


Figure 5: Access to School Computer Lab

ITEM 3: NEW MEDIA HAS A POSITIVE IMPACT ON MY WORK

Participants from the three colleges were asked to agree or disagree whether new media positively impacts their work. Figure 6 show the learners’ agreement or disagreement to the influence of new media Impact on their schoolwork In Graeme College, 32 (27%) respondents strongly agreed, and 34 (29%) agreed that new

media positively affect their academic work. Those who neither agreed nor disagreed with the statement were 37 (32%), 8 (7%) disagreed, while 6 (5%) respondents strongly disagreed and that new media had any positive influence. This suggests that Graeme college learners believe that new media is influencing their studies positively.

Nearly 40% (52) of the respondents from St Andrews College strongly agreed that new media enhances their learning process, 37 (28%) agreed, and 36 (27%) were neutral. Cumulatively, 68% of St Andrews College learners agreed that new media positively influences their work. Those who disagreed or strongly disagreed that new media has a positive influence were less than 5%.

Only a quarter of the respondents, 25 (27%), in Elukhanyisweni, agreed that new media integration into the school curriculum has a positive influence. Those who strongly agreed were 13 (14%), 12 (13%) of the respondents were neutral, 17 (19%) disagreed, while 24 (27%) of the respondents strongly disagreed that new media has any positive impact on their education. The aggregate of strongly agreed and agreed responses stood at 41%, comparatively lower than the percentages recorded in Graeme College and St Andrews College.

The finding suggests that the impact of new media technologies depends how the contextual factors were incorporated in the implementation stage. According to Wang and Woo (2007), the road map to a successful ICT integration may involve the consideration of different and complex issues. For instance, the issue of why and how the ICTs will be implemented cannot be neglected before the actual work to yield positive results for the user. Hence, it involves policies directing educational authorities as to their roles and functions in the introduction of ICT into existing and yet to be developed educational curricula.

Stocchetti (2014: 66) further outlines that “the focus on preparing materials for use in schools was premised on the belief that simply articulating policy and programme would not be sufficient. In order to have new content and ideas about teaching incorporated into a classroom activity, teachers would need the guidance of new curricular materials”. Thus, by looking at these findings, the respondents have stated the use of new media in their schoolwork indeed assists them to achieve better results.

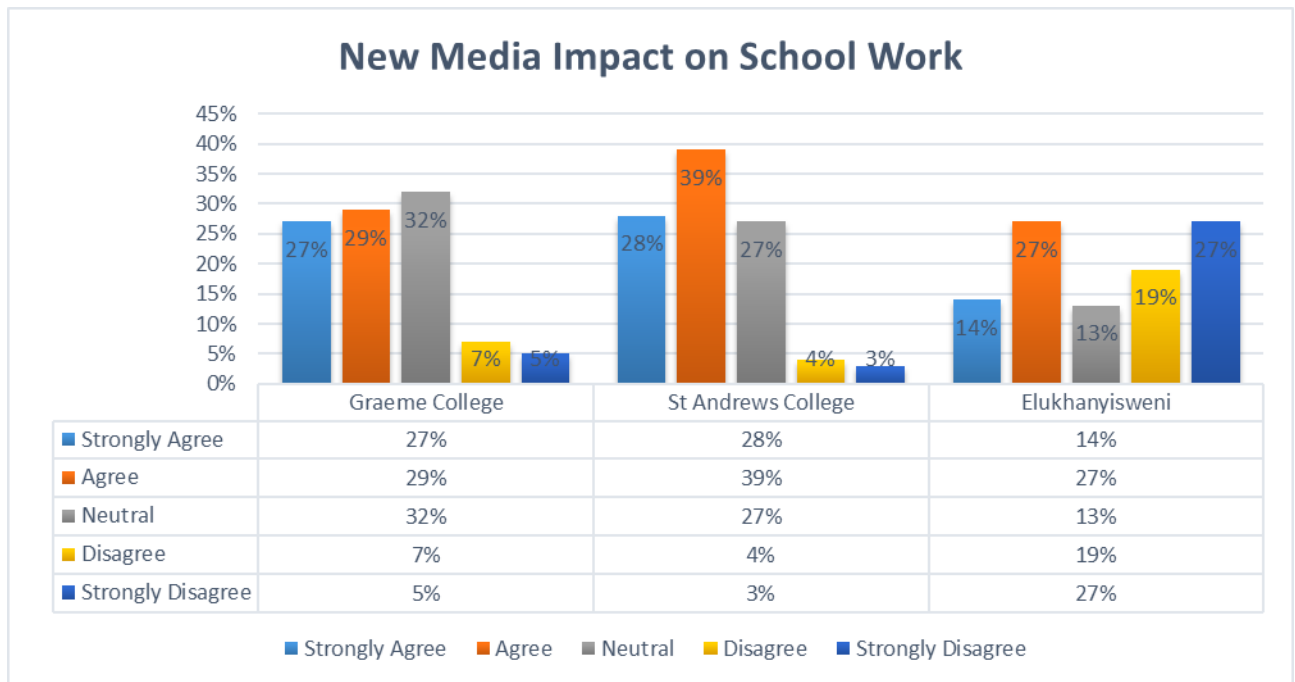


Figure 6: New Media Impact on Schoolwork

ITEM 4: ABILITY TO ACQUIRE MORE KNOWLEDGE

Graeme College: 43 (37%) respondents strongly agreed that the internet enhances their ability to acquire more knowledge, 46 (39%) agreed, and 26 (22%) were neutral. This shows that the majority of Graeme College learners see the internet as a valuable tool for sourcing information regarding their schoolwork.

In St Andrews College, 52 (39%) of the respondents strongly agreed, and 59 (44%) agreed that the internet helped them in obtaining additional information on their respective subjects; 20 (15%) of the respondents were neutral, while less than 2% disagreed. In all, 83% of the learners agreed the internet was an essential medium for seeking additional knowledge concerning their school subjects.

In Elukhanyisweni, the researcher wanted to find out whether the respondents can acquire more knowledge when using new media for their schoolwork. As shown in Figure 7 below, the majority of the learners 37 (41%) agreed that using the various search engines available on the internet, facilitates the acquisition of knowledge, 26 (28%) strongly agreed while 10 (11%) were noncommittal. Only 10 (11%) and 8 (9%), respectively disagreed and strongly disagreed that internet was not a source for acquiring knowledge. Those who held this view had no computer skills, highlighting the need to expose learners to digital technologies for learning.

The finding is consistent with previous research which suggests that “diverse skills and competencies for being media literate can be put forward such as sharing and taking part in the emerging participatory culture online (Jenkins, 2009) cited in Stocchetti (2014: 80). Thus, according to Carlsson, 2009 cited in (Stocchetti, 2014: 80), “learners that are exposed to digital tools for learning have the ability to evaluate the reliability and credibility of different information sources, negotiate meaning and take part in public discussions”. As can be seen from Figure 7, most of the learners across the three schools strongly agreed that new media enhances information gathering.

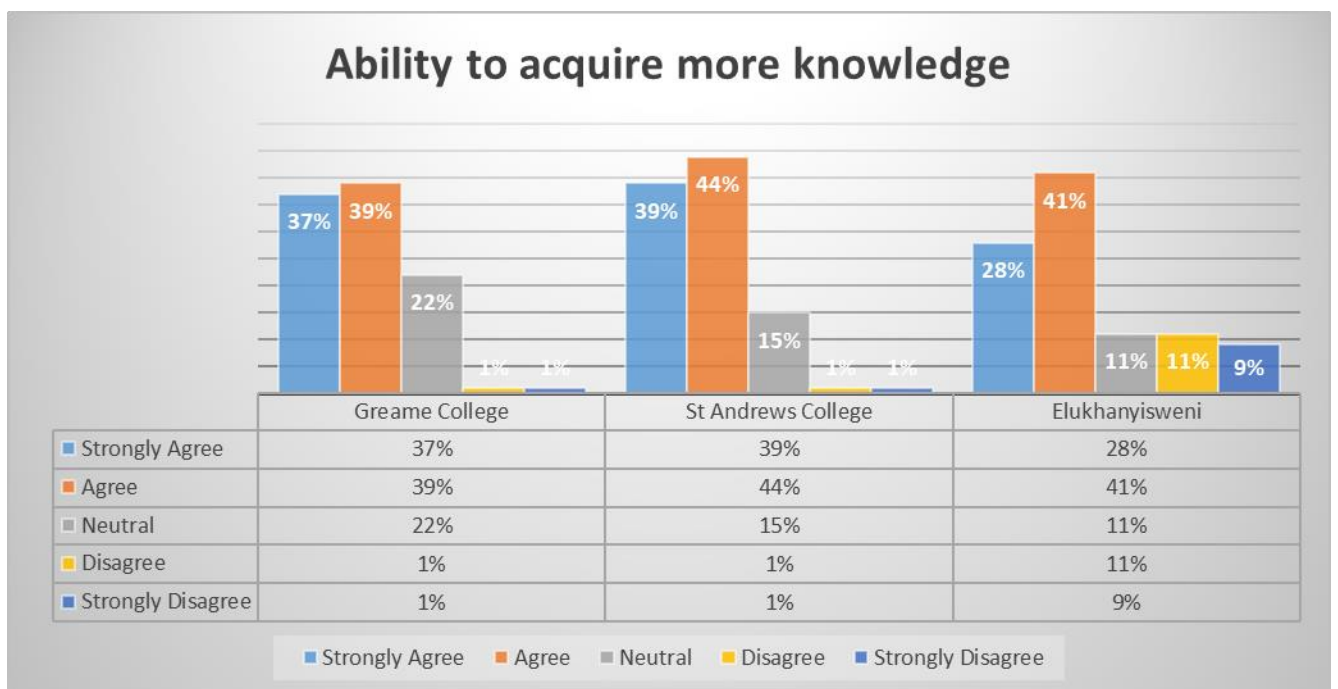


Figure 7: Ability to acquire more knowledge

ITEM 5: ACCESS TO WI-FI AT HOME

This item sought to establish whether the respondents have access to Wi-Fi at their residences or internet access outside their school boundaries. In Graeme College, 46 (39%) strongly agreed to have Wi-Fi at their homes, 22 (19%) agreed, and 18 (15%) were neutral. Moreover, 12 (10%) of the respondents disagreed, while 19 (16%) strongly agreed that they have Wi-Fi access.

In St Andrews College, the majority of respondents 118 (88%) strongly agreed that they have Wi-Fi access. Those who stated this admitted that they have a computer

connected to the Wi-Fi in their homes. Only 3 (2%) of the respondents gave a neutral response, and no respondent disagreed with having a Wi-Fi connection at home.

However, in Elukhanyisweni, only 14 (15%) respondents strongly agreed, and to have access to Wi-Fi in their homes. Those who agreed were 19 (21%) and 11 (12%) neither agreed nor disagreed. This suggests that 47 respondents representing 52% of the respondents disagreed or strongly disagreed that they have Wi-Fi access at home. As shown in Figure 8, most of the learners have access to Wi-Fi at home. However, learners from Graeme College and St Andrew College, appear to have more access to Wi-Fi or internet access at home than their counterparts in Elukhanyisweni.

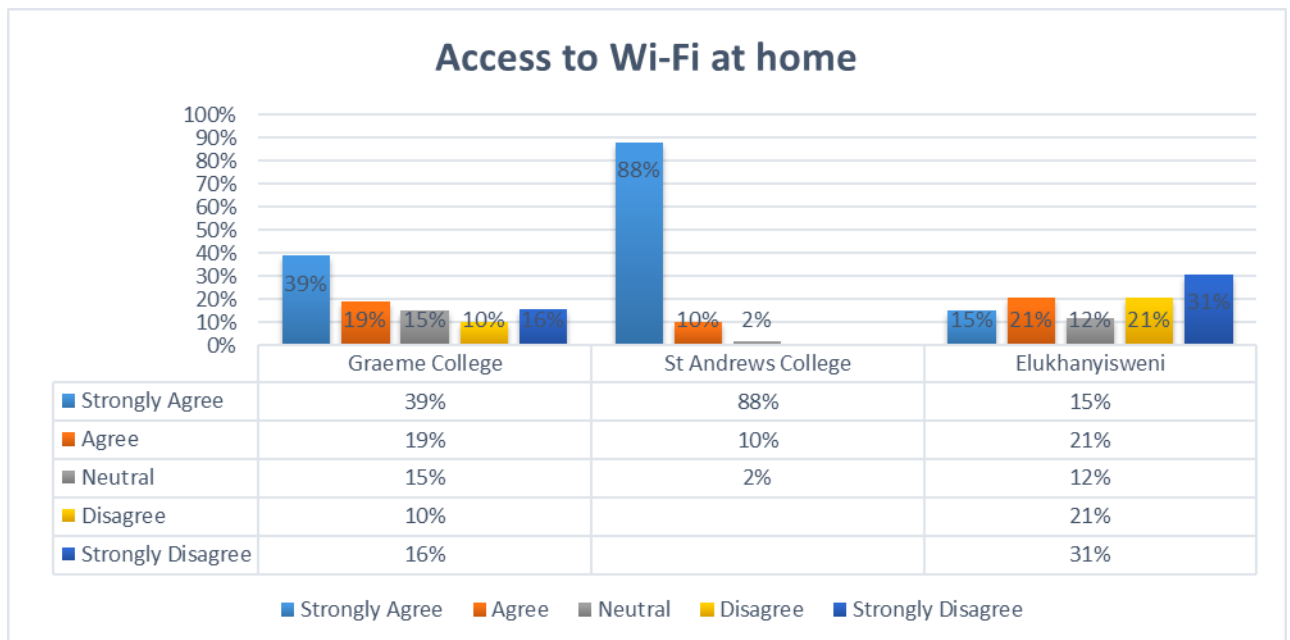


Figure 8: Access to Wi-Fi at home

ITEM 6: TECHNOLOGY EMBEDDED CURRICULA

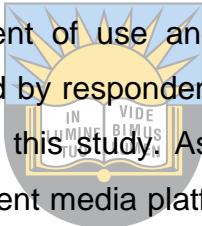
This item sought to determine whether embedding ICT in the school curricula enhances the respondents' technological skills. The majority of Graeme College respondents, 39 (33%) and 31 (26%) agreed and strongly disagreed respectively, that the technology-embedded curriculum improves their technological skills. A significant of the respondents 41 (35%) were neutral and undecided. Less than 5%

of the respondents were adamant that ICT-embedded curricula improve learners' technological skills.

In St Andrews College, 66 (49%) respondents agreed and 34 (25%) strongly agreed that technology-embedded curricula promote and enhances their technological skills. Altogether 74% of the respondents agreed that technology-embedded curriculum positively influences the acquisition of technological skills. This is 15% higher than the level of agreement in Graeme College. While 27 or 20% of the respondents were neutral, less than 5% of differed or disagreed.

Similarly, a significant number of the respondents, 32 (35%) in Elukhanyisweni, agreed that ICT influences technological skill acquisition. However, unlike in Graeme College and St Andrews, more respondents, 23 (25%) in Elukhanyisweni, disagreed that ICT-embedded curriculum enhances technological skills. 22 (24%) of the respondents were neutral.

This item has looked at the extent of use and impact of having a technology-embedded curriculum as perceived by respondents. This is evident in the Uses and Gratifications Theory, employed in this study. As espoused in the theory, teachers and learners can incorporate different media platforms in their teaching and learning process as means to get the information they need, and that is satisfactory for their subjects. In addition, these media platforms can be used to communicate relevant information to the stakeholders to satisfy both the sender and the receiver of the message. The theory suggests that individuals can choose to seek information that speaks to them. Hence, learners use online search engines or books to access information and knowledge relevant to their subjects (Korhan & Ersoy, 2016: 1). The results show that the majority of the respondents from all the schools agreed and strongly agreed to have a technology-embedded curriculum. This means that the respondents are exposed to computer literacy skills. Figure 9 below shows learner's responses across the selected school regarding the influence of technology-embedded curricula



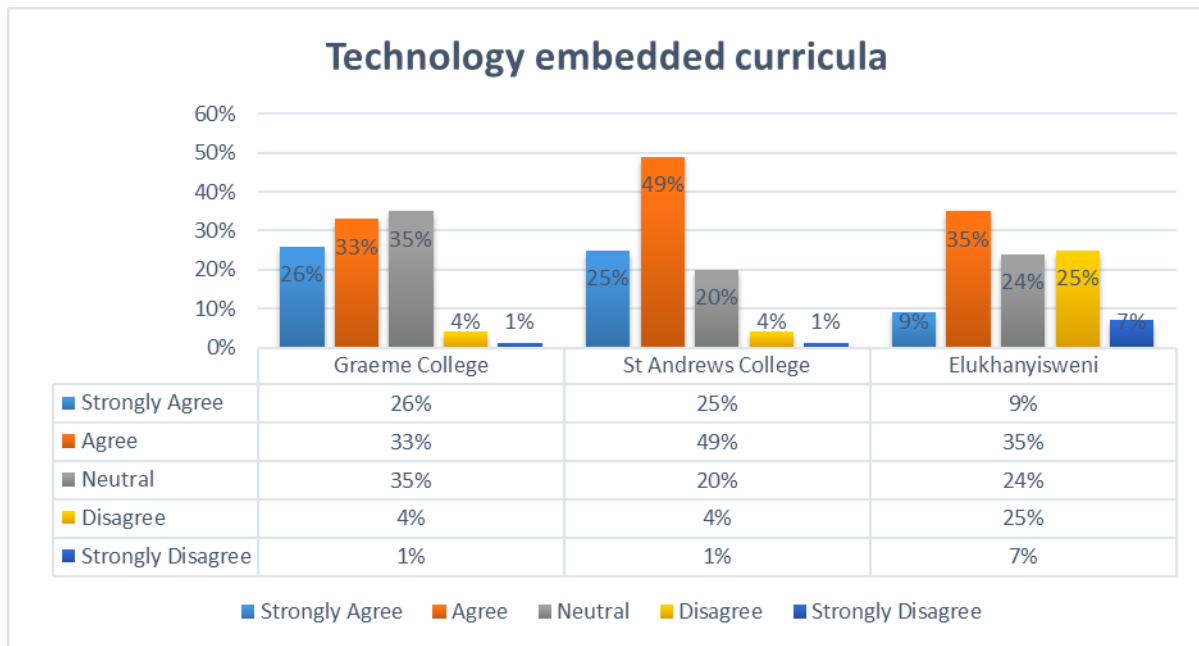


Figure 9: Technology embedded curricula

ITEM 7: SCHOOL WEBSITE

This item was used to ascertain the availability and use of school websites in the selected schools. Additionally, the measure helped determine whether the websites had helpful information and were accessible to current and potential learners. In Graeme College, 37 (32%) respondents strongly agreed that the school had a functional and accessible website, 36 (31%) disagreed, and 32 (27%) were neutral. Only 5% of the respondents disagreed that the college had a functional website.

Fifty-four (54) or 40% of the respondents in St Andrews College strongly agreed that the college had a functional and informative website; 55 (41%) agreed, while 22 or 16% neither agreed nor disagreed. This suggests that an overwhelming number of Graeme College respondents, 109 (81%), believe that the school has an active website that is functional and informative.

When Elukhanyisweni respondents were asked whether they have a school website and if they use or engage in it, only 4 (4%) strongly agreed, while 7 (8%) agreed and 21 (23%) were neutral. However, 29 (32%) respondents disagreed, and 30 (33%) strongly disagreed that the school has a functional website. This suggests that Elukhanyisweni does not have a functioning website and for the learners to use.

In this item, the researcher wanted to find out whether the schools have active websites where they communicate relevant information about their school activities. School websites are important for information dissemination and connection. Stocchetti (2016: 80) states, “Media in education ensures that learners and teachers are able to analyse and criticize information for their use.” This happens when learners are capacitated with digital skills. Matos (2019: 5) emphasises the importance of technical, professional, and generic digital technology skills needed in order to understand, use and adopt the technology within school activities. The details of the responses regarding the availability and use of school websites are illustrated in Figure 10 below.

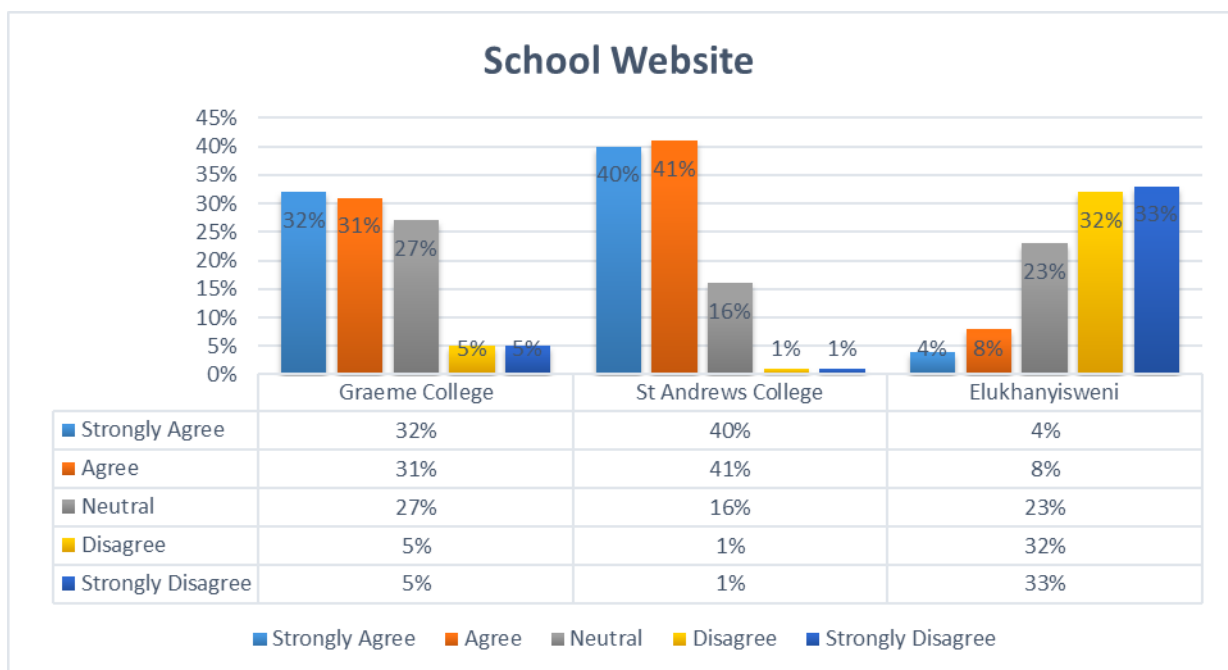


Figure 10: School Website

ITEM 8: SCHOOL COMMUNICATOR APPLICATION

This item sought to ascertain whether the selected colleges use school communicator apps to communicate with their respective stakeholders, including learners and parents. As shown in Figure 11 below, a preponderance of Graeme College respondents 50 (43%) strongly disagreed that they have a school communicator app with their school details, events, and calendar. Less than a quarter of the respondents, 21(18%), strongly agreed, while 11 (9%) were neutral.

In contrast, 66 or 49 % and 45 (34%) of respondents from St Andrews College strongly agreed and agreed that they have a school communicator app, which transmits essential information to the relevant stakeholders. Only 12 (9%) respondents were neutral, while 7 (5%) disagreed.

In Elukhanyisweni, those who disagreed and strongly disagreed that the school has a school communicator app were 57(56%). Only 12 (14%) strongly agreed, while 19 (21%) were neutral. This suggests that most of the respondents in Elukhanyisweni do not agree that their school have a functional and accessible school communicator app. It could also be that the respondents did not understand the question clearly.

The findings indicate that students of Elukhanyisweni were lagging in using of digital technology for pedagogy, which affected its use. As Makovhololo et al. (2017: 462) suggest, “The Diffusion of Innovations theory focuses on the manner in which a new technological idea or the new use of an old one migrates from creation to use.”

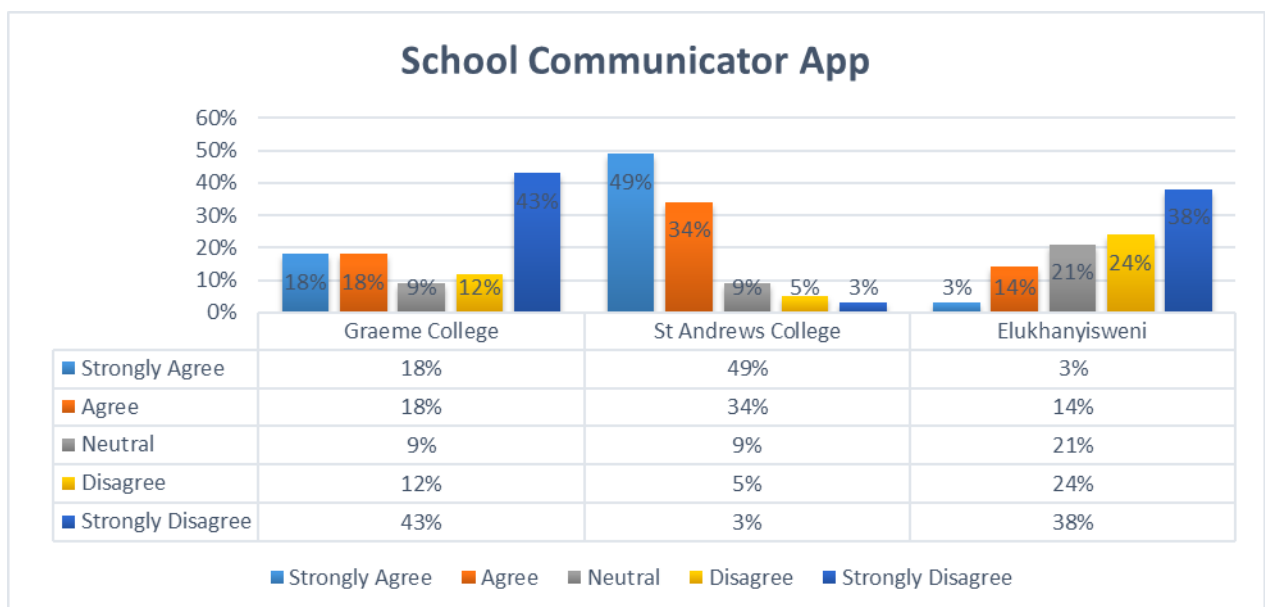


Figure 11: School Communicator App

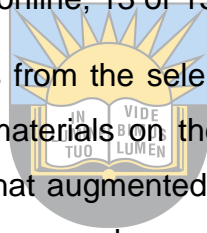
ITEM 9: DOWNLOADING CONTENT ONLINE

In this item, the researcher wanted to determine whether the learners download content such as music videos, movies, and so forth on the internet. In Graeme College 65 (56%) of the respondents strongly agreed, 28 (24%) agreed, and 6 (5%) were neutral. In contrast, 9 (8%) of the respondents disagreed, whereas 8 (7%) strongly disagreed.

In St Andrews College, 89 (66%) of the respondents in St Andrews College: strongly agreed that they download movies, music videos, and so forth online for entertainment, 30 (22%) agreed, and 9 (7%) were neutral. Furthermore, only 3 (2%) respondents 3 (2%) disagreed and strongly disagreed.

Similarly, in Elukhanyisweni, those who agreed and strongly agreed that they download content online for entertainment purposes were 44 (48%). Almost an equal number of respondents, 34 (37%), disagreed and strongly disagreed that they download entertainment materials online; 13 or 155 were neutral.

The findings indicate that learners from the selected schools search and download content, including entertainment materials on the entertainment. This is consistent with the views of Rogers (2008) that augmented student-driven learning with MLDs creates an environment where learners have convenient access to content and material that interests them regarding their learning needs and development. One of the highest forms of learning takes place when students have a stake or buy-in to the content they are learning (Jensen, 2008). The content may range from pdfs, slides and videos related or not related to their study subjects. The breakdown of the responses regarding downloading content online is further illustrated in Figure 12 below.



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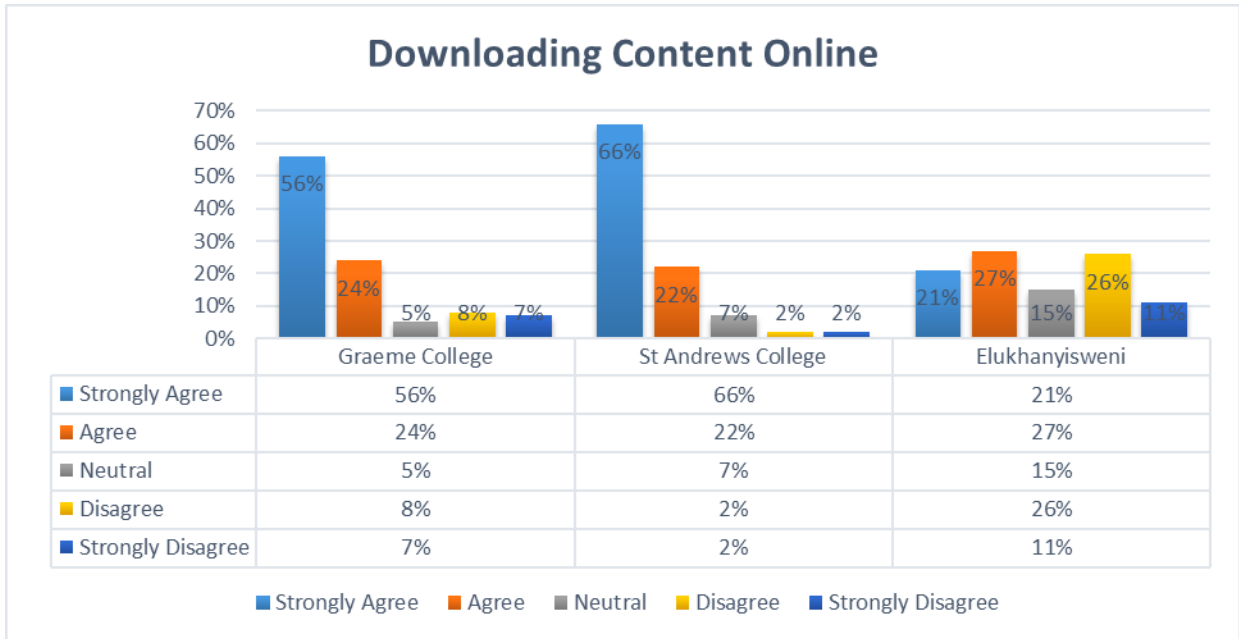


Figure 12: Downloading content online

ITEM 10: E-MAIL COMMUNICATION WITH TEACHERS

Email is one of the digital communication tools that can enhance teacher-learner communication flow. Therefore, the researcher wanted to find out whether the respondents communicate with their teachers using emails for their schoolwork s and submission of assignments. An overwhelming number of the respondents in Graeme College strongly disagreed 56 (48%), and disagreed 32 (27%), that they use email to communicate with their teachers; 19 (16) were neutral. Those who agreed and strongly agreed were less than 10%.

In contrast, 50 (37%) respondents in St Andrews College strongly agreed, and 52 (39%) agreed they used email to communicate with their teachers. while: 21 (16%) respondents were neutral. 10 (7%) disagreed, whereas while 1 (1%) strongly disagreed.

In Elukhanyisweni, most respondents disagreed 37 (41%) and strongly disagreed 33 (36%) that email was a means of communication with their teachers. Five (5) or 5% respondents strongly agreed; 9 (10%) agreed that they communicate with their teachers via email; 7 (8%), were neutral. The findings suggest that St Andrews respondents are familiar with and use email to communicate with their teachers.

Figure 13 below provides a graphic illustration of the level of using email to communicate among the selected schools.

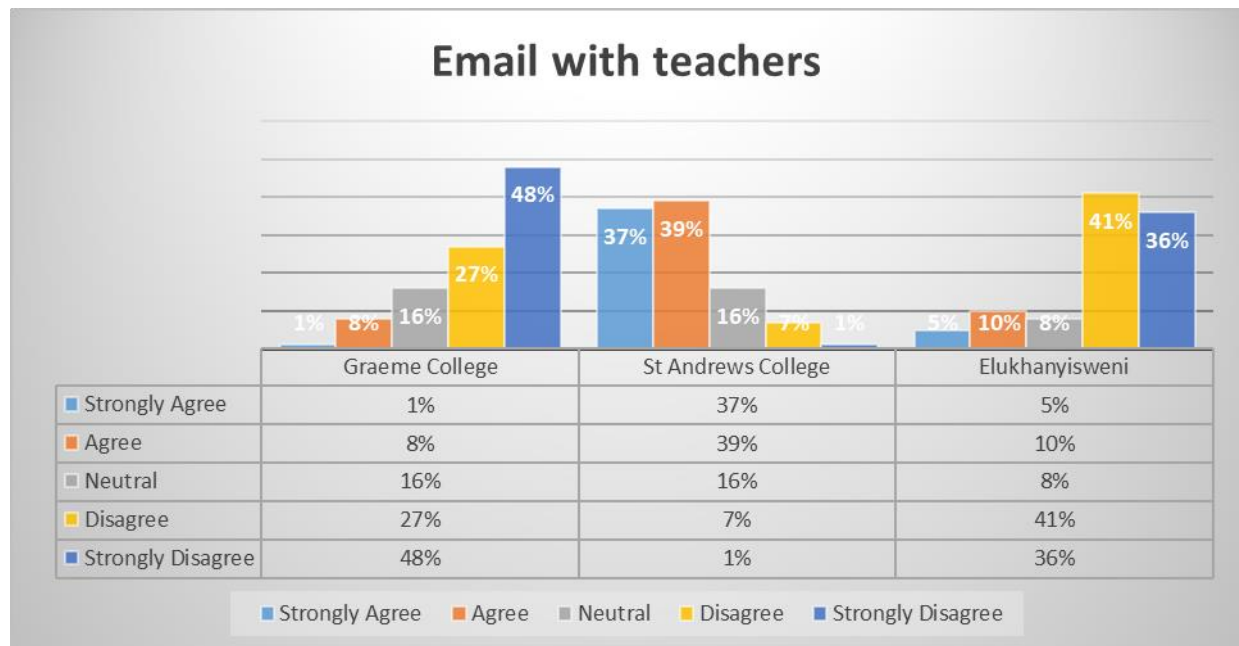


Figure 13: Email with Teachers



ITEM 11: SCHOOL INTERACTIVE BLACKBOARD

Interactive blackboards can improve cognitive learning, especially personalised student teaching (Shi et al., 2021). Therefore, this item sought to establish whether the selected schools use blackboards for teaching and learning. Figure 14 below shows the distribution of respondents' agreement or disagreement with the statement.

In Graeme College, 47 (40%) respondents strongly agreed, 17 (15%) agreed that they have an interactive blackboard, while 13 (11%) were neutral. Cumulatively, those who disagreed or strongly disagreed were 40 (34%). A further breakdown shows that 27 (23%) strongly disagreed, while 13 (11%) agreed.

There was a marked difference in St Andrews College, where 99 (74%) respondents strongly agreed, and 31 (23%) agreed that they have an interactive blackboard. Only 3 (2%) and 1 (1%) respondent disagreed or strongly disagreed.

In Elukhanyisweni, 10 (11%) respondents strongly agreed, 19 (21%) agreed, and 22 (24%) expressed a neutral opinion. However, 18 (20%) respondents disagreed, and

22 (24%) strongly disagreed that the school has an interactive blackboard. This suggests that there is minimal use of interactive blackboards in Elukhanyisweni secondary school.

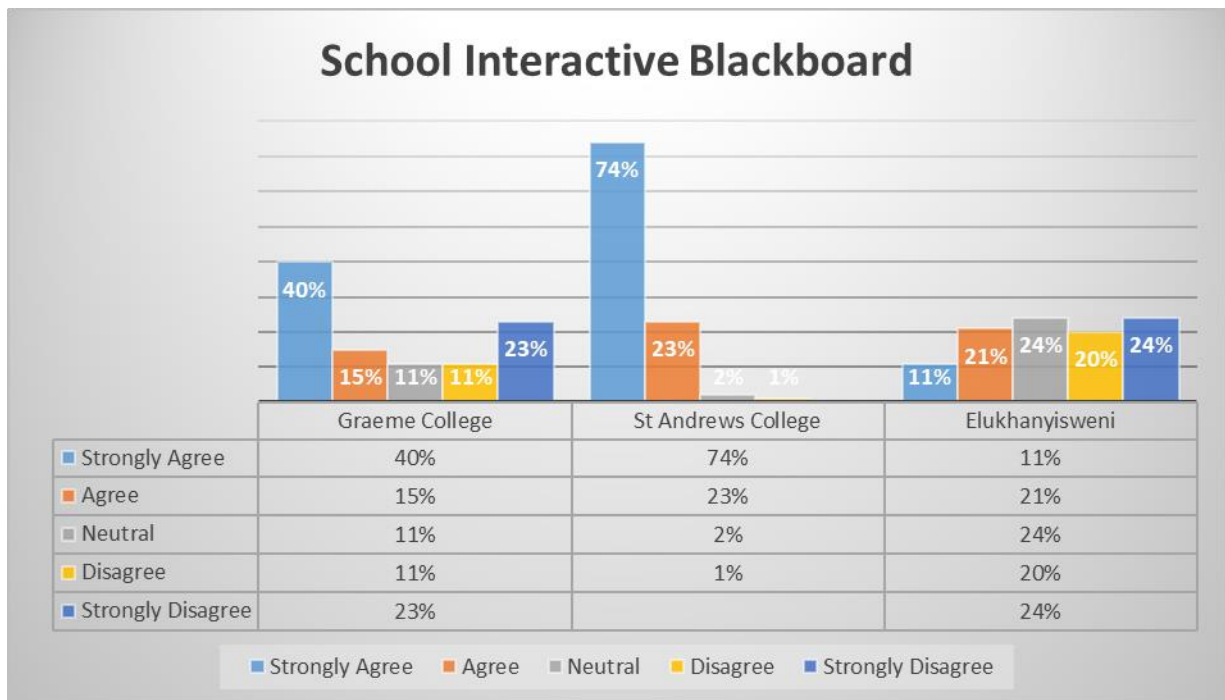


Figure 14: School Interactive Blackboard



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ITEM 12: THE USE OF COMPUTERS WITH INTERNET

In this item, the researcher wanted to determine whether the respective schools have internet connections, r cable or Wi-Fi.

In Graeme College, 48 (41%) respondents strongly agreed, and 19 (16%) agreed that school computers were connected to Wi-Fi, which gives learners easy access to the internet. 10 (9%) respondents were neutral, 5 (4%) disagreed, and 35 (30%) strongly disagreed.

In St Andrews College, 88 (66%) respondents strongly agreed, and 31 (23%) agreed that their school computers or gadgets provided by the schools have Wi-Fi connections. There were 10 (7%) respondents that chose neutral response, 1 (1%) disagreed, while 4 (3%) strongly disagreed.

The overwhelming majority of respondents in Elukhanyisweni strongly disagreed 36(39%) disagreed 33 (36%) that their school computers had internet connections

either through WIFI or cable. Those who agreed or strongly agreed were 4 (5%) and 7 (8%), 11 (12%) were neutral.

Thus, by looking at the results, only Elukhanyisweni does not have internet connections while Graeme and St Andrews College are connected. Lack or poor internet connections can limit learners' access to materials online, ultimately affecting their learning outcomes. Hence, the researcher agrees with Plomp (2003: 19) that integrating new media technologies into the curriculum should reflect teaching and learning that enhances problem-solving skills. Figure 15 below illustrates the disparity in internet connections among the selected colleges.

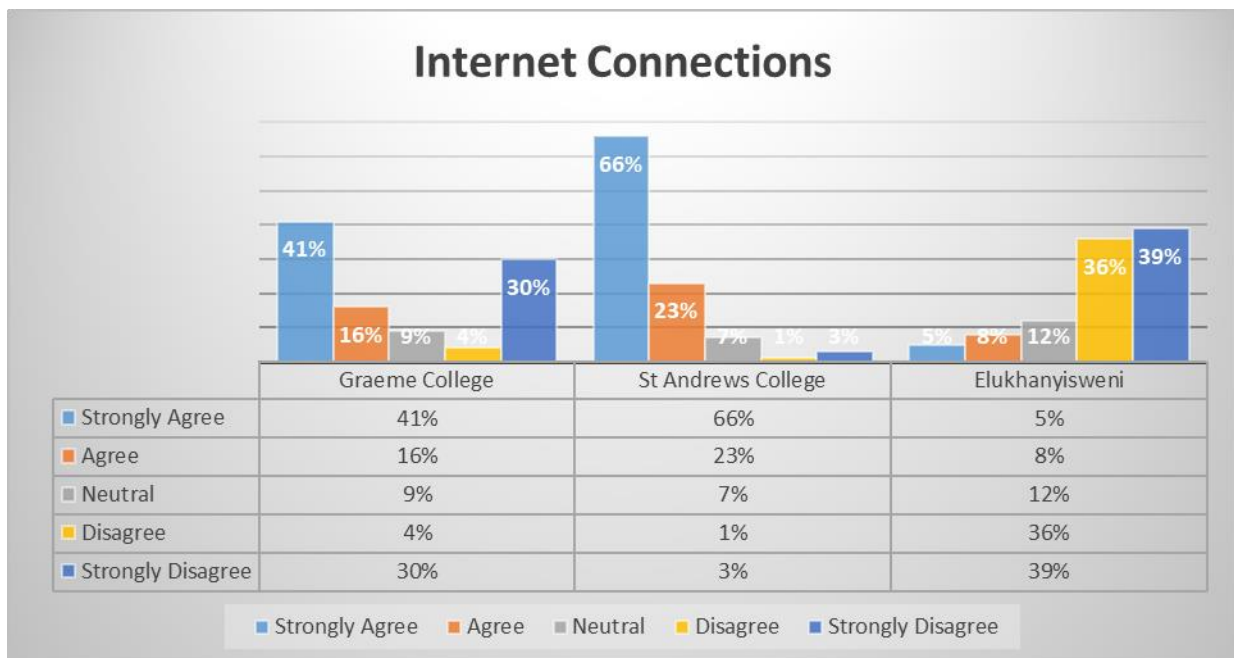


Figure 15: Computers with Internet Connection

ITEM 13: GOOGLE BOOKS

The researcher used this item to ascertain whether respondents were familiar with eBooks, especially using the Google books app to search for books online. Google books are found online as related to the subject being studied by the learner or participant.

In Graeme College, 11 (9%) agreed, 2 (2%) strongly agreed, 22 (19%) selected neutral. The majority of the respondents, 46 (39%), strongly disagreed, and 36 (31%)

disagreed. This suggests that most Graeme college learners are neither familiar with nor use the Google books app.

However, in St Andrews College, 10 (7%) respondents strongly agreed, while 11 (8%) agreed that they searched google books related to their subjects online; 36 (27%) respondents were neutral. Like in Graeme college, most respondents, 42 (31%), disagreed, and 35 (26%) strongly disagreed.

Interestingly, 11 (12%) respondents in Elukhanyisweni strongly agreed, 21 (23%) agreed, while 18 (20%) were neutral. Furthermore, 31 (34%) respondents disagreed, while 10 (11%) strongly disagreed.

The result in Elukhanyisweni is puzzling considering that the respondents have earlier admitted that the school computers have little or no internet connections. Given that accessing google books is only possible with an internet connection, it is likely that the learners accessed google books using personal or internet connections at home. Figure 16 below provides further illustration of the respondents' responses regarding use of google books.

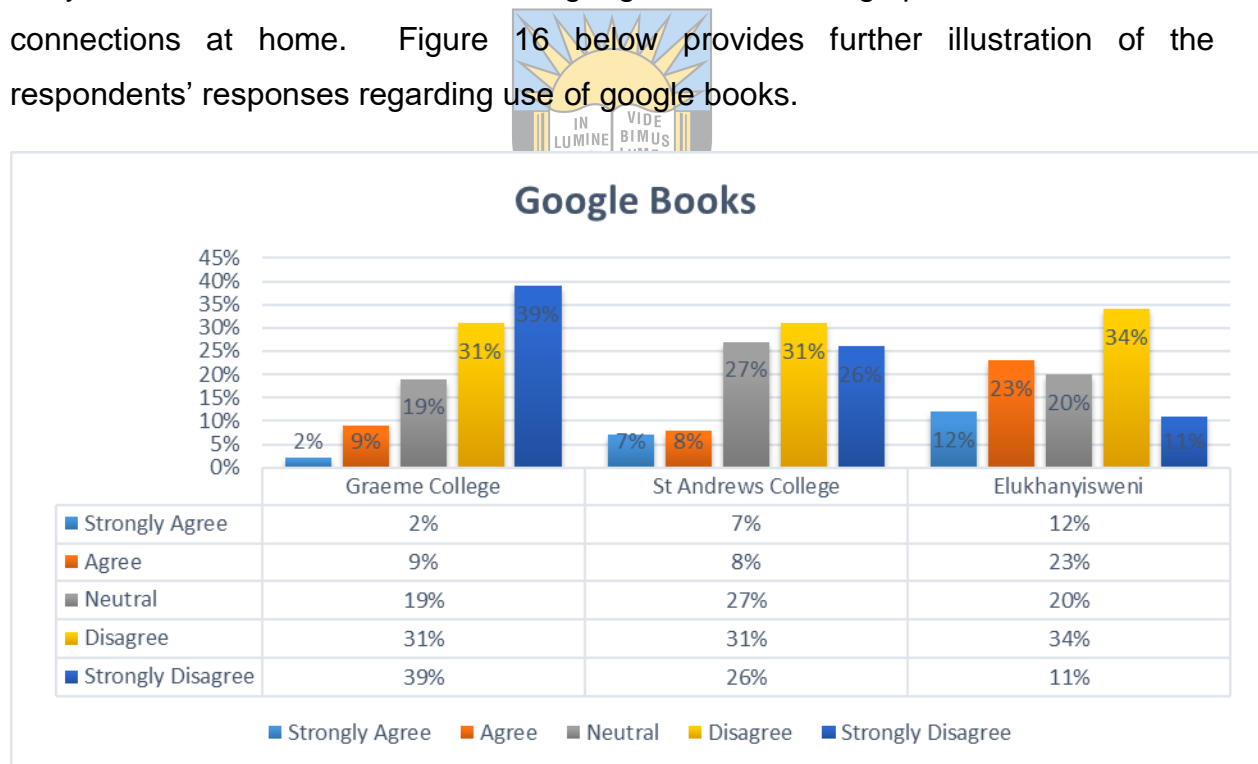


Figure 16: Google Books

ITEM 14: ABILITY TO USE MICROSOFT TOOLS

This item refers to the respondents' ability to use the different Microsoft programmes, such as Word, Excel, PowerPoint, etc.

As shown in Figure 17 below, overwhelming respondents in Graeme College 74 (63%) strongly agreed they can use Microsoft tools such as Word, Excel, and PowerPoint; 31 (26%) agreed, while 8 (7%) selected neutral. Only 5 (4%) respondents strongly disagreed.

In St Andrews College, 103 (77%) strongly agreed they could use Microsoft programmes, for instance, PowerPoint, to create slides; 28 (21%), while 3 (2%) were neutral regarding this issue.

However, in Elukhanyisweni, the aggregate of those who strongly disagreed 31 (34%) and disagreed 25 (28%), that they can use Microsoft tools such as were more 56(62%) compared to Graeme college and St Andrews. Hence, there were 7 (8%) respondents who strongly agreed, while there were 14 (15%) who agreed and 14 (15%) who were neutral.

This suggests that most learners at Graeme and St Andrews College are better equipped to use Microsoft programmes compared to few in Elukhanyisweni.

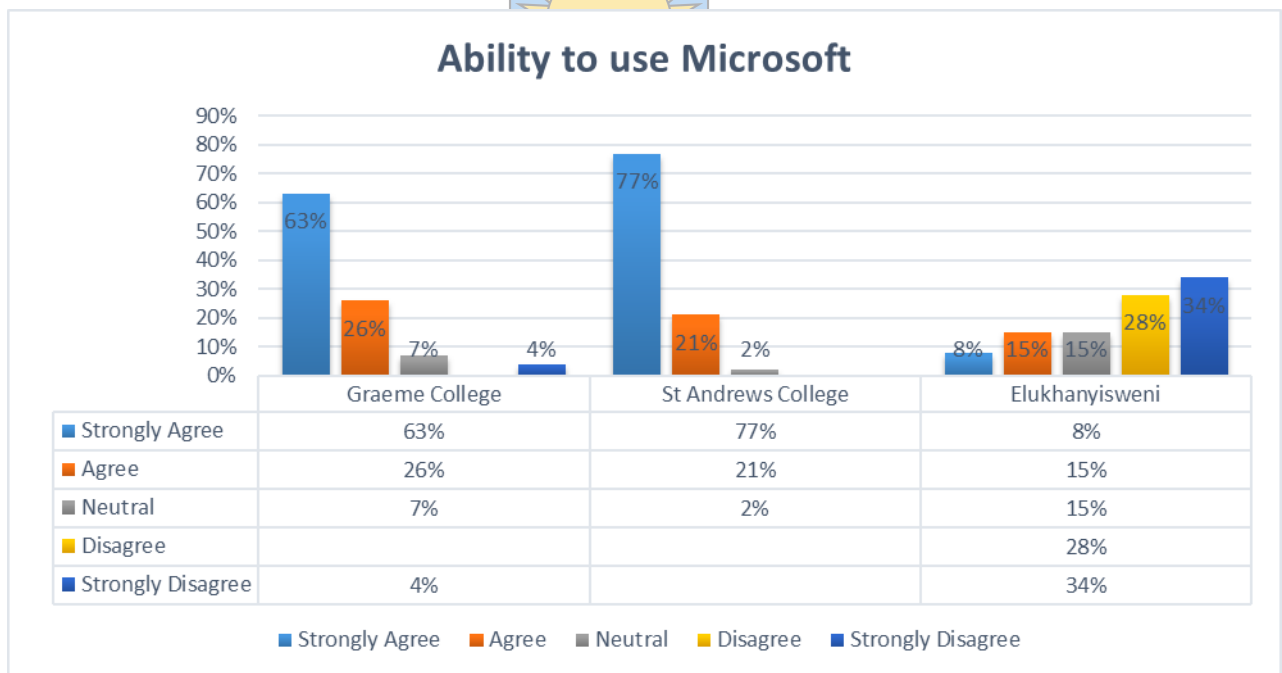


Figure 17: Ability to use Microsoft

ITEM 15: ONLINE QUIZZES

This item focussed on whether the investigated schools make use of online quizzes in their teaching and learning processes. Figure 18 below describes the level of online quizzes in the selected schools.

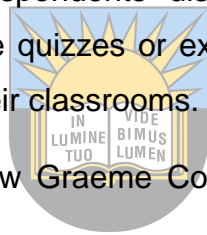
In Graeme College, 43(37%) respondents strongly disagreed that they practise online quizzes or tests in class; 30 (26%) disagreed, while 20 (17%) were neutral. Those who agreed or strongly agreed were 24 or 20%.

In contrast, in St Andrews, the aggregate of those who agreed (32%) and strongly agreed (34%) that they have online quizzes in the classroom or any simulation programmes, was 89 or 80%.

Furthermore, 8 (6%) of the respondents disagreed to being able to perform quizzes online, whereas 9 (7%) strongly disagreed.

In Elukhanyisweni, 38 (42%) respondents disagreed, while 29 (32%) strongly disagreed about conducting online quizzes or exercises. Only 14 (15%) agreed to participate in online activities in their classrooms.

The findings indicate that very few Graeme College and Elukhanyisweni learners engage in online activities.



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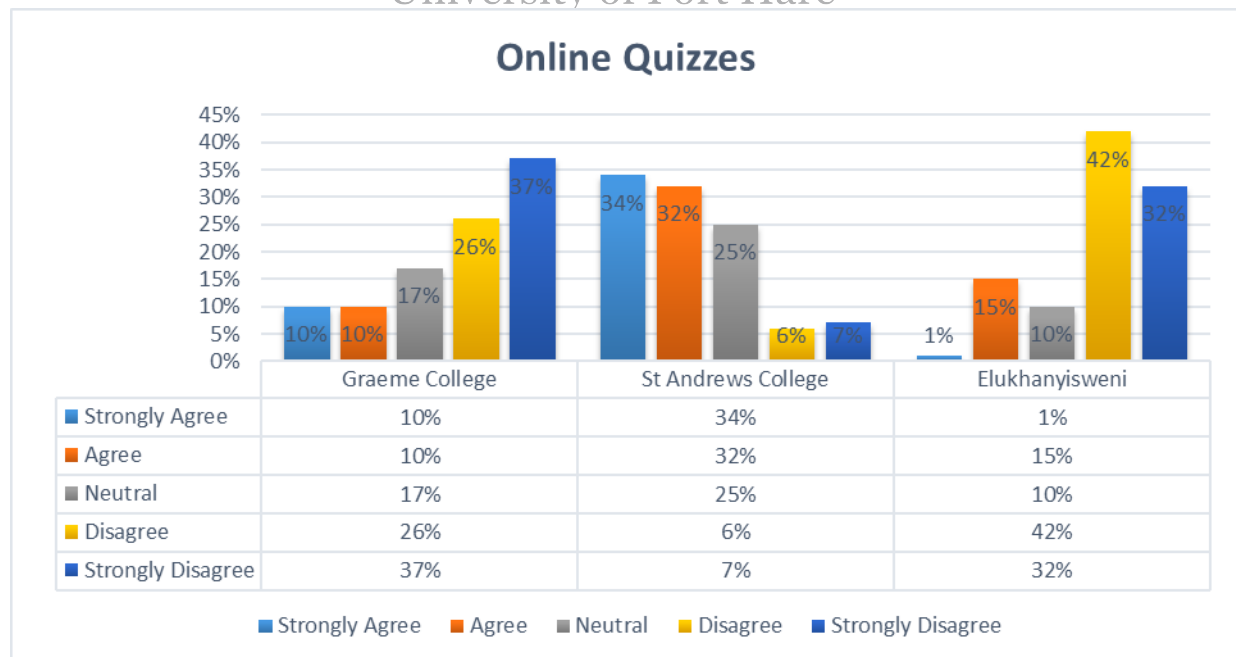


Figure 18: Online Quizzes

ITEM 16: EXERCISE COMPUTER SIMULATIONS

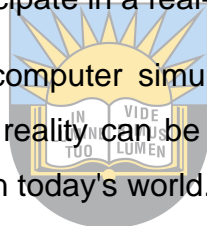
In this item, the researcher wants to determine whether the respondents perform or do any simulations of real-time experiences in their school. The majority of the respondents in Graeme College, 51 (44%), strongly disagreed, 32 (27%) disagreed, while 21 (18%) were neutral. Only 7 (6%) respondents strongly agreed to participate in any form of computer simulation.

In St Andrews College, 30 (22%) respondents disagreed to participate in computer simulations of real-world situations in their classes; 21 (16%) strongly disagreed, while 27 (20%) of the respondents agreed. A significant number of the respondents, 47 (35%), were neutral.

In Elukhanyisweni, most of the respondents, 41 (45%) disagreed to participate in computer simulations, whereby they are performing an actual life situation via a computer programme. Similarly, 29 (32%) strongly disagreed, while 9 (10%). Just 10 (11%) respondents agreed to participate in a real-time computer simulation.

According to the above results, computer simulations are not used as a form of teaching and learning. Simulating reality can be important in the face of the critical role technology has come to play in today's world.

Sheninger (2014: xvii) emphasizes that the increasing dominance technology plays in our lives can easily be experienced through behavioural observations of professionals, businesses, parents, children, and even grandparents. This is because the number of adult internet users keeps increasing as the advances in technology result from simulating reality (Sheninger, 2014: xvii). Figure 19 presents the responses regarding computer simulation exercises across the selected schools.



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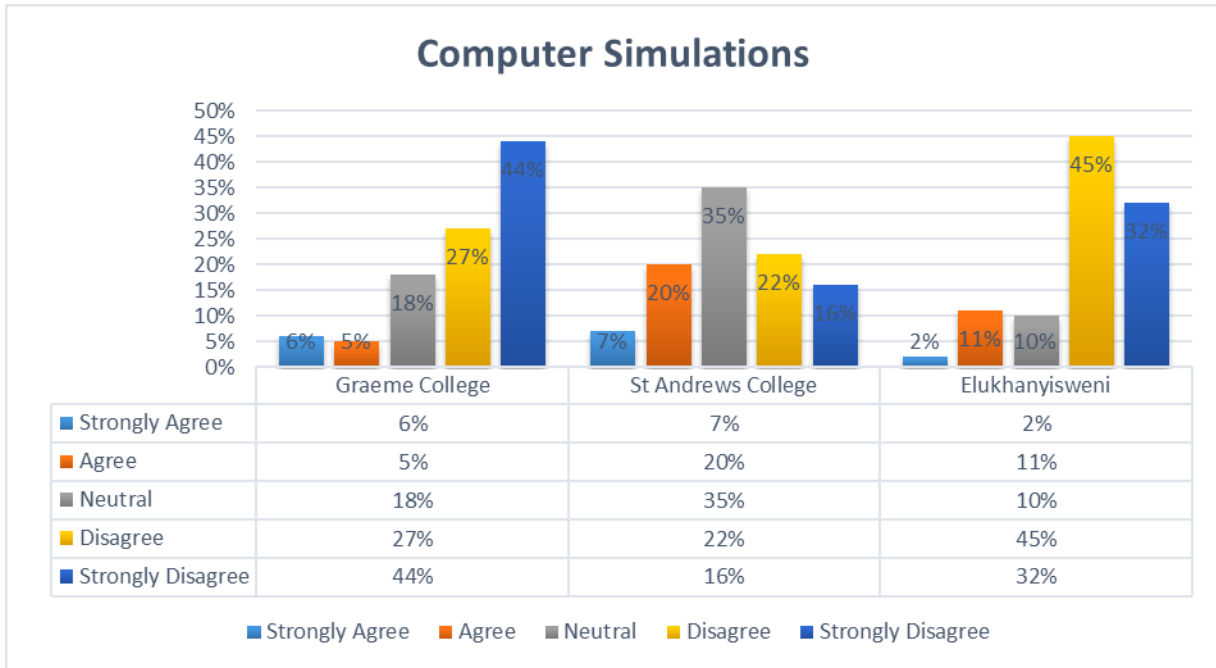


Figure 19: Exercise computer simulations



ITEM 17: SOCIAL MEDIA (WHATSAPP) GROUPS FOR SUBJECTS

In Graeme College, the researcher sought to ascertain if the respondents participate, or they are part of social media groups such as WhatsApp created for specific subjects. As shown in Figure 20 below, 63 (54%) respondents strongly agreed, 28 (24%) agreed, while 7 (6%) were neutral. 8 (7%) respondents disagreed, whereas 10 (9%) respondents strongly disagreed.

The majority of respondents in St Andrews College, 76 (57%), strongly agreed they have WhatsApp groups, which they use to discuss issues pertaining to their subjects, 40 (30%) of the respondents agreed, while 15 (11%) were on neutral. Those who disagreed were less than 2%.

In Elukhanyisweni, most respondents, 32 (35%), agreed they have social media groups to communicate with their classmates concerning their subjects; 23 (25%) strongly disagreed, while 12 (13%) were neutral. The widespread use of social media groups in the learning environment of the sampled schools is consistent with previous research.

Social media is a growing platform of communication, especially amongst young people. Tarantino et al. (2013: 3), cited in Mbodila et al. (2014: 04), argue that the

“rapid development of ICTs has sparked the creative incorporation of social media into current pedagogical applications and processes. This is corroborated by Badge et al. (2012: 02), who argue that social networks are rapidly moving beyond their original purpose and are inevitably becoming part of the learner experience”. The findings suggest that the schools use social media as a communication platform by learners and teachers.

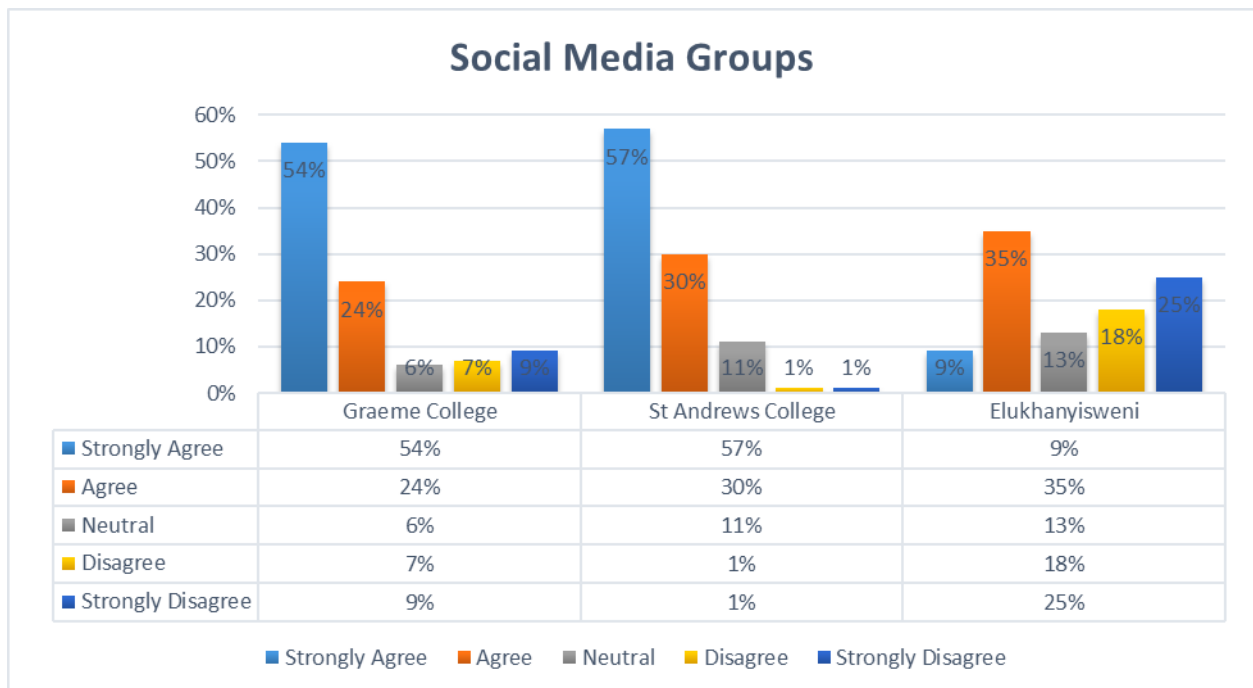


Figure 20: Social Media Groups for subjects

ITEM 18: ACCESS TO YOUTUBE EXERCISES

In this item, the researcher sought to know whether the respondents actually accessed YouTube for classroom exercises that test their ability and knowledge. In Graeme College, 43 (37%) respondents strongly agreed, 24 (21%) agreed, and 19 (16%) were neutral. However, 15 (13%) of the respondents disagreed with having access to YouTube as a form of exercising their mind, whereas the remaining 16 (14%) respondents expressed that they strongly disagreed with this.

In St Andrews College, 69 (51%) of the respondents strongly agreed they have access to YouTube solutions related to their assignment, for example, Maths and Physics solutions available on YouTube, 37 (28%) agreed, and 19 (14%) were neutral. Only 7 (5%) respondents disagreed, whereas 2 (1%) strongly disagreed.

However, in Elukhanyisweni, 33 (36%) of the respondents strongly disagreed, and 26 (29%) disagreed that they have access to YouTube material, whereby they can watch videos related to their subjects or assignments. 12 (13%) of the respondents strongly agreed, while 12 (13%) agreed to have access to YouTube, 8 (9%) expressed a neutral opinion.

According to the above explanations, it is clear that Graeme and St Andrews College agreed and strongly agreed to watch YouTube videos related to their studies. YouTube can be a potent tool for engaging learners to enhance their cognitive outcomes. The Flipped Learning model states that the use of technology serves to attend to personalized individual needs in terms of content in order to keep the learners engaged (Bergmann & Sams, 2012). Figure 21 illustrates the opinion of respondents concerning the use of YouTube.

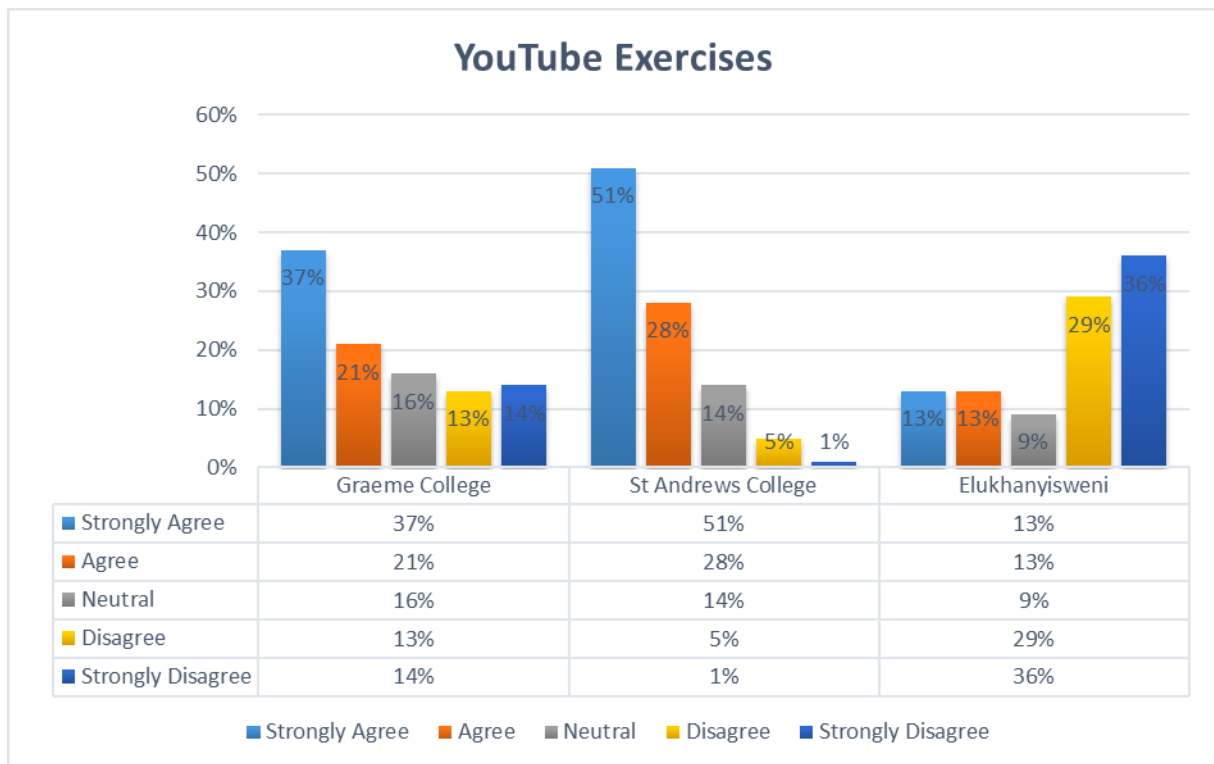


Figure 21: Access to YouTube Exercises

ITEM 19: MONTHLY DATA ON MOBILE PHONE

In this item, the researcher wanted to determine if the respondents get monthly data on their phones to access the internet. 64 (55%) respondents in Graeme College strongly agreed to this, while 23 (20%) of the respondents have agreed, and 11 (9%)

respondents were neutral. Furthermore, 10 (9%) respondents disagreed, while 9 (8%) strongly disagreed about having monthly data on their mobile phones.

Similarly, in St Andrews College, this item sought to ascertain whether the respondents have an allowance for their monthly data for their phones. 86 (64%) respondents strongly agreed, whereby 17 (13%) agreed to this, and 14 (10%) of the respondents were neutral. Furthermore, 8 (6%) of the respondents disagreed, whereas 9 (7%) strongly disagreed.

In Elukhanyisweni, 16 (18%) respondents strongly agreed, they have a monthly allowance for internet data on their phones, modem, or Wi-Fi router, 32 (35%) agreed, and 9 (10%) of the respondents were neutral. Conversely, 14 (15%) respondents disagreed, while 20 (22%) strongly disagreed.

As the finding indicates, the majority of the respondents have revealed that they receive monthly data to connect to the internet. Figure 22 provides a further illustration.

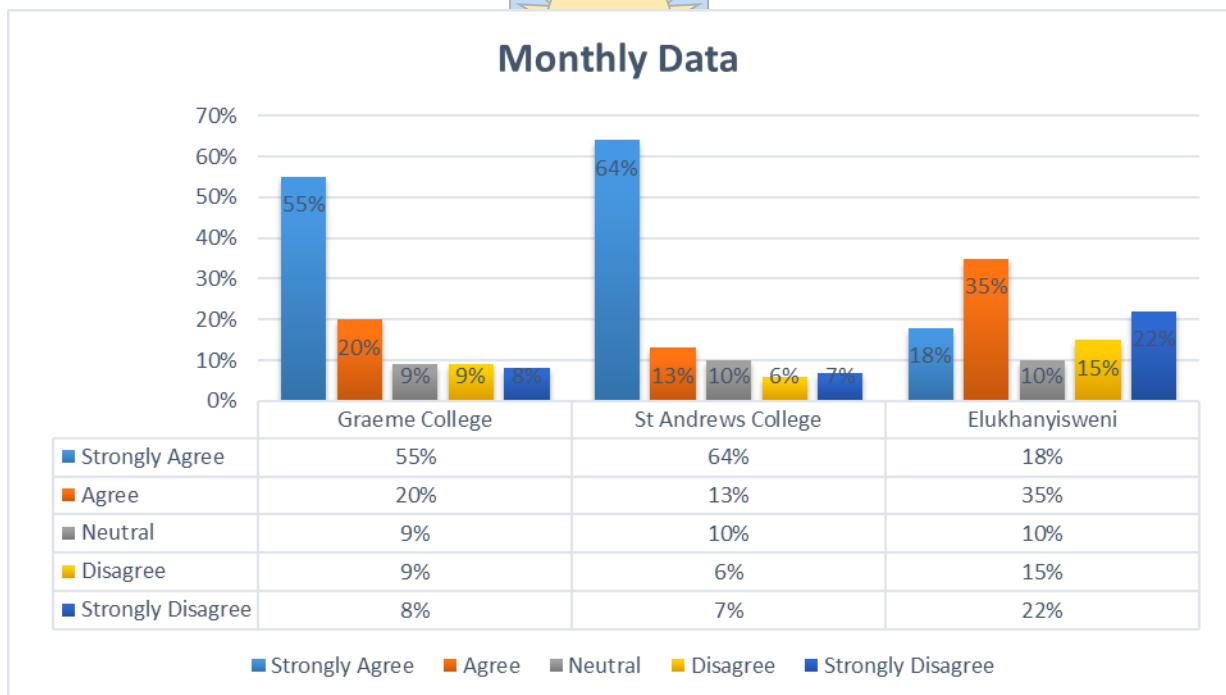


Figure 22: Monthly Data on Mobile Phone

ITEM 20: INTERNET CREATES BETTER INTERACTIONS

In this item, the researcher wanted to find out whether the respondents' interaction in the online platforms creates better relations or working conditions with their peers. Thus, 42 (36%) of the respondents strongly agreed, while 40 (34%) respondents agreed, and 20 (17%) respondents were neutral. However, 7 (6%) respondents disagreed, while 8 (7%) strongly disagreed.

St Andrews College: in this item, the researcher wants to determine if internet use enhances their relations or working interactions in terms of teamwork with their peers or classmates. Thus 58 (43%) of the respondents strongly agreed, 41 (31%) agreed to have better interactions, and 29 (21%) of the respondents were neutral. Additionally, 6 (4%) of the respondents disagreed, although none have strongly disagreed.

In Elukhanyisweni: this item sought to find out if the respondents perceive the internet or the online platforms to be contributing positively to their interactions with their peers and schoolwork. 12 (14%) respondents strongly agreed, while 30 (33%) of the respondents agreed, and 16 (18%) of the respondents were neutral. However, 17 (19%) of the respondents disagreed, while 16 (18%) strongly disagreed.

This item focused on finding whether the respondents have any online interactions with their peers, significantly enhancing their working relations. The findings are consistent with the views of Churchill, Lu, Chiu and Fox (2015: 4) that mobile technology offers a variety of tools for teachers that offer educational opportunities of the twenty-first century and new options for student-technology partnerships in learning. Because mobile technologies are empowered with interactive multimedia presentational capabilities, they can enable the delivery of a range of multimedia materials such as video, audio, graphics, and integrated media. This information is clearly illustrated in the Figure 23 below:

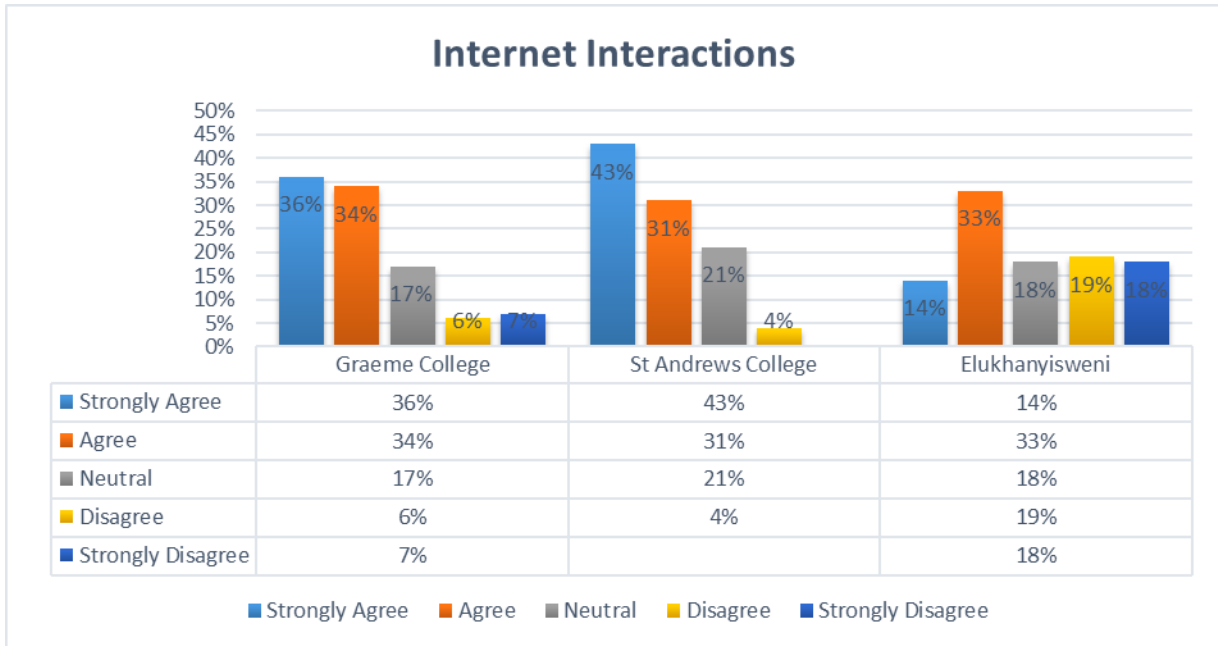


Figure 23: Internet and better interactions

ITEM 21: POWERPOINT PRESENTATIONS FOR LEARNERS

The main idea in this item was to find out whether the teachers prepare slideshows or PowerPoint presentations for their classes. In Graeme College, 23 (20%) respondents strongly agreed, while 33 (28%) of the respondents have agreed and 43 (37%) respondents were neutral. Furthermore, 5 (4%) respondents disagreed, while 13 (11%) strongly disagreed.

Similarly, in St Andrews College: respondents were asked whether the teachers in the respective school prepare PowerPoint slides for their classes. The majority of the respondents, 50 (37%), agreed and 29 (21%) strongly agreed that their teachers prepare slides for their lessons; 40 (30%) of the respondents were neutral. Furthermore, 12 (9%) respondents disagreed, while 3 (2%) strongly disagreed.

In Elukhanyisweni, this item sought to determine whether the respondents' educators prepare slide shows for their classes that can be accessible to the learners. Only 13 (14%) respondents strongly agreed, 19 (21%) agreed, and 7 (8%) of the respondents expressed a neutral option. In contrast, 34 (37%) of the respondents disagreed, while 18 (20%) strongly disagreed.

The findings indicate that PowerPoint slides are used as part of the teaching and learning process in the respective schools. The degree of use varies from school to

school. Elukhanyisweni educators appear to use PowerPoint presentations minimally (see Figure 24 below).

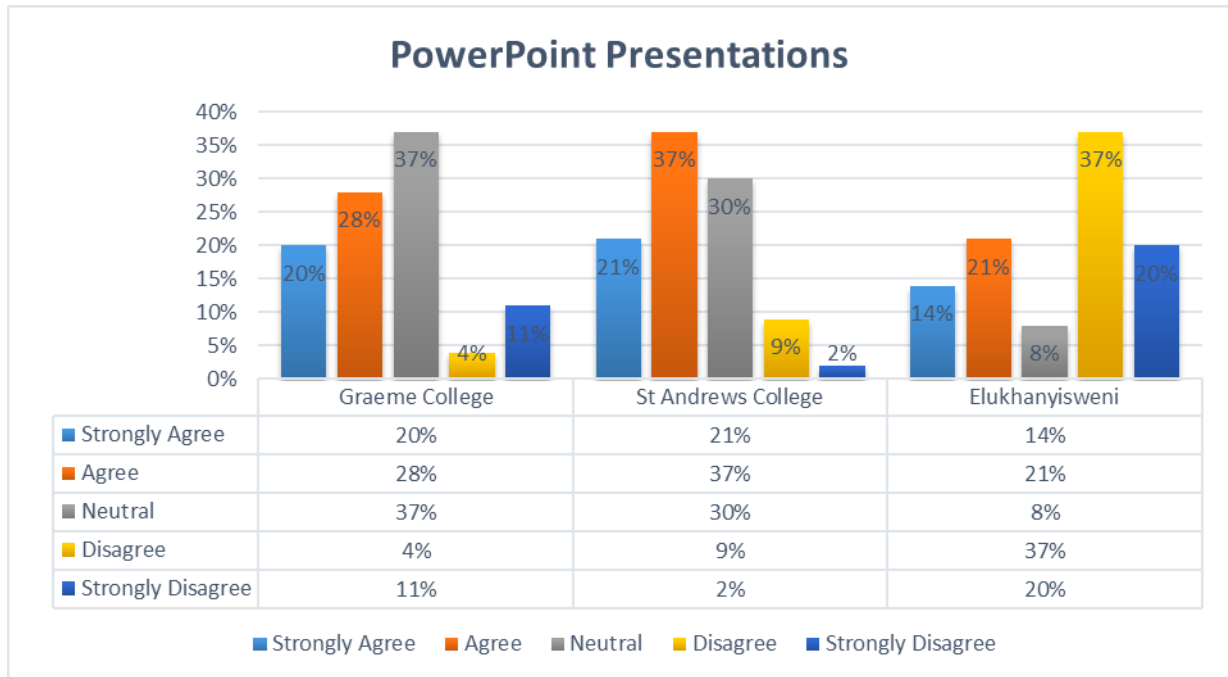


Figure 24: PowerPoint Presentations



ITEM 22: IMPORTANCE OF LEARNING USING TECHNOLOGY

Technology is an ever-growing and changing aspect of societal development, and the researcher wanted to find out whether respondents consider using it as a relevant strategy. According to Guy (2009), this can be referred to as social capital and can, in turn, motivate learners, especially those who are doomed to be at risk.

In Graeme College: this item seeks to determine whether the respondents consider learning through technology as something imperative for their future technological skills. Thus, 47 (40%) of the respondents strongly agreed, while 44 (38%) of the respondents agreed, and 18 (15%) were neutral. Furthermore, four (4) respondents representing 3% disagreed, whereas 5 (4%) respondents strongly disagreed.

In St Andrews College, the participants were asked whether they find the use of technology in their studies relevant and might be helpful for higher education and the workplace environment. An overwhelming majority, 49 (37%) of the respondents, strongly agreed, while 50 (37%) agreed, and 29 (22%) of the respondents were neutral. 4 (3%) of the respondents disagreed, whereas 2 (1%) strongly disagreed.

In Elukhanyisweni, this item sought to ascertain whether the use of ICTs in education prepares the learners for higher institutions education and the workplace. This is because the use of ICTs consumes almost every aspect of our lives. Hence, the learners have to advance their technological skills. Sixteen (16) or 18% of the respondents strongly agreed, while 36 (40%) of the respondents agreed, and 11 (12%) of the respondents were neutral. However, 10 (11%) respondents disagreed, while 18 (20%) strongly disagreed.

Figure 25 provides respondents' opinions about the importance of technology in today's learning.

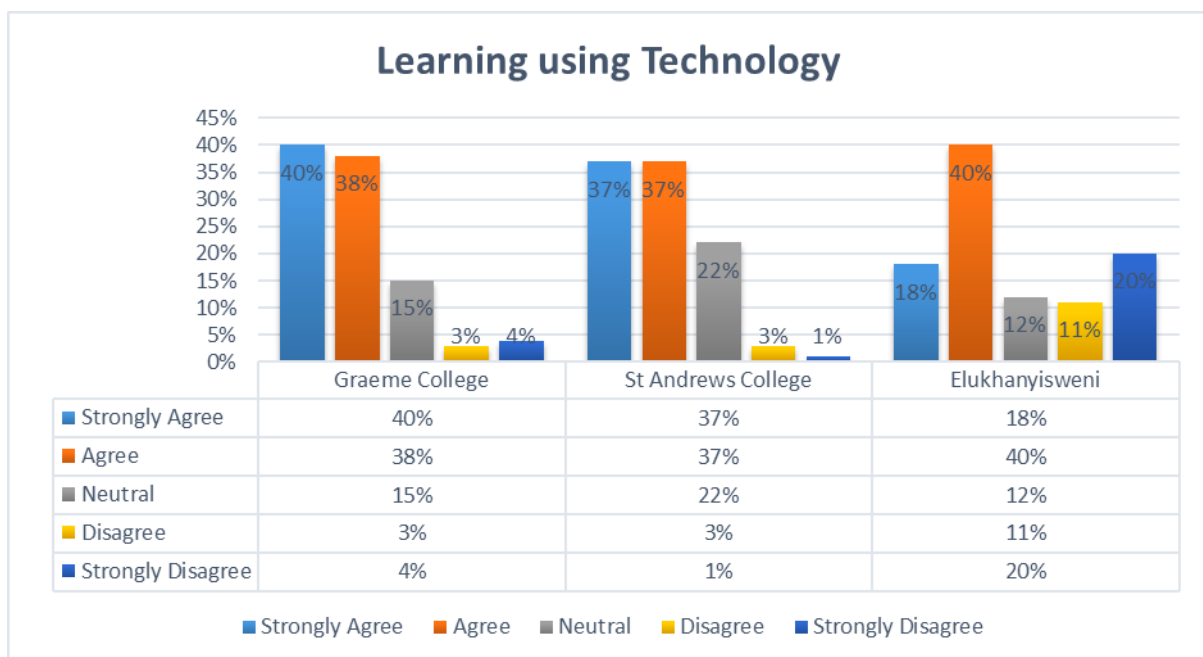


Figure 25: Importance of learning using technology

ITEM 23: WHATSAPP AS A COMMUNICATION TOOL

WhatsApp is extensively used in almost all spheres of our lives, whether in church, work, or school. Therefore, this item focused on the importance of utilising WhatsApp as a communication tool in the selected schools.

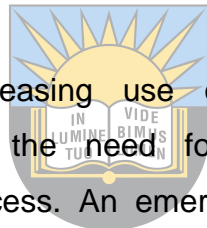
It looked specifically at how teachers and learners use this platform in their school life. As shown in Figure 26 below, respondents expressed divergent views. In Graeme College, this item sought to determine whether the respondents use WhatsApp to communicate with their teachers, peers, and classmates. The majority

of respondents, 58 (50%), strongly agreed, 34 (29%) agreed, and 12 (10%) respondents were neutral. On the other hand, 6 (5%) respondents disagreed, while 7 (6%) respondents strongly disagreed.

Most respondents in St Andrews College, 48 (36%), strongly agreed, 48 (36%) using the WhatsApp platform to communicate with their teachers; 30 (22%) respondents were neutral. Only 5 (4%) respondents disagreed, whereas 3 (2%) have strongly disagreed.

Given the advancement of communication platforms due to internet access, it is now possible for learners to communicate with their peers and teachers via WhatsApp. Thus, the researcher wanted to find out whether the respondents in Elukhanyisweni: also use WhatsApp as a communication tool in their school and classrooms. 20 (22%) respondents strongly agreed, while 24 (26%) of the respondents agreed, and 6 (7%) of the respondents were neutral. However, 18 (20%) respondents disagreed, while 23 (25%) strongly disagreed.

The findings indicate the increasing use of WhatsApp in teacher-learner communication. This highlights the need for educators to embrace digital technologies in the learning process. An emerging pedagogy for an information society should reflect changes on all these components of the learning process (Plomp, 2003: 19). Therefore, the researcher agrees with Plomp (2003: 19) that integrating new media technologies into the curriculum should reflect teaching and learning that enhances the platform's communication as well.



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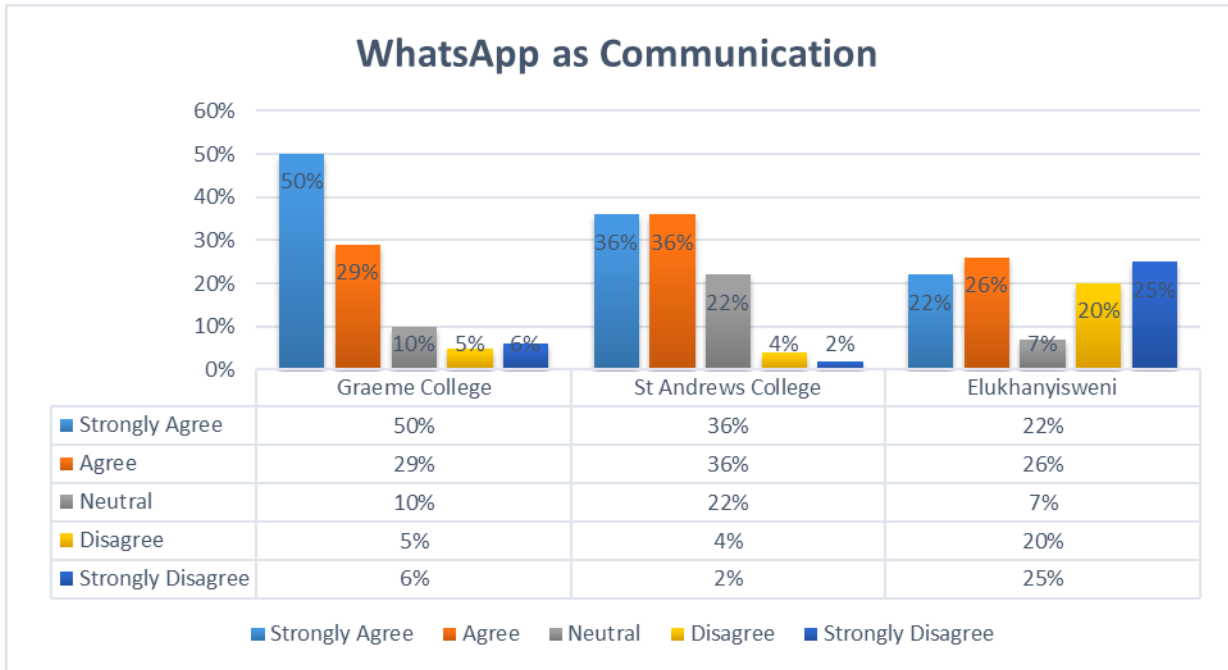
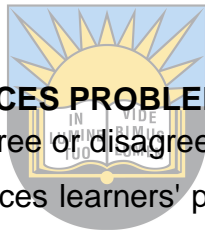


Figure 26: WhatsApp as a Communication Tool



ITEM 24: TECHNOLOGY ENHANCES PROBLEM-SOLVING ABILITY

This item asked respondents to agree or disagree with the statement that technology in the learning environment enhances learners' problem-solving abilities. In Graeme College, the majority of the respondents, 43 (37%), agreed, and 33 (28%) strongly agreed that the implementation and use of technology for learning could improve problem-solving ability; 29 (25%) of the respondents were neutral. Furthermore, 8 (7%) respondents disagreed, and only 3 (3%) strongly disagreed.

Similarly, 51 (38%) of St Andrews College respondents agreed that implementing and using computers within the curriculum enhances problem-solving skill and enable learners to articulate a phenomenon independently with search engine assistance. An additional 37 (28%) respondents strongly agreed, 36 (27%) were neutral. However, 6 (4%) respondents disagreed, while 4 (3%) strongly disagreed.

In Elukhanyisweni, 33 (36%) of the respondents agreed, 9 (10%) strongly agreed that ICTs enhance learners' problem-solving skills. Those who hold this opinion argue that the more a learner is exposed to digital technology, the more mentally equipped. However, 18 (20%) of the respondents disagreed, 20 (22%) strongly disagreed, and 11 (12%) were neutral.

The researcher wanted to determine whether the respondents look at the technology they use as a problem-solving tool. Lesame et al. (2012) stipulate, "The internet as a medium has most of the characteristics of new media, such as interactivity amongst individuals, convergence and hyper textuality. Hence, the researcher believes that implementing new media technologies into the curriculum benefits teaching and learning, such as two-way communication amongst learners. As the findings indicate, most respondents agreed and strongly agreed that media technologies improve teacher-learner communication and sharpen learners' ability to engage in critical thinking. Respondents' opinion on the impact of technology on problem-solving ability is presented in Figure 27 below.

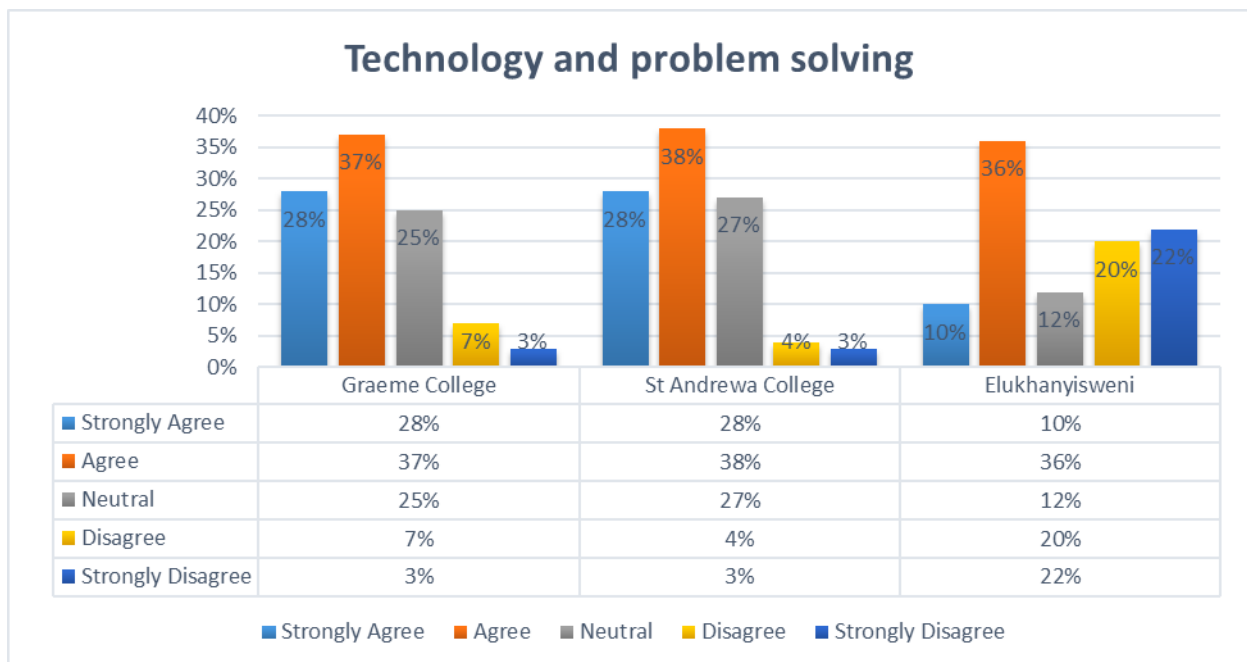


Figure 27: Technology enhances problem solving

ITEM 25: SOCIAL MEDIA AND CYBERBULLYING

Young people, including teenagers who use social media for schoolwork and social activities, face increasing cyberbullying threats. According to Cantone et al. (2015: 59), there is an indication that being a victim of bullying contributes independently to children's mental health problems. The persistence of the phenomenon for prolonged periods may cause the development of low self-esteem and depressive symptoms that can persist into adulthood. Bullying and online exposure were considered

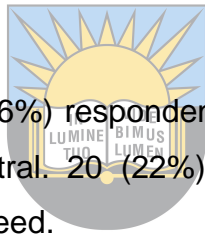
important in this study as more young people, especially teenagers, are involved in advanced bullying acts, either as perpetrators or victims.

Therefore, this item sought to determine whether respondents think social media exposes them to cyberbullying and if this could influence them in any way.

In Graeme College, 46 (38%) strongly agreed, 25 (21%) agreed that increasing exposure to online platforms and social networking sites influence cyberbullying). Twenty-nine (29) respondents or 25% were neutral, 7 (6%) disagreed, whereas 10 (9%) strongly disagreed.

In St Andrews College, almost an equal number of respondents agreed, 45 (34%) and strongly agreed, 43 (32%) that bullying is a fundamentally problematic phenomenon in society across generations, whether young or old. The respondents believe online platforms have dramatically increased the risks of cyberbullying. However, 35 (26%) respondents were neutral, 7 (5%) disagreed, while 4 (3%) disagreed.

Similarly, in Elukhanyisweni, 15 (16%) respondents strongly agreed, while 24 (26%) agreed, and 15 (16%) were neutral. 20 (22%) respondents disagreed, while 17 (19%) respondents strongly disagreed.



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The result shows that most of the respondents agreed and strongly agreed to social media influencing the aspect of cyberbullying. The findings are similar to previous studies that highlight the negative impact of social media use.

According to some scholars such as Whittaker & Kowaski (2014: 11), the development, advancement, and availability of ICT's to young adults in high schools has created a rise of cyberbullying cases reported about school learners committing suicide. Figure 28 below illustrates respondents' levels of agreement and disagreement across the three schools.

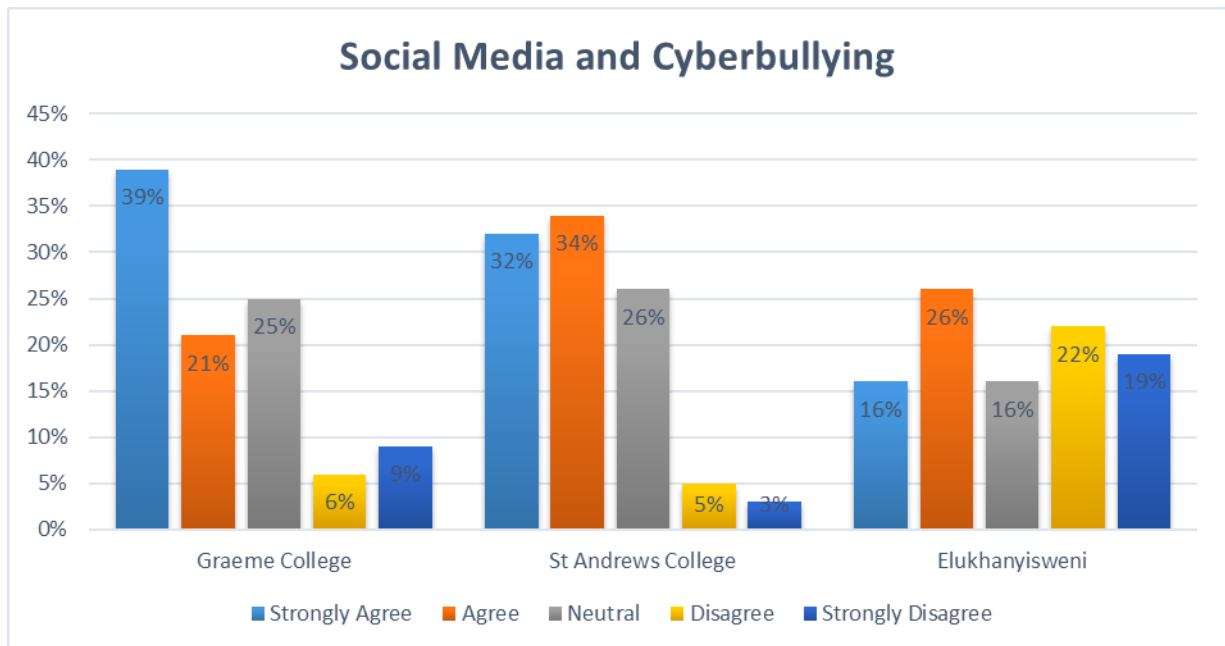
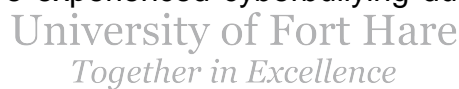


Figure 28: Social Media & Cyberbullying

ITEM 26: BULLYING ONLINE INCREASE THROUGH INTERNET EXPOSURE

In this item, the researcher sought to ascertain whether access to the internet increases exposure to online bullying or cyberbullying. Respondents were required to state whether they have experienced cyberbullying due to social media or other online platforms.



Of the preponderance of respondents in Graeme College, 56 (48%) strongly disagreed, and 22 (19%) disagreed that the learners' exposure and use of digital technologies have increased the level of bullying online. 16 (14%) were neutral, while only 16 (14%) strongly disagreed and 8 (7%) disagreed.

Graeme College: this item assumes that the However, 8 (7%) respondents have strongly agreed while 16 (14%) have agreed and 14 (12%) have chosen neutral.

St Andrews College: young people, in particular, are at the prime of social media use amongst other uses of online platforms. Thus, the researcher seeks to find out if their growing use of social media is the cause of the increasing cyberbullying acts amongst teenagers. 47 (35%) of the respondents strongly disagreed, 32 (24%) disagreed, and 29 (22%) were neutral. However, 7 (5%) respondents strongly agreed, while 19 (14%) agreed.

Similarly, in Elukhanyisweni, 30 (33%) of the respondents strongly disagreed, 29 (32%) disagreed, and 11 (12%) were neutral. However, 8 (9%) respondents strongly agreed, while 13 (14%) agreed.

The study considered bullying and online exposure necessary, as more young people, especially teenagers, are involved in advanced bullying acts, as either perpetrators or victims. According to Cantone et al. (2015: 59), there is an indication that being a victim of bullying contributes independently to children's mental health problems. The persistence of the phenomenon for prolonged periods may cause the development of low self-esteem and depressive symptoms that can persist into adulthood. Figure 29 below shows the responses regarding online exposure and cyberbullying.

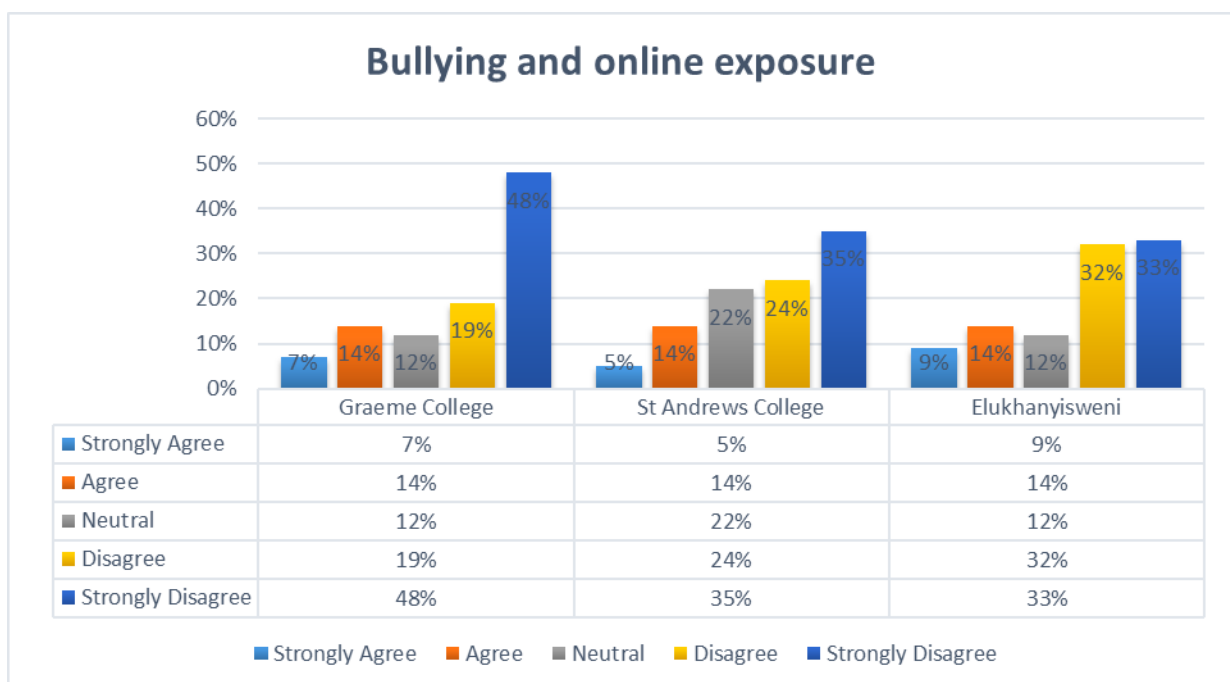


Figure 29: Online bullying

ITEM 27: EDUCATIONAL CDS AND DVDS ASSIST WITH SUBJECTS

In this item, the researcher sought to find out whether the learners have educational CDs and DVDs that assist them in their subjects for complex problems. The majority of respondents in Graeme College, 56 (48%), strongly disagreed, while 32 (27%)

disagreed with having CDs and DVDs containing information on their subjects. Only 6 (5%) respondents strongly agreed, while 7 (6%) agreed 16 (14%) were on neutral.

In St Andrews College, 77 (57%) of the respondents strongly disagreed, 19 (14%) disagreed, while 26(19%) were neutral. In contrast, just 8 (6%) respondents agreed, and 4 (3%) strongly agreed they have any CDs or DVDs for additional assistance for their studies.

Similarly, in Elukhanyisweni, 38 (42%) of the respondents disagreed, 37 (41%) strongly disagreed that they use any education CDs or DVDs. In comparison, 8 (9%) were undecided. When those who agreed and strongly agreed were aggregated, they were eight (8), less than 10%. Figure 30 below presents a breakdown of the findings.

The above results clearly show that most respondents do not use educational CDs and DVDs for their learning. However, some respondents have revealed that they have access to and use these CDs and DVDs for learning. According to Gros, Kinshuk & Maina (2015), technology is something external that should be perceived as an instrument to support different activities. Therefore, technology is either a replacement or a substitute for an already existing function.

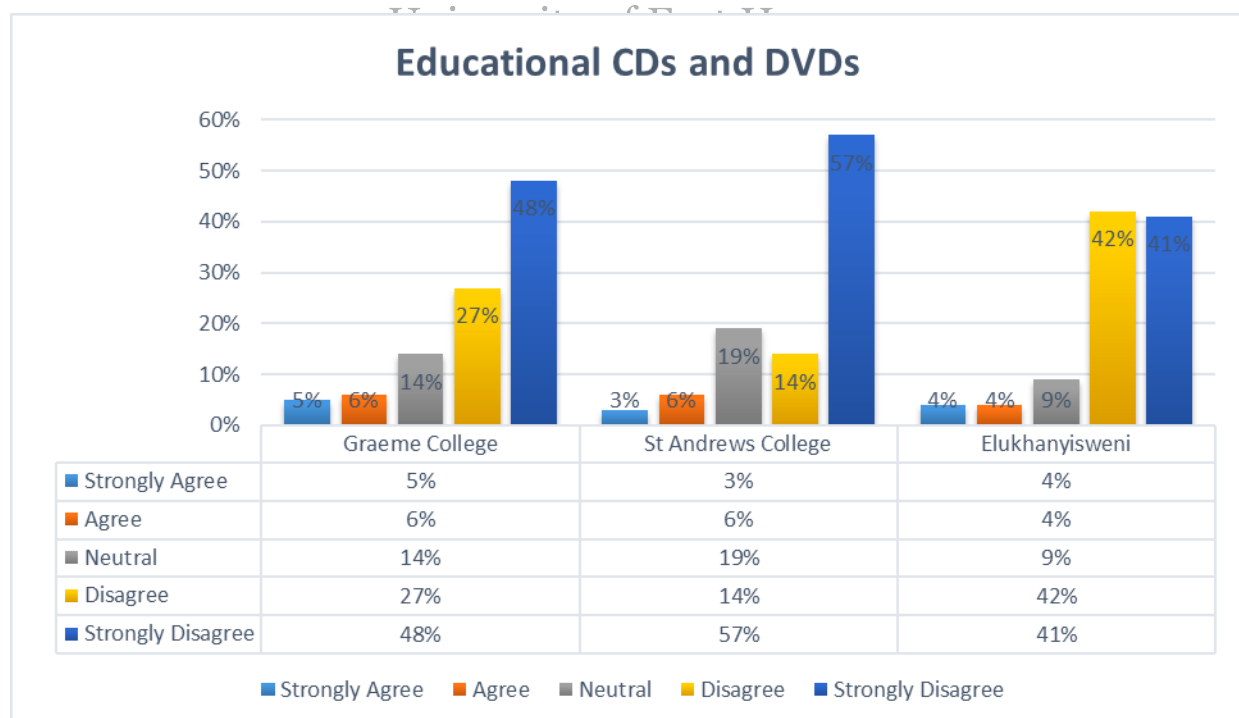


Figure 30: Educational CDs & DVDs

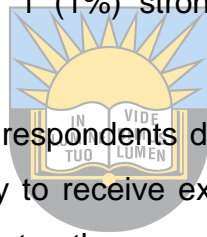
ITEM 28: ACCESS TO AN ONLINE TUTOR

This item aimed to ascertain if learners have access to online tutors specifically for their studies. The majority of the respondents in Graeme College, 55 (47%), strongly disagreed, 30 (26%), while 16 (14%) were neutral. Those who agreed were 15 (13%). In other words, 73% of the respondents have no access to online tutors in Graeme College.

Similarly, in Andrews College, most respondents, 39 (29), strongly disagreed, and 37(28) disagreed with having access to online tutors even as they acknowledged the utilization of online tutorial services. However, 9 (7%) of the respondents strongly agreed to have access to online tutors, 13 (10%) agreed, while 36 (27%) were neutral.

Like in Graeme College and St Andrews, the majority of respondents in Elukhanyisweni strongly disagreed with having access to online tutors. In contrast, 5 (5%) of the respondents agreed, 1 (1%) strongly agreed, while 16 (18%) were neutral.

The study results show that most respondents do not have access to online tutors, which denies them the opportunity to receive extra tutoring and an online learning experience. Figure 31 below illustrates the responses regarding access to an online tutor.



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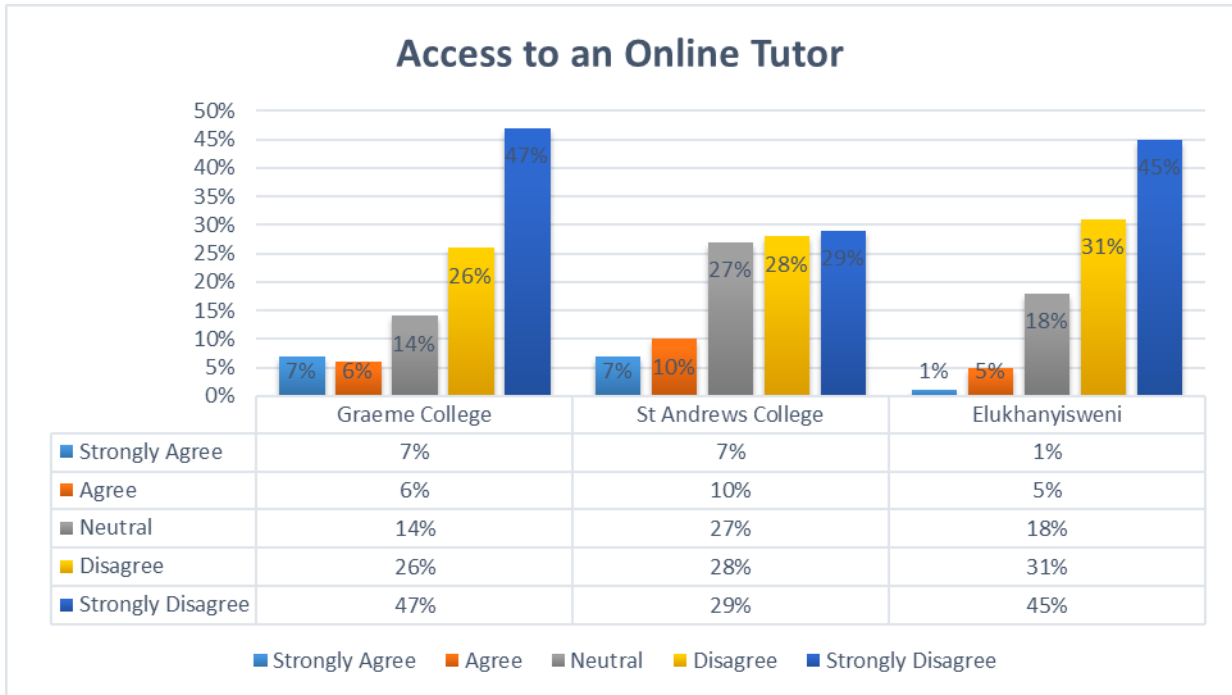


Figure 31: Access to Online Tutor



ITEM 29: THE SCHOOL HAS AN ACTIVE FACEBOOK PAGE

This item sought to determine whether the selected schools have active Facebook pages that connect learners, teachers, and other stakeholders, including prospective learners.

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Most respondents in Graeme College, 43 (37%), strongly agreed, the school has an active Facebook page; 38 (32%) agreed, while 22 (19%) were neutral. In contrast, only 6 (5%) disagreed, while 8 (7%) strongly disagreed.

In St Andrews College, those who strongly agreed and agreed the school has an active Facebook page whereby they communicate their social and formal events were 58 (43%). However, a significant number of the respondents, 47 (22%), were undecided or neutral; 21 (16%) have disagreed, while 12 (9%) strongly disagreed.

In comparison, 35 (38%) of the respondents in Elukhanyisweni disagreed the school has a visible and active Facebook page accessible to learners and prospective learners. 21 (23%) of the respondents agreed 12 (13%), strongly agreed while and 20 (22%) of the respondents were neutral

In this item, the researcher wanted to find out whether the respective schools have a Facebook page that focuses on posting information about their institution and learning programmes. The results show that the respondents from St Andrews and Graeme College have agreed to have a Facebook page in their schools, while at Elukhanyisweni, most of the respondents disagreed. However, it is evident that "online participation facilitates increased awareness and civic voice whether as digital curator or consumer. As social media becomes a more significant part of daily information and communication needs, educators at all levels are tasked with helping students negotiate their digital and real-time efforts. So that traditional skills of critical inquiry, evaluation, and analysis are applied across all mediums (Jenkins et al., 2009) cited in Stocchetti (2016: 93). Figure 32 below provides additional information regarding the availability of school Facebook pages across the selected schools.

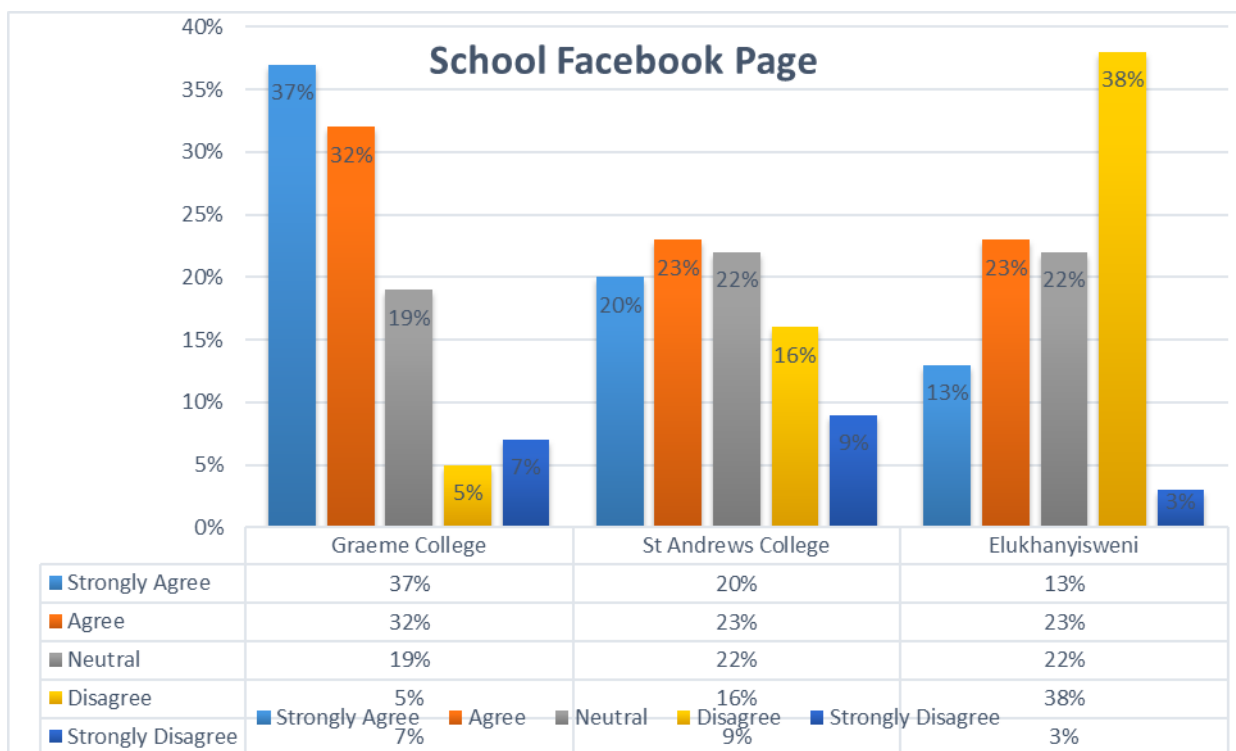


Figure 32: School Facebook Page

ITEM 30: CYBERBULLYING ACT BY OR TOWARDS LEARNER

The researcher used this item to ascertain whether respondents have experienced any form of cyberbullying, whether as a perpetrator or the victim.

Only a negligible number of respondents in Graeme College, 5 (4%) strongly agreed, 8 (7%) agreed, and 11 (9%) respondents were neutral. The majority of the

respondents, 82 (70%), strongly disagreed with experiencing cyberbullying; 12 (10%) disagreed.

Similarly, most respondents in St Andrews College, 68 (51%), strongly disagreed, and 29 (22%) disagreed that they have experienced any bullying either as a victim or perpetrator. Only 7 (5%) strongly agreed, and 15 (11%) agreed, while 15 (11%) were neutral.

In Elukhanyisweni, the researcher wants to find out whether the respondents have bullied someone through online communication platforms or assisted someone who did. The majority of respondents, 36 (40%), disagreed, 26 (29%) strongly disagreed, and 19 (21%) were neutral. Only 2 (2%) respondents strongly agreed, while 8 (9%) agreed.

As the findings indicate, most respondents appear not to have taken part in a bullying act. However, many admit online bullying exists and can affect learners negatively. Rogers (2013: 13), states that technology can distract learners when instruction is being delivered by traditional methods. Figure 33 shows the level of respondents' opinions concerning cyberbullying at the selected schools.

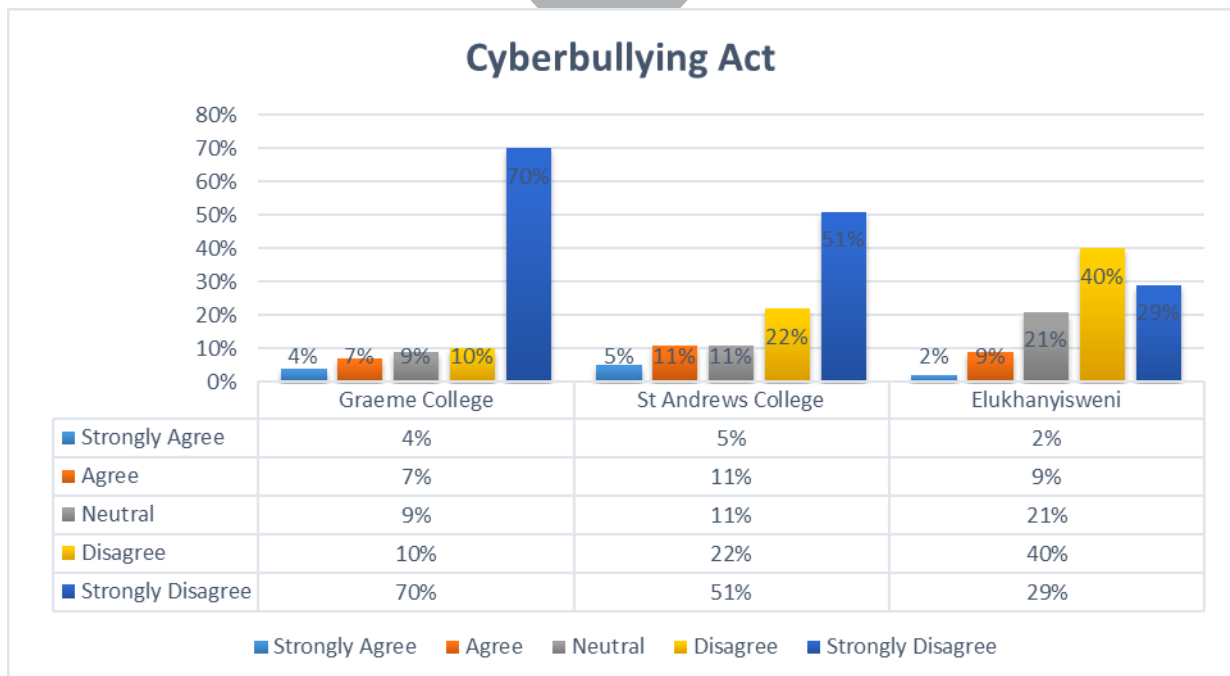


Figure 33: Cyberbullying act

4.4 Summary of Key Analysis

In this section, the researcher is mainly concerned with reporting the findings of the research study. The study focussed on integrating new media or digital technologies with pedagogical methods to teaching and learning to accumulate better results in high school education. The researcher wanted to find information that supports or rejects the notion of difficulties associated with the implementation of digital technologies in Eastern Cape high school as well as the poor results for grade twelve learners. The Eastern Cape is one of the poverty-stricken provinces in South Africa with a high crime rate. This contributes to some of the issues hindering proper application and use of digital technologies at schools as they get stolen in some schools.

4.4.1 New media impact on education

Teaching and learning using digital technologies means that there is great exposure to the internet. Asabere et al. (2017) states that the application and use of ICTs in daily school activities have improved in developed countries, which is still a struggle in third world countries. However, new media technologies and approaches are positively impacting education in developed countries (Asabere, 2017: 162). Therefore, looking at the survey results, it is evident that the two schools in urban areas, St Andrews and Graeme College benefit the most from the use of digital technologies. Hence, this means that learners in rural and township areas are still facing difficulties accessing computers and the internet for assistance in their education. Thus, the researcher argues that the Eastern Cape is still behind in their matric results because most schools are situated in rural areas with no ICT-trained teachers and proper resources.

4.4.2 Internet access and problem-solving skill

Most of the respondents believe that being able to use digital technologies and having unlimited access to the internet creates some level of innovativeness and contributes to problem solving.

Internet access nowadays is accessible not only in school libraries but also in malls, restaurants, homes, public parks, and so forth, which is why learners can search for information and learn wherever they may be. The finding shows that internet access

has improved blended learning. A blended or combined learning system involves learners being taught by their teachers in the classroom as well as through the internet on their own and at their own pace.

However, while the learners from the Makhanda schools had no problem connecting to the internet or accessing the computer or any digital technology, the learners from Elukhanyisweni have limited technological skills, as they are not exposed to digital technologies except for their phones or smartphones.

The results suggest that Educational CDs and DVDs, especially CDs and DVDs with Maths and Physics solutions, are becoming a thing of the past. Most of the respondents from the responses seem unfamiliar with them. There is a sense that modern learners would rather search for information or knowledge through the internet via Google, YouTube, and other search engines. The findings show that participants heavily depend on digital technology or the internet for their schoolwork and communication amongst their schoolmates and teachers. This, works well as someone gets exactly what they want whether it is in the form of text, audio or video which assists the kind of learner who is searching.

Information searching in the internet also yields good results as the principal also states that “We as the school actually maintain a website for our stakeholders to access information easily. The website gives detailed information as to what takes place on the school (events), their way of doing things, admission information, gallery of the school, events information and headmasters and teachers’ information” (Principal of St Andrews College, Makhanda, May 2019).

Therefore, internet technology has the essence of supporting the learning process through the online platforms of learning or communication (Utami, 2018: 2). Utami further suggests that it may be beneficial for teachers to combine the two instructional models, which are online and traditional (or face-to-face), as they both have various advantages and disadvantages (2018: 2).

The researcher believes that the high school education system and the curriculum should come with a certain level of innovativeness and problem-solving skills for the learners, thus giving them the ability to think independently instead of “spoon-

feeding” them with notes. Dwiyogo (2018:1) mentions, “The purpose of learning is to improve and develop the quality of learning” towards the learners. Hence, the idea of a classroom that is driven by the learners in terms of discussions and knowledge production but facilitated by the teacher with the assistance of digital technologies and the internet. It is possible to achieve the desired positive results by the learners and teachers through their collective efforts. Dwiyogo (2018:1), also states that teachers should establish and develop an ideal teaching and learning method in order to improve the quality of learning amongst their learners. In line with the finding of this study, this researcher thinks that it is imperative for the schools to keep their social media pages active for their current stakeholders, prospective stakeholders, and learners.

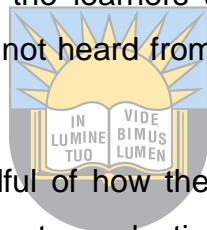
4.4.3 School communicator app

The schools make a point to engage with their learners and parents through different communication platforms, whether traditional or online. For instance, due to the rise of new media and social media usage, there are recent developments such as school communicator apps for parents and learners where they are kept up to date with the activities and calendar of the school throughout the academic year. “This keeps people in the know and makes communication much easier, as people can communicate anywhere and anytime. In our school we make use of the D6 school communicator app, while they also make use of the websites, which are active and updated frequently” the principal at St Andrews College stated. However, the principal at St Andrews College mentioned that their Facebook and Instagram pages are actually run by one of the learners in the school. Thus, he stipulated that the notion behind that is that the learner is in a better position to understand the content that interests their co-learners as well as other prospective learners.

4.4.4 Cyberbullying amongst the learners

The participants revealed that they use WhatsApp for their learning, especially communicating and engaging with issues concerning their school subjects. And because the participants have unlimited access to Wi-Fi or data (internet) and computers and their phones, it is possible for them to create and maintain these social media groups for their studies as well. However, access to social media

platforms negatively affects some learners who end up being victims of cyberbullying acts perpetrated by other learners. Cyberbullying involves hurting someone else using ICTs, in the form of sending harassment messages via texts or through online platforms. However, it is the most viral because it can reach an enormous number of audiences within a short time, and it cannot be removed or undone (Nixon, 2014: 143). Whether traditional or online (cyber), bullying creates a void in the victim, making them feel lonely and untrusting, making it difficult to report the matter to their teachers and parents. Somehow, this may take away their pride, dignity, self-esteem, and self-confidence, as they are humiliated and blackmailed repeatedly. In the issue of bullying and cyberbullying. St Andrews College Head Master stated that, “We actually encourage learners to report acts of bullying against them anonymously. He further stated that they also encourage their learners to make use of the Guardian app to report such acts as it assists problems they cannot see. In the app the professionals who assist the learners are able to see if the learner has suicidal thoughts and if they have not heard from the learner after specific period of time they are able to trace them”



He stated that the school is mindful of how they treat the learners, as it believes using harsh measures could be counterproductive. “It is also important how they (as teachers) deal with troublesome learners as harshness does not necessarily work sometimes. Instead, the learner may need and be referred to professional help within the school” (Head Master, St Andrews College, Makhanda).

With the advanced and growing use new media technologies in schools, it is evident that learners experience some bullying even in the social media platforms they engage in with their fellow learners. Some have their personal information circulated to everyone without their consent. This leads to some learners being miserable, which can lead to underperformance in their studies as they try to cope with the abuse from the other learners. Some of the learners are victims, while some are abusers. An abusive child can also be affected by some stress, perhaps at home, or they may also be experiencing bullying, thus channelling it to someone as a coping mechanism.

4.4.4.1 The Guardian App

The Guardian app as “a helper” to vulnerable learners – the Guardian app was actually developed to curb the problems of cyberbullying through the digital space, because the learners can log their thoughts and feelings through this app to an unknown person. However, even though their problems are recorded through the online platform, they are attended to with utmost urgency, as this may also be an indication that a child’s life is in danger. Thus, a location where a victim is can be found through advanced technology in phones and computers.

Therefore, interventions like these are needed to control the growing phenomenon of learners committing suicide because they do not have anyone to talk to about the problems they face with their peers or home-based issues. Some of these young learners are anti-social, are heavily exposed to, and are experts in using digital technologies (also known as geek). This can be problematic. Exposure to the internet can either create a bully over the internet (or dark web) or a victim because of the lack of social skills.



4.5 DISCUSSION OF THE FINDINGS

In this section the aim is to interpret and explain the results of the thesis as well as elaborate on the research findings and discuss the significance and implications of the results. In the study the researcher was guided by the following research questions;

- How do learners and educators perceive the utilization of digital media for pedagogy towards improving learners’ performance?
- To what extent are digital media technologies for pedagogy implementation influencing learners’ pass rates?
- What can be done to improve the implementation of integrating digital media into pedagogy regarding public secondary schools?

The study has employed a mixed methods approach in order to collect data by using interviews for the principals of the schools and distributed questionnaires to the learners. The data was analysed differently, quantitative data was presented through numeral graphs and the qualitative data was analysed through thematic analysis in

order to arrive at the findings. It was imperative to ask the respondents whether new media has a positive impact on their school work. Participants from the three schools were asked to agree or disagree whether new media positively impacts their work.

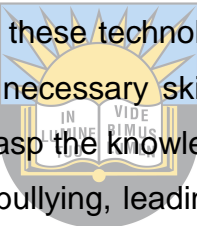
Therefore, according to the findings of the quantitative data that is presented in graphs it is indicated that, learners in Graeme and St Andrews Colleges have unlimited access to the internet, whereas those from Elukhanyisweni they do not have internet. The learners also indicated that they are able to acquire more knowledge through the search engines available. A small number of respondents from Elukhanyisweni secondary school are able to search the internet with data that they have bought individually. Learners from Graeme and St Andrews Colleges' have access to an interactive website, the website benefits the internal as well as external stakeholders of these organisations. Downloading content online has also proved to be another important aspect in the learning process and information sharing. According to Churchill, Lu, Chiu and Fox (2015: 4), internet connections for learners have proved to have better results. Therefore, the aspect of using search engines for knowledge consumption and sharing is of importance, especially to boost the cognitive abilities of the learners. This also assists the teachers in the process of teaching as they do not have to be the sources of information anymore.

The findings also indicated that the learners indeed go through bullying and especially cyberbullying across the three schools that were examined. Further, at St Andrews College, due to the solemnity and depth of the issue they have managed to seek assistance with an outside service which is the Guardian App whereby the victims can report anonymously. The Principal at St Andrews College indicated that this has a positive impact because it limits the number of learners who are likely to commit suicide. The Guardian App allows the learners to speak to an assigned specialist to the particular case over the phone. Hence, if it happens that the learner or victim is no longer keeping contact, then help will be sent to that learner by using their location. Nixon, (2014: 143) describes this, as the abuse of a learner by fellow learners, whether it is done physical or through the online platforms that are available and accessible to the learners.

4.6 CONCLUSION

This chapter focused on analysing and presenting the results or findings of the study, which investigated the integration of new media and pedagogy in the classrooms of the twenty-first-century. The results show that indeed schools make use of digital technologies to learn and communicate in the school environment. Furthermore, it is evident from the findings that the learners from the two private schools have unlimited access to digital technologies and the internet in the schools and on their smartphones and tablets. While the learners from the public school selected have limited resources and internet access both at school and their homes compared to the learners at the private schools selected.

According to the data collected, the learners from the public school use the internet and digital technologies bought by their parents for personal use. Hence, this makes learning and teaching more creative as learners are able to search for information on their own and build on what they already know, which helps their development and problem-solving skills. Exposure to these technologies is perceived as a good thing by the researcher because it is a necessary skill in higher education and working environment. Thus, it is better to grasp the knowledge at a younger age. It was found that there has been a rise in cyberbullying, leading to depression and suicide cases among some learners. Hence, the schools have measures to deal with the issues, but at this point, it is not very clear whether it is enough to curb the problem completely.



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CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In this section the researcher focuses on the conclusion of the study and recommendations for similar forthcoming research studies. The researcher will mainly discuss the findings of the study, what has been found out in relation to the problem statement, the research questions, the aim, and objectives that were set out initially in the study. The study was carried out to find out the gap that exists concerning integrating digital media technologies and pedagogies in the teaching and learning processes of Eastern Cape high schools.

The research questions that the researcher sought to answer were;

- How do learners and educators perceive the utilization of digital media for pedagogy towards improving learners' performance?
- To what extent are digital media technologies for pedagogy influencing learners' pass rates?
- What can be done to improve the implementation of integrating digital media into pedagogy regarding public secondary schools?

The study employed a mixed methods approach to obtain the data. This entailed the use of questionnaires that were distributed to the learners across the three schools and the data was analysed using numeric graphs. Interviews were conducted with the Principals of each school, and the data was analysed using thematic analysis.

The problem that was addressed by the researcher was the issue of underperformance of Eastern Cape high schools in matric results as compared to other provinces. The study comparatively analysed the use of digital technologies in private and public high schools of the Eastern Cape Province. The research questions were answered through data collected and presented through the findings of the study. The researcher asked about how learners and educators perceive the utilization of digital media for their learning purposes. Through the findings the respondents mentioned that they use digital media tools and online platforms for

their subjects and communication purposes. Communication through digital media tools is not only limited to school subjects but also to the larger school environment and stakeholders. Also, it is evident that digital media technologies influence the learners learning processes and pass rates as they are able to access search engines for information, share knowledge on social or online platforms created by their teachers. Thus, concerning public high schools the government should ensure to provide internet access as well as provide security in schools where computer labs have computers to guard against theft. According to the findings there is a need for the government to provide data to learners and teachers as most of them own cell phones in absence of digital media resources and training.

5.2 SUMMARY OF KEY FINDINGS

5.2.1 FREQUENT ACCESS TO THE INTERNET

The findings show that the majority of the respondents have unlimited access to digital technologies and the internet. As a result, this makes their search for information easy. In addition, learners can access and attain knowledge anywhere and everywhere. Nowadays, information tends to be at our fingertips because of the increased use of technology in society and school. It was also found that those having difficulties connecting to or lack access to the internet use the services of internet cafes. This highlights the need for equipping learners with the knowledge of working through a computer system, as it is pivotal in their daily lives and contributes a great deal even to their end-year school results.

Furthermore, both private and public-school learners seem to have access to the internet through their phones and the internet café for their schoolwork or social media visibility and participation. This finding is consistent with Utami (2018: 2), who states that technology in education has an important role, which allows the learner to access information anywhere and through any digital device.

5.2.2 ACCESS TO SCHOOL LABORATORY FOR SCHOOLWORK

The findings show that only two schools out of the three selected for this study have school laboratories. Hence, the learners have access to them for their schoolwork (assignments and projects). This tends to have a positive effect on the learners as

they can search for more information through the internet provided by the school, and they do not have to spend money on data bundles and internet café. They can also type their assignments on their own time and probably prepare their class presentations should they need to use the computer facilities.

On the contrary, the other school does not have a school laboratory. This has negatively impacted the learners and their learning because there are few alternatives in terms computer and internet access in rural areas.

5.2.3 NEW MEDIA HAS A POSITIVE EFFECT ON SCHOOLWORK AND ACQUIRING KNOWLEDGE

This section mainly focused on the effect that the implementation and use of new media has on the learner's schoolwork. Hence, most learners were of the opinion that using digital technologies, including the internet, positively affects their schoolwork, especially knowledge production. It also contributes significantly to computer literacy skills or being "tech-savvy" as society requires nowadays. Most communication can be done through the internet, such as banking, shopping, eLearning, communicating or messaging as well as email and texting and so forth.

It is also evident that new media enables learners to acquire more knowledge related to their studies using digital technology and the internet. This is evident as most respondents strongly agreed digital technology has helped expand their horizon leading to new information sources that have improved their understanding and knowledge about their school subjects. Thus, this means that it has become increasingly imperative for schools to maintain their computers and sponsors for Wi-Fi connection. It can sometimes be challenging to keep the internet connection (whether Wi-Fi or internet cables).

5.2.4 ACCESS TO COMPUTER AND WI-FI AT HOME

These days it has become imperative for parents to install Wi-Fi connections at their homes as it works even for them in terms of "working from home" situations. Therefore, most respondents expressed that they have access to the internet besides their data bundles at home because of that primary reason. Also, another reason is the growing phenomenon whereby people sign up for a contractual agreement and have a monthly subscription to a Wi-Fi router, which connects

multiple devices for the whole family. However, many families cannot afford this, especially in rural areas, where most parents strive to pay these bills.

5.2.5 TECHNOLOGY-EMBEDDED CURRICULA PROMOTE TECHNOLOGICAL SKILLS

The findings show that most respondents believe that technology promotes their technological skills, which will assist them when they enter higher educational institutions and the workplace. Everything is mainly done using computers, smartphones, and the internet. However, it is important that they learn this skill as early as primary school if there are means to do so, because it is not the case for all the public schools, as some of them do not have these technologies. Furthermore, some public schools have computer laboratories but do not have enough knowledge and personnel to teach their learners. However, (Perron et.al. 2010), cited in Mathevula and Uwizeyimana (2014:1), suggests that the existence of a variety of digital media technologies goes far beyond computers and the internet or even telephony.



5.2.6 SCHOOL INFORMATIVE WEBSITE

A website acts as a map or a clear image of an organisation from those who are outside. Thus, it is found out that in these schools, a website serves to inform the current and potential stakeholders about their school programmes (academic and social), fees for each particular year, admission requirements, admission forms, vision and mission statement, their staff members, statement of conduct, activities, events and any relevant information. A school website also includes images of events happening in the school, which helps even the potential learners have an idea of the kind of school they are looking at and envision themselves being part of that community or not. Therefore, in these schools, it is mainly used to market their image to potential learners, as the Principal from St Andrews College mentioned:

“The website and our social media pages are very crucial as we aim to attract learners from all over South Africa, and it has worked for us for years”, said the Principal of St Andrews College, May 2019. Thus, ensuring that the school website is up to date with current information, schools from the Eastern Cape have the ability to attract learners from as far as Gauteng province.

5.2.7 LEARNERS ABILITY TO USE SCHOOL COMMUNICATOR APP, SEARCH THE INTERNET FOR VIDEOS AND DOWNLOADING

The school communicator App is an App the school uses to disseminate information, especially to parents, quickly. Thus, Parents usually are required to download the App and sign up, providing their details and their wards' details. This makes communication easy, quick and cheaper as they are notified each time something is posted. It works like WhatsApp. The only difference is that one cannot respond to messages posted on the App instantly and on the same platform, (it is not interactive). It is only to transmit the information as urgently and affordable as possible. Some schools use the D6 School App; Graeme College also has an SMS system called *Ibambisa*.

Loveless (2003: 2) suggests that, integrating ICTs into teaching and learning should be seen as providing a lasting skill that will be needed to maintain knowledge for both the teacher and the learner. The finding shows that respondents search the internet for different material (learning and entertainment), whereby they stream music videos, films, and other social content. This shows a social side to the use of digital technologies, especially for young people. In this case, young people mostly enjoy downloading music, videos, movies, and series on their phones as it is most convenient for them, especially in areas that have free Wi-Fi such as malls, restaurants, and public parks. Thus, streaming the internet for entertainment for teenagers is the most calming and self-fulfilling exercise. That often leads them to be anti-social and technology experts, with some even accessing the dark web.

5.2.8 COMMUNICATE VIA EMAIL WITH TEACHERS AND BLACKBOARD

The respondents were asked if they communicate with their teachers using emails. However, many have disagreed on this. This means that they do not communicate via emails with their emails. Furthermore, respondents were asked about access to a school interactive whiteboard or Blackboard. The results show that they do not have any access to a blackboard system in their school. Blackboard is an online platform whereby teachers communicate information about assignments and tests to their learners and learners can submit it on that online platform. In consideration of the diffusion of innovations theory Chang (2018: 1) mentions that, the choice is always

based on choosing standardization or innovation when it comes to information management.

5.2.9 USE OF COMPUTER CONNECTED WI-FI AND READING GOOGLE BOOKS

The researcher saw it imperative to find out whether the learners or respondents have access to computers that have a Wi-Fi connection. The finding further shows that learners have access to Wi-Fi which has multiple benefits. The learners are able to search and read books online and download PDF documents on any particular subject of interest. The ability to read books online assist the learners in expanding their knowledge in a specific phenomenon that they are studying or learning. Therefore, according to Gros, Kinshuk & Maina (2015), the internet can be considered as something external that should be perceived as an instrument to support different activities.



5.2.10 ABILITY TO USE MICROSOFT TOOLS

Microsoft tools are needed for any computer or tablet to function properly, especially for typing assignments or creating slide shows for a presentation. According to the findings, most learners from the selected schools, especially the two urban schools, can use Microsoft tools (programmes) such as Word, Excel, etc. Other Microsoft tools may include but are not limited to Excel (especially for business spreadsheets) and emails for communicating in an instant letter but formally mainly. However, a significant number of respondents in Elukhanyisweni secondary school do not possess the skillset to use these tools. The ability to use Microsoft tools or related applications is vital because individuals will need these tools in their studies in higher education and when employed in corporate organisations. As many institutions of higher learning gravitate towards online or eLearning platforms, the ability to use digital technologies has become an essential requirement to study in these institutions.

5.2.11 EXERCISING ONLINE QUIZZES AND COMPUTER SIMULATIONS

The findings show that not many learners participate in online quizzes nor exercise computer simulations. An online quiz will require the learner to answer random

questions about a specific phenomenon. In contrast, computer simulation imitates a real-life situation experienced in a computer, such as learning to drive, playing a game, etc. Thus, this helps develop the learners' mind so that they are able to do what they cannot do in their real-life through an online platform or a computer programme. Thus, Pachler & Leask (2013: 7) state that, the cognitive theory suggests that in terms of educational technologies the theories of cognitive psychologists appear to inform software implementation. This follows the revelatory paradigm of discovery-based and problem-solving oriented learning and simulation.

5.2.12 SOCIAL MEDIA (WHATSAPP) GROUPS FOR SUBJECTS AND YOUTUBE

As the use of the internet is growing so is the use of social media platforms for chatting. Thus, these social media platforms can be used for different purposes such as church groups, class or school groups for parents or learners, workers in a specific department and so forth. Creating a group is to make the dissemination and access of messages easier for everyone in the group as it is possible to send a message to multiple receivers and receive it simultaneously. Therefore, it is also deemed necessary by some of the learners to search and view some videos online (on YouTube) that clearly depict a phenomenon clearly and practically.

Subjects that may require practical solutions include Maths, Physical Science, and Life Sciences, to name a few. Mbodila et.al. (2015:2), suggest that social media's role can be essential in collaboration, community building, participation, and sharing. Social media uses mobile and web-based technologies to create interactive communication platforms whereby the learners can share, discuss and modify user-generated content (Jan & Hermkens, 2011) cited in Mbodila (2015:2).

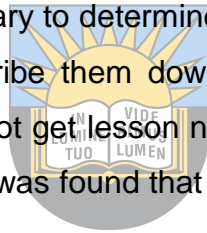
The findings reveal that learners actually use WhatsApp and infuse the benefits to their advantage. Thus, by having study groups that also operate on WhatsApp or any social media platform; the learners are able to work together in groups and pairs as per their classroom assignments. This then also contributes to the passing rate of the learners because it encourages learners to learn everywhere through their phones. Another benefit is that they can also share information in the form of pictures, audio, and videos. Hence, it works well for them to understand things better. However, considering that all the selected schools are in the Eastern Cape

Province, which mostly ranks low in the matric results as compared to other provinces. Thus, it is of great importance that social media is infused in teaching and learning.

5.2.13 ACCESS TO MONTHLY DATA ALLOWANCE AND TEACHER SLIDES

Nowadays, it is perceived imperative for young people to have data on their phones because it enables them to access the internet. Hence, the internet allows individuals to search for content online and connect with friends and family online to maintain relationships. Some people conduct and advertise their businesses and social events on social networking sites, as it is a faster, cheaper, and cost-effective way to communicate.

As evinced from the findings, it is evident that young people or learners have access to monthly data allowances, which enable them to stay connected. However, the researcher also deemed it necessary to determine whether the learners have access to teacher slides for notes or scribe them down in class. Therefore, the findings showed that the respondents do not get lesson notes from their teachers in the form of slides. In one of the colleges, it was found that very few students ask or search for slides.



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5.2.14 SOCIAL MEDIA INCREASED BULLYING ONLINE

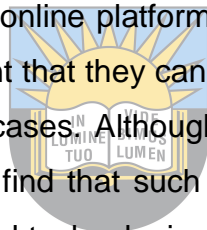
In this item, it became clear that the advances and increased the use of the internet have increased the cases of bullying online. Some of the learners have expressed that they have been bullied online by their fellow learners. One of the school principals acknowledged that bullying among learners is “Something that is not easy to report at times”. According to the Principal at St Andrews College, it is not easy to talk to the learners about bullying; hence, they introduced them to the Guardian App. In the Guardian App, someone they have never met and who is not in their daily lives can assist them. This assists to curb loneliness and feeling of vulnerability from the victim and assist them in opening up to seek help before committing suicide, as in some cases.

Thus, based on the findings most respondents revealed that they were either the perpetrator or on their side. In contrast, few revealed that they were actually

victimised online, whether through texts, revealing of their private information online. Cyberbullying is a problem that young people face, in the same form as traditional bullying but through digital communication platforms. Cyberbullying is a huge problem amongst young people because perpetrators of cyberbullying do not see the faces of their targets, and they are not exposed to the full consequences of their actions (Nixon, 2014:143).

Therefore, it is evident from this study that high school learners go through abuse perpetrated by their peers in their schools. This abuse and bullying cause them stress in a manner that influences their school performance. As a result, the Head Master of St Andrews College mentioned that because this is a serious matter, they intervened by putting in place a Guardian App for their learners. This was another revelation from this study that there is such an important tool to capture and anonymously attend to stressed-out learners.

The victims can be tracked in the online platform as they have initially reported that they are facing bullying in the event that they cannot speak to their teachers, parents or peers in order to curb suicide cases. Although this is essential and encouraging development. It was surprising to find that such a tool exists in schools situated in the Eastern Cape. The use of digital technologies take prominence in this age as this is how teaching and learning process is conducted.



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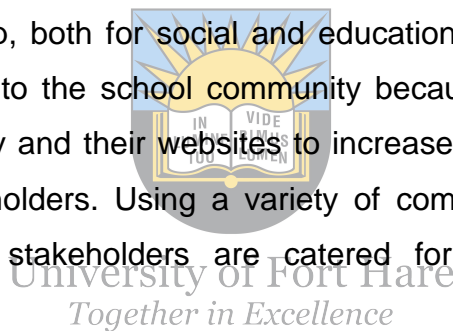
5.2.15 ACCESS TO EDUCATIONAL DVDs, CDS AND ONLINE TUTOR

In this item, the researcher wanted to find out whether the learners use educational CDs, and DVDs, which were once used almost ten years back to learn practical solutions to subjects, especially Mathematics. This shows that the growth of using the internet has taken over, in the sense that not many of the learners use these CDs anymore as they are able to search for something, and it plays instantly, as it is available online. Thus, this clearly shows that it is imperative for the learners to have internet access both in their schools and on their devices because it is not only for social purposes but also to search and download necessary educational content.

5.3 SUMMARY OF THE STUDY

The study has come up with findings from the data analysis presented through graphs in the previous chapter. Thus, the most crucial thing found by this study is that, the learners from both private and public high schools of the Eastern Cape Province have access or unlimited access to digital technologies (such as smartphones, tablets) and the internet. Hence, this means that learners can find information or knowledge independently with the assistance of technology in line with the twenty-first-century learning ecosystem. Therefore, there is no need for teachers to stand in the class and tell learners everything.

In contrast, they are able to search for information themselves. Access to computers, smartphones, and the internet allows them to acquire as much knowledge and better understanding through practical examples in videos and audios. Learners have access to different search engines such as YouTube, Google, Yahoo and so forth. They are also active on various social media platforms such as Facebook, Instagram, and WhatsApp, both for social and educational purposes. These social networks also add value to the school community because the schools also have their social media visibility and their websites to increase the volume of information they send to their stakeholders. Using a variety of communication platforms also ensures all the school stakeholders are catered for in terms of knowledge accumulation.



Furthermore, well-resourced schools nowadays also use different technological apps (or applications) to communicate and transmit knowledge to their relevant stakeholders. Such Apps include the D6 School App and Guardian App (for learner safety), which are actively used at Graeme and St Andrews College. In addition, the schools also make use of the SMS (short message service) system, as it is faster and cost-effective.

The D6 School Communicator App (Application)- is a new age platform of communication that parents should download for them to have access to school-related information. This includes events, homework for all grades, activities, school newsletter, school calendar, and relevant information. Therefore, this allows for communication and interaction between the school and parents to be quicker and cost-effective, which is the aim of implementing technology in the school environment.

The Guardian App (Application)- the Guardian App serves to protect the learners through their digital technology use or tech-savvy life. Nowadays, people's lives depend on and function through digital technologies. Hence, the learners can at times find themselves vulnerable. Therefore, The Guardian App serves as a protector whom the learner can communicate to without seeing them face to face, as they can report their troubles through the App, which can detect their need for help. Speaking to the Head Master from St Andrews College, it was mentioned that the learners are urged to download the App to safeguards them from problems and difficulties that the teachers and fellow learners may not be aware of.

Bullying is a huge problem in the school environment. A learner may experience victimization from other learners or one particular learner. Hence, with the increase of technology use in schools, both private and public, the level of bullying has advanced to cyberbullying, whereby a learner may experience bullying through texts, social media platforms, and other forms of technology. Thus, because victims of bullying normally suffer in silence, this communicator app was introduced to learners to access and utilize when they feel pressure and vulnerability. There have been cases of suicides amongst high school learners whereby in some instances, a learner was bullied at school, and no one knew.

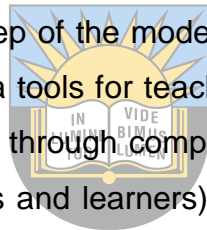
Furthermore, this study also found out that digital media access to learners has positive effects in terms of performance regarding their school activities. This study has concluded that the respondents actually have unlimited access to knowledge as they are able to search for information themselves to add to what their teachers taught them. Thus, in the problem statement, the researcher stated the need for a shift in traditional learning systems whereby the teacher is the source of information and knowledge to an interactive system whereby the learners are active participants to avoid "spoon-feeding. This interactivity will allow the learners to be creative thinkers, problem solvers, and independent individuals in their learning.

5.4 SUGGESTING DIGITAL MEDIA AND PEDAGOGY INTEGRATION (DMPI) MODEL OF COMMUNICATION

Subsequent to the findings of the study the researcher has suggested a digital media and education related model. Considering the findings of the study the researcher has come up with a six-step model, named; the Digital Media Pedagogy Integration (DMPI) Model.

This model will aim to focus on the teaching approaches that are guided by the integration of digital media into the curriculum. It speaks to the need and importance having learners that engage better with the content of their school subjects and are able to search for information on their own. Thus, the model focuses on proper incorporation of the digital media tools to the teaching and learning approaches of high schools.

In this model the first step; is for the Department of Basic education to be involved in the planning, develop objectives and implement the digital media tools into the curriculum for use. The second step of the model is for the schools and teachers to accept and adopt the digital media tools for teaching (i.e blackboard and WhatsApp groups), as well as ensuring to go through computer literacy training. The third step is for the stakeholders (i.e parents and learners) of the school to accept the use of digital media tools in the school for learning and communication purposes. The fourth step of the model is for teachers to choose the appropriate media for communication and learning processes. The fifth step is when the learners are able to use the search engines for knowledge accumulation, creating content and communication with other learners and teachers. The last step is whereby the school has adopted the digital media tools and are able to utilize them for communicating with internal and external stakeholders as when as maintaining a proper school website. The DMPI model is clearly presented below in Figure 1 below:



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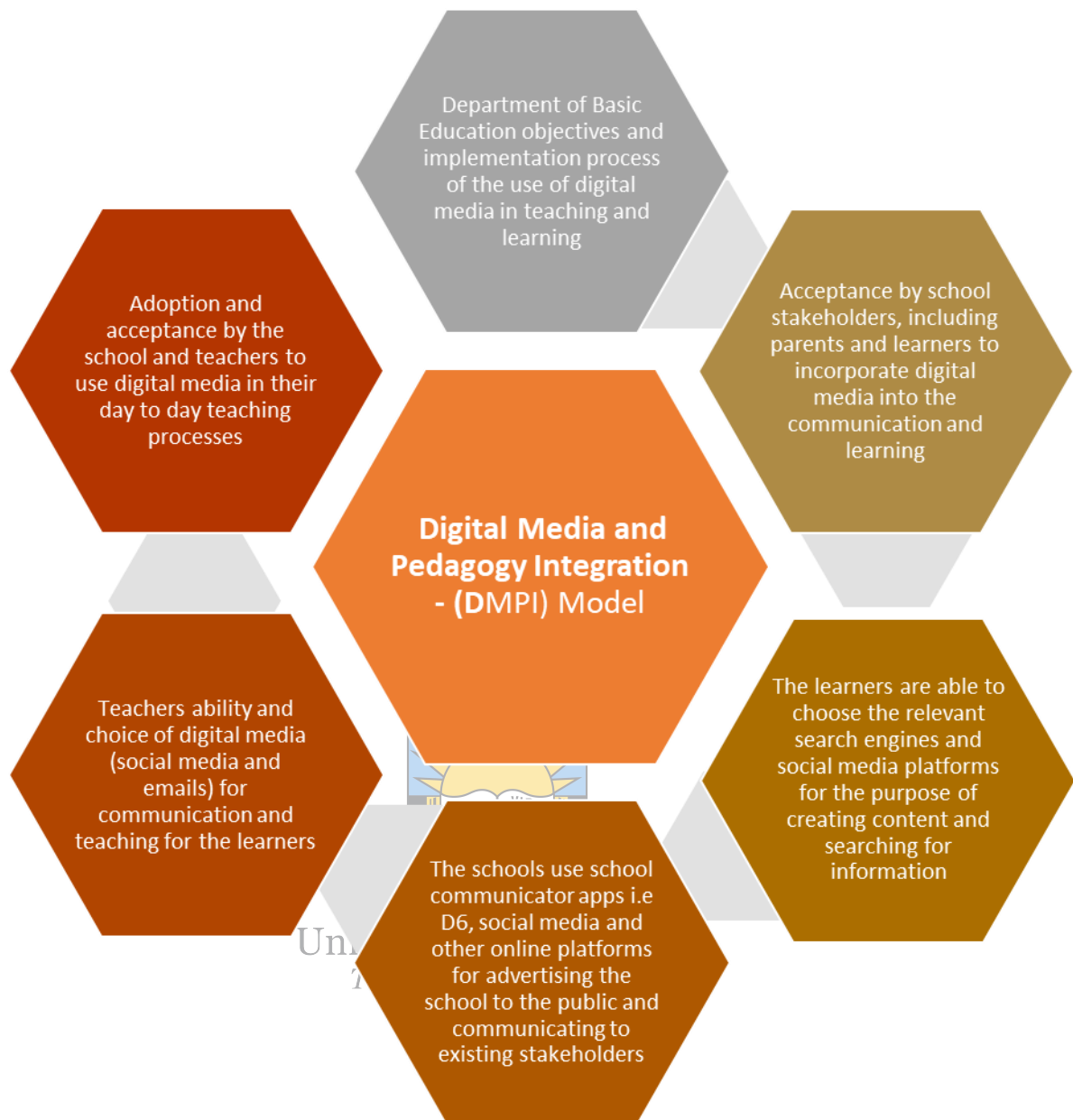
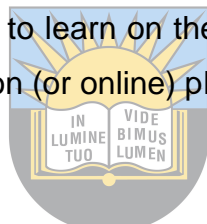


Figure 1: Digital Media and Pedagogy Integration - (DMPI) Model

Source: Researcher/Author, 2022

The model as proposed by the researcher will contribute to the body of knowledge in the sense of providing advice to the Department of Basic Education and teachers on how they can properly utilize the digital technologies that are available to them and the learners. This study has recommended that there is a need for teachers to go through Computer literacy training so that they are able to teach ICT related subjects as well as to incorporate the digital media tools into their daily teaching and learning activities. This will allow for the researcher's suggestion that there should be a shift away from the traditional approach of learning, whereby the teacher is considered to

be the center of information while the learner becomes a passive participant in the learning process. The researcher suggests for teachers to adopt a more constructive approach that will allow the learners to be active participants in their learning activities. Therefore, this model provides a clear indication of the usage of digital media tools for educational purposes. These media tools are used differently in the schools depending on the knowledge each school is exposed to. This model also relates to the diffusion of innovations theory in the sense that the innovation which is the use of new media should be accepted and adopted for the implementation by the stakeholders of the schools. Thus, proper implementation as related to the findings, in St Andrews College the social media accounts of the school are handled by the students in terms of content creation and distribution. It is also imperative for those teachers that are not equipped with the skill-set and knowledge of operating and teaching using a computer with internet access. Therefore, the main point that this model is trying to show is that through the adoption and effective use of these digital technologies the learners are able to learn on their own and with their peers as well as access enhanced communication (or online) platforms.



5.5 RECOMMENDATIONS FROM THE STUDY

Based on the findings of the study, the researcher has identified the following recommendations;

- As the researcher, I would suggest or recommend that teachers ensure that they are able to use digital technologies to the best of their abilities and fully utilize the social networking sites for their subjects. This will bring and contribute good results. However, it would be good conduct on the side of the school to employ more young teachers. They tend to have innovative ways to communicate and disseminate or share information amongst the learners. The teachers should encourage learners to be diverse in their thinking and search for knowledge.
- Teachers should undergo more rigorous training and workshops that deal with computer technology. This will give them the necessary skills to teach in the digital age and blend their traditional learning models with that of the online platforms. This will mean that they are using the blended learning strategies

whereby the teachers and learners can learn everywhere they are and submit their assignments by email or blackboard. The teachers will also be able to use other online platforms and strategies for learning and prepare slide notes for their classes.

- Creation and use of social media groups for educational purposes. An educator or someone of higher authority should closely monitor the learners' social media group. This will ensure that learners know the importance of sharing information at a younger age and that learning in groups increases knowledge production because each student is good at a particular subject, and not all. Thus, by sharing knowledge with other learners, they are sure to yield good results for themselves and their peers, contributing to the entire school's pass rate.
- The government should provide better internet connectivity to public schools. This will ensure learners have unlimited internet access on their school computers so that they are able to do their work using the resources provided by the school.
- Public schools should have therapists who deal with learner issues at school, especially bullying, which is a serious issue that needs attention. There are learners that are being bullied but will not say anything to anyone because of lack of trust and fear of the bully "perpetrator". Providing therapists in public schools could help reduce the incidents of suicides by young learners. As shown by the findings of this study, there are cases of suicidal thoughts and emotional turmoil suffered by learners because other learners at school had bullied them. In addition, schools should ensure that they have a strict policy against bullying whereby someone who is guilty of such can face severe consequences and not get away lightly with a warning.

5.6 SUGGESTIONS FOR FURTHER RESEARCH

- This study used a sample of only three schools as a comparative study. Hence, future research can look at more schools so as to be sure to draw concrete results. Also, the study focused on the Eastern Cape, which limited

the scope of the study. Future research can investigate the phenomenon in more provinces to provide a more nuanced comparison.

- Furthermore, a future study can also include interviews with the learners, whereby the researcher will know exactly what their answers mean further and provide explanations.
- Other researchers can focus on cyberbullying in high schools, as it is a growing phenomenon but with no particular attention from the Department of Basic Education.
- Lastly, this research is best suited for the Department of Education to identify precisely, the areas the school are lacking in, especially after developing policies and strategies to be implemented.

5.7 CONCLUSION

To conclude, this section focused on discussing the key findings of the study, conclusions, recommendations and suggestions for future study drawn on the results of the study. Different issues were discussed, such as the amount of internet access that learners have, having monthly data bundles, access to a computer in school and at home, cyberbullying by learners and how it affects learners, the use of social media as a communication tool amongst others and so forth. These all contribute to the use and implantation of new media technologies in both public and private schooling systems.

However, the study has concluded that the integration of digital media into educational systems has both positive and negative effects and teachers need proper training in order to carry out a teaching and learning system that is properly blended. Thus, this will ensure that learners share information online and on social media platforms with their peers producing maximum results for the school. It was also evident through the findings that schools use different forms of communication to engage with their current and potential stakeholders, such as Facebook, Instagram, website (that is updated frequently) and school communicator App as well as The Guardian App for cases of cyberbullying.



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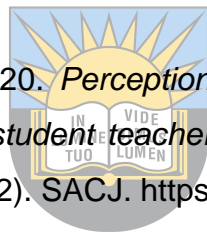
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APPENDIX A- QUESTIONNAIRE

Student questionnaire: University of Fort Hare, Alice.

Dear Respondent

I am Yolisa Mhlomi currently working at the University of South Africa (UNISA) and enrolled for my Doctorate Degree, at the University of Fort Hare in Alice. Thus, for the purpose of my thesis, I need your participation in this survey.

The main aim of my study focus on researching the role of new media (internet, on-line learning: using technology) and the efforts of integrating new media or Information and Communication Technologies (ICTs) in the pedagogical activities of high school learners. There are current debates and transitions concerning the fourth industrial revolution, which mainly focus on how technology has and is influencing people's lives, in terms of social communication, working environment and the education system have all been affected.

Thus, integrating technology and pedagogy is perceived necessary in order to shift away from teacher-centred classrooms, whereby teachers are regarded as the main sources of information to learner-centred classrooms. This changes the perspective that learners are passive participants in learning, but active and innovative individuals who are able to solve constructive problems encountered.

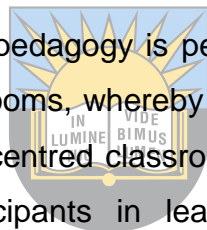
In this questionnaire, you will find items about yourself. The items explore how you perceive the implementation of new media technologies in high school learning. In addition, part of the research is also to find out what more one can do when it comes to technological changes of your school curriculum.

Read each question carefully and answer as accurately (correctly) as possible. Ask for help if you do not understand something. A number of possible answers follows the items. For each item, read carefully the suggestions on the number of possible choices and then tick the box next to the answer of your choice.

You give consent by participating in this survey. However, it is important to note, that no one knows your identity, and all information is confidential.

Thank you for your participation!

Ms Y. Mhlomi



University of Fort Hare
Together in Excellence

Email: 201002192@ufh.ac.za/ymhlomi@gmail.com

Telephone number: 083 5577 583

Please tick one possible answer from below:

Age distribution

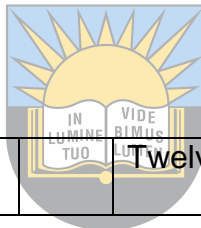
15-16 years		17-18 years		19 years	+	
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Gender Distribution

Male		Female	
------	--	--------	--

Grade

Ten (10)		Eleven (11)		Twelve (12)	
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University of Fort Hare

Likert scale questionnaire *Together in Excellence*

SA = Strongly Agree5

A = Agree4

N = Neutral3

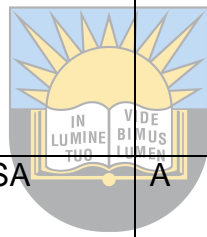
DA = Disagree2

SD = Strongly Disagree1

Please tick the answer that you find most applicable to you:

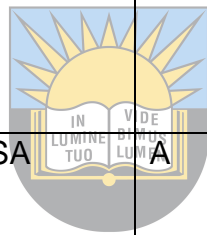
		Strongly agree (SA)	Agree (A)	Neutral (N)	Disagree (DA)	Strongly disagree (SD)
	Question	5	4	3	2	1
1	I have frequent access to the internet.	SA	A	N	DA	SD
2	I access the school computer laboratory for schoolwork.	SA	A	N	DA	SD
3	Using new media has a positive influence on my schoolwork.	SA	A	N	DA	SD
4	New media enables me to acquire more knowledge related to my subject of study (i.e a Life Orientation assignment).	SA	A	N	DA	SD
5	I have access to computer, smartphone and Wi-Fi at home.	SA	A	N	DA	SD
6	The technology embedded curricula promotes my technological skill.	SA	A	N	DA	SD
7	My school has an informative website which is updated regularly.	SA	A	N	DA	SD

8	My school has a school communicator app (i.e D6 school app) which has frequent updates about school events and calendar.	SA	A	N	DA	SD
9	I also engage in searching the internet for videos, downloading music and movies.	SA	A	N	DA	SD
10	I communicate via email with my teachers.	SA	A	N	DA	SD
11	My school has an interactive whiteboard or blackboard.	SA	A	N	DA	SD
12	I use a computer connected to Wi-Fi or cable provided by the school.	SA	A	N	DA	SD
13	I read Google books for my schoolwork.	SA	A	N	DA	SD
14	I am able to use Microsoft tools (i.e Word, PowerPoint, Excel spreadsheets etc.).	SA	A	N	DA	SD
15	In the classroom, I can exercise software creation, online quizzes and tests.	SA	A	N	DA	SD



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16	In the classroom, we also exercise computer simulations of real world situations where I can make changes and see the results.	SA	A	N	DA	SD
17	I participate in social media platforms (i.e Whatsapp group) related to the subjects.	SA	A	N	DA	SD
18	I have access to YouTube exercises for my subjects (i.e Maths, Physical Science, Life Science etc.).	SA	A	N	DA	SD
19	I get data on my phone on a monthly basis.	SA	A	N	DA	SD
20	The internet allows me to work and interact better with other students on tasks.	SA	A	N	DA	SD
21	Our teachers prepare their lessons in PowerPoint presentations which are also available on a school communicator app or emails.	SA	A	N	DA	SD
22	Learning with computer is important as it advances	SA	A	N	DA	SD



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	my technology skill for higher education and workplace.					
23	We use WhatsApp as a communication tool with my teachers and classmates.	SA	A	N	DA	SD
24	Using a computer for learning is beneficial and challenges my thinking and problem solving ability.	SA	A	N	DA	SD
25	The use and exposure to social networks has increased the chances and risks of bullying online.	SA	A	N	DA	SD
26	I have experienced cyberbullying as a result of social media (WhatsApp, Facebook or text messaging).	SA	A	N	DA	SD
27	I also have educational CDs and DVDs to assist with my subjects.	SA	A	N	DA	SD
28	I have access to (or have) an online Tutor.	SA	A	N	DA	SD
29	My school has an active Facebook page for interaction with learners	SA	A	N	DA	SD



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	and potential learners.					
30	I have bullied or took part in a bullying action in an online platform (i.e WhatsApp, Facebook etc. or through text/mms message).	SA	A	N	DA	SD



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APPENDIX B- INTERVIEW QUESTIONS
INTERVIEW SCHEDULE FOR HIGH SCHOOL PRINCIPAL'S

Principal's interviews: University of Fort Hare, Alice.

Dear Respondent

I am Yolisa Mhlomi currently working at the University of South Africa (UNISA) and enrolled for my Doctorate Degree, at the University of Fort Hare in Alice. Thus, for the purpose of my thesis, I need your participation in this interview.

The main aim of my study focus on researching the role of digital media (internet, on-line learning: using technology) and the efforts of integrating digital media or Information and Communication Technologies (ICTs) in the pedagogical activities of high school learners. There are current debates and transitions concerning the fourth industrial revolution, which mainly focus on how technology has and is influencing people's lives, in terms of social communication, working environment and the education system have all been affected.

Thus, integrating technology and pedagogy is perceived necessary in order to shift away from teacher-centred classrooms, whereby teachers are regarded as the main sources of information to learner-centred classrooms. This changes the perspective that learners are passive participants in learning, but active and innovative individuals who are able to solve constructive problems encountered. Therefore, I would like to know your role as the principal in ensuring the development and improvement of the learners learning processes in the twenty first century.

I will be guiding and asking the questions that are following as the researcher. I may also ask follow up questions where something is not clear. However, it is important to note, that no one knows your identity, and all information is confidential.

Thank you for your participation!

Ms Y. Mhlomi

INTERVIEW QUESTIONS:

- 1. Who is responsible for your school computer lab, connection and finances?**
- 2. Who manages the school social media accounts and Admin responsibilities?**
- 3. What is the school policy regarding cyberbullying or online bullying?**
- 4. Does the school maintain an informative website?**



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APPENDIX C- DATA COLLECTION LETTER

Department of Communication
Faculty of Social Sciences and Humanities
University of Fort Hare
Alice, 5700.



April 13, 2019

TO WHOM IT MAY CONCERN

This serves to introduce Ms. Yolisa Mhlomi with Student Number: 201002192 who is a 3rd Year Doctoral (PhD) Student in the Department of Communication at the University of Fort Hare. Her Doctoral study focuses on "Integration of New .Media and Pedagogy in the 21st Century Classrooms: A case of selected schools Secondary Schools in East11; Cape, South Africa". She is at the stage of Data Collection and the Department of Communication would like to solicit for your kind assistance in allowing her to collect data from your school.

Kindly note that an Ethical Clearance has been issued to her to guide and conduct this study, meaning that she will abide by ethical principles and thus ensure anonymity, confidentiality, and avoidance of any harm to the participants and schools as she collects data. Your kind assistance and consideration will therefore be highly appreciated. Should you require any further clarifications, please do not hesitate to contact me as I am also her Research Supervisor.

Kind regards

A handwritten signature in black ink, appearing to read "O.O. Osunkunle".

Prof. O.O. OSUNKUNLE

Research Supervisor / Head of Department
Department of Communication
Faculty of Social Sciences and Humanities
University of Fort Hare
Private Bag X1314
Alice
5700
Republic of South Africa
Office Phone: 040 602 2312
Cell: 083 366 2970
Email: oosunkunle@ufh.ac.za



APPENDIX D - TURNITIN REPORT

Mhlomi Thesis

ORIGINALITY REPORT

10%

SIMILARITY INDEX

9%

INTERNET SOURCES

6%

PUBLICATIONS

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APPENDIX E- ETHICAL CLEARANCE



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ETHICAL CLEARANCE CERTIFICATE REC-270710-028-RA Level 01

Certificate Reference Number: OSU331SMHL01

Project title: **Integration of new media and pedagogy in the 21st century classroom: A case of selected Secondary Schools in Eastern Cape, South Africa.**

Nature of Project: PhD in Communication

Principal Researcher: Yolisa Mhlomi

Supervisor: Dr O.O Osunkunle

Co-supervisor: N/A

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above-mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

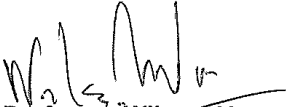
Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013, university ethics committees may continue to grant ethical clearance for research involving children without the Minister's consent, provided that the prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to

- Withdraw or amend this Ethical Clearance Certificate if
 - Any unethical principal or practices are revealed or suspected
 - Relevant information has been withheld or misrepresented
 - Regulatory changes of whatsoever nature so require
 - The conditions contained in the Certificate have not been adhered to
- Request access to any information or data at any time during the course or after completion of the project.
- In addition to the need to comply with the highest level of ethical conduct principle investigators must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office

The Ethics Committee wished you well in your research.

Yours sincerely


Professor Wilson Akpan
Acting Dean of Research

09 December 2016