Teachers' use of cell phones in online teaching of Grade 7 subjects

by

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Submitted in partial fulfilment of the requirements

for the degree in Magister Educationis

in the Faculty of Education,

University of Pretoria

Supervisor

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August 2022

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Declaration

I hereby certify that the dissertation I am submitting to the University of Pretoria for the degree of Magister Education is unique to me and has never been submitted by me for a degree at this or any other higher education institution.

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- Informed consent/assent,
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Dedication

The following people are honoured by this work:

May God richly bless my family, particularly my wife and kids, who have consistently inspired me to pursue greater goals and never give up, even if doing so has been a challenge to you.

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I want to start by thanking the Almighty, our God, for giving me the strength, wisdom, and intellect to complete this study despite the difficult circumstances.

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We appreciate everyone who participated.

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Abstract

Due to the Covid-19 pandemic, 2020 was one of the most difficult years in South Africa. Many institutions and organisations that had not yet adapted their operations to technological innovation were forced to do so in order to survive. This was the researcher's driving force behind the study, which was inspired by his experience teaching Grade 7 learners in Mathematics and Science online, while using a cell phone. A qualitative comparative case study was carried out to better understand how teachers in a township as well as an urban school use cell phones for online teaching in Grade 7. Field notes, document analysis, and semi-structured interviews with fifteen teachers from township and urban schools were used to collect the data. Atlas ti was used to perform the content analysis and coding of both the classroom documents and the interview responses.

The results show that ICT can lead to a lot of uncertainty and that most teachers feel inefficient, even though they are open to new approaches and new technologies in online education. Teachers argue that their inadequacies in online teaching will be exposed if they are not properly trained in ICT. The study's conclusions demonstrate that teachers' technical proficiency and positive attitudes are key factors in whether digital technology is successful in teaching methods using cell phones.

There is a need to provide online training for all teachers, including those in township schools, so that the curriculum can continue to be covered even when schools are closed for daily attendance.

Keywords: Information and Communication Technology (ICT), online teaching and learning, computer integration, township and urban schools.

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August 2022

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List of figures

Figure 2.1: TPACK framework (Mishra & Koehler, 2006). 18

Figure 4.1: Presentation of trained urban and township participant teachers 42

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List of tables

Table 3.1: Township primary school participants 26

Table 3.2: Urban primary school participants..... 27

Table 3.3 Documents selected for analysis 32

Table 4.1: Summary of the results of the interviews with selected Township Teacher Participants (TTPs).....40

Table 4.2: Summary of the results of the interviews with selected Urban Township Teacher Participants (UTPs) 41

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Table of contents

Declaration ii

Ethics clearance certificate iii

Dedication iv

Acknowledgements v

Abstract vi

Language editors' disclaimer vii

List of figures viii

List of tables ix

Table of contents x

Chapter 1: Introduction and Background 1

1.1. Introduction 1

1.2. Background 1

1.3. Context 2

1.3.1 Context in the rural school 2

1.3.2 Context at the urban school 2

1.4. Rationale 3

1.5. Problem statement 4

1.6. Purpose of the study 5

1.7. Research questions 5

Main research question 5

Sub research questions 5

1.8. Literature review 6

1.9. Theoretical framework 6

1.10. Research design and methodology 6

1.11. Conclusion 8

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Chapter 2: Literature review and theoretical framework 9
2.1. Introduction 9
2.2. Online learning in schools 9
2.2.1 Challenges 9
2.2.2 Benefits 10
2.3 Learning Management Systems 13
2.3.1 Edmodo 13
2.3.2. Google Classroom 13
2.4. Social networks 14
2.4.1. Introduction 14
2.4.2. WhatsApp 14
2.4.3. Facebook 15
2.5. Zoom, Microsoft Teams, and Cisco Webex 16
2.5.1 Zoom video conferencing 16
2.5.2 Microsoft Teams 16
2.5.3 Cisco Webex 16
2.6. Theoretical framework 17
2.6.1 Technology Knowledge (TK) 19
2.6.2. Content Knowledge (CK) 19
2.6.3. Pedagogical Knowledge (PK) 19
2.6.4. Pedagogical Content Knowledge (PCK) 20
2.6.5. Technological Content Knowledge (TCK) 20
2.6.6. Technological Pedagogical Knowledge (TPK) 20
2.6.7. TPACK 20
2.7. Conclusion 21
Chapter 3: Methodology and research design 22
3.1. Introduction 22
3.2. Paradigm 22

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3.2.1. Introduction 22

3.2.2. Ontology 22

3.2.3. Epistemology 22

3.3. Methodology 23

3.4. Research design 24

3.4.1 Advantages of case studies 25

3.4.2. Disadvantages of case studies 26

3.5. Sampling 26

3.6. Data collection 28

3.6.1 Semi-structured interviews 28

a) Advantages of semi-structured interviews 28

b) Disadvantages of semi-structured interviews 28

3.6.2 Field notes 29

3.6.3. Documents 29

3.7. Data analysis 30

3.7.1 Semi-structured interviews 30

3.7.2 Field notes 31

3.7.3 Document analysis 31

3.8. Methodological norms 34

3.9. Ethical considerations 35

3.10. Conclusion 36

Chapter 4: Data analysis 38

4.1. Introduction 38

Main research question 38

Sub research questions 38

4.2. Presentation of analysis of semi-structured interviews 39

4.2.1. ICT integration at school level 42

a) Computer knowledge 43

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b) Integration of technology in subject teaching in primary schools 44
c) Teaching platforms 45
d) Challenges 45
4.3. Presentation of the analysis of the field notes 46
4.4. Presentation of the analysis of documents 47
4.4.1 The GDE Ten Pillar Strategic Drivers education programme 48
4.4.2 Draft White Paper on e-Education 49
4.4.3 ICT integration policy in teaching and learning 50
a) The schools aim for ICT 50
b) Access to ICT 51
4.4.4 Sample of a lesson plan integrating ICT 52
4.5. Conclusion 53
Chapter 5: Findings 54
5.1. Introduction 54
5.2. Computer knowledge 55
5.3. Incorporation of technology in subject teaching 55
5.4. Platforms used for teaching 56
5.5. Viability of teaching using cell phones 56
5.6. Resources needed to conduct online teaching using cell phones 57
5.7. The obstacles that teachers face when transitioning to online education 57
5.8. Findings associated with field notes 58
5.9. Findings associated with document analysis 59
5.10. Reflections on the theoretical framework 59
5.11. Reflections on the research design and methods 60
5.12. Conclusion 61
Chapter 6: Conclusions and recommendations 62
6.1. Introduction 62
6.2. Summary of the research 62

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6.3. Limitations of the study 63

6.4. Contribution of the study 63

6.5. Recommendations 64

6.6. Conclusions 64

References 66

Appendices 75

Appendix A: Research approval letter 75

Appendix B: Consent letter to the principal 78

Appendix C: Consent letter to teacher participants 81

Appendix D: Interview questions for the participants 84

Appendix E: Field note schedule 85

Appendix F: Sample of interview responses 86

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Chapter 1: Introduction and Background

1.1 Introduction

The goal of the research was to determine how teachers in a township and an urban school use cell phones to teach students in Grade 7 online. Online learning is centered on synchronous and asynchronous Internet-based teaching. Asynchronous learning allows learners to respond to activities at their own pace, while synchronous learning involves real-time communication between learners and teachers via online platforms like conferences and chat rooms (Rasmitadila et al., 2020). The subject, the setting of the school, the justification for the study and its problem, the study's objectives and research questions, and a brief mention of the literature review are all included in this section. An overview of the methodology and research approach is also provided in this section.

1.2 Background

Covid-19 pandemic made 2020 one of the most challenging years for South Africa. In order to survive the pandemic, numerous institutions and organizations that had not previously adapted to technological innovations were compelled to do so. Not exempt, the education sector observed an increase in the use of technology for teaching and learning in many primary and high schools as well as tertiary institutions. Information and communication technology (ICT) has been forced into the classroom, which is helping to give our primary school learners 21st century skills. Many public primary schools in Gauteng West townships still have difficulty integrating ICT. The World Economic Forum (WEF) predicts that 65% of today's schoolchildren will work in completely new occupations or jobs that do not currently exist, according to Mhlanga and Moloi (2020).

Learners in South Africa in particular, cannot afford to fall behind in acquiring 21st century skills due to the importance of ICT use in the classroom. During the lockdown, the researcher discovered that he was the only one at his school teaching Grade 7 learners online with a cell phone, which raised several questions about this issue. ICT is critical in developing independent, lifelong learners who can thrive in the modern, fast-changing world. Incorporating ICT into the classroom has become increasingly important, especially considering the aftermath of the Corona virus epidemic,

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which forced schools to close for more than three months and affected learners' daily attendance. As a result, online teaching and learning were required.

Seventy five point nine percent of participants in a Statistics South Africa survey on the societal effects of the Covid-19 outbreak use cell phones for home schooling, compared to 36.1% who use tablets and 61.2 percent who use PCs (Statistics South Africa, 2020). Zakaria and Khalid claim that ICT can be used in all subject areas (2016). Furthermore, Domalewska (2014) demonstrates how learner and self-knowledge are integrated into learning through technology-enhanced learning.

Meyer and Gent (2016) claim that the Department of Basic Education has contributed to national initiatives aimed at enhancing access, enhancing management, teacher and learner skills, and supplying high-quality technological equipment. Hennessy et al. (2010) contend that teachers must explicitly prepare learners for the 21st century skills – the capacity to collaborate, communicate, develop, innovate and think critically – to acquire new information and participate in lifelong learning. Although there is still research being done on the use of online teaching and learning in public primary schools, it is growing in popularity. Teachers can simultaneously communicate with most learners at home using cell phone devices.

1.3 Context

1.3.1 Context in the rural school

The school where the researcher is currently teaching is a public primary school in a township. There are no computers in our school as they were stolen in 2016. Computer-integrated teaching is currently very difficult to implement. At the provincial level, one of the ten key proponents of education is information and communication technology in education, and the school has a statement outlining the different ways that ICT can be integrated into teaching. However, there are very few laptops belonging to the respective school departments at our school, with an average of ten teachers. During the Corona virus lockdown in the year 2020, learners were unable to attend school, and several teachers were unable to teach online.

This contributed to too many learners at our school falling behind in curriculum coverage when compared to learners in urban schools. On the other hand, school-

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related Information and communication technologies could be incorporated into the school setting using cell phones that are available to both teachers and learners.

1.3.2 Context at the urban school

The situation at the urban school is different from the township school in terms of ICT resources. The school has an ICT policy that they are implementing, as well as ICT resources such as laptops, interactive white boards and Wi-Fi. As most learners possess cell phones and other ICT devices such as laptop computers, computer integrated teaching is simple to implement. Teachers have very positive attitudes towards computer-integrated education, which is aided by the availability of ICT resources.

1.4 Rationale

The researcher's motivation for this study stems from his online teaching experience in Mathematics and Natural Sciences to Grade 7 learners using cell phones from April to August 2020. Mhlanga and Moloi (2020) demonstrated how the national lockdown affected the 2020 academic calendar. During the Covid epidemic, just 30% of South African learners were accessible digitally via radio, television and online learning platforms and devices (Statistics South Africa, 2020). This is inadequate because online learning did not begin in the country until the early 2000s, but most schools under the DBE were closed due to the pandemic. Internet connectivity was not resolved, and even if it had been, teachers would have needed to be trained to teach online. Schools were forced to shut down and learners stayed at home without being able to learn.

To account for the lost time, the academic calendar had to be adjusted. Some topics had to be omitted in order for the programme to be completed in 2020. Several learning institutions responded by shifting part of their programs to digital platforms in an attempt to alleviate the academic disruption, according to a survey conducted by Statistics South Africa (2020).

This survey provides a comprehensive picture of home-schooling during the lockdown, especially in contrast to the 83.5 percent of respondents who said their children attended private schools. More people in public schools during the lockdown said they home-schooled their children, with 67.1 percent of those with children reporting this (Statistics South Africa, 2020). Since then, the researcher has been considering

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how to persuade more primary school teachers in townships to use online learning in all their Grade 7 subjects. The researcher claims that by teaching learners online and completing the curriculum, even in trying pandemic situations like the Covid-19 situation, this may narrow the gap between wealthy schools and underfunded township schools. The results of this study may aid administrators and educators in making wiser choices for Grade 7 learners who are learning online via cell phones in a range of subjects, particularly in public township primary schools.

1.5 Problem statement

There is a need to facilitate online teaching to learners in township schools to continue providing curriculum coverage when schools are closed for daily physical attendance. Learners will be able to master their subjects by employing learning approaches and strategies that interest them, and they will be able to overcome the academic gap between urban and township learners by using current technology. They can also improve their understanding of communication technology. My general observation was that during the national lockdown in 2020, urban schools quickly embraced online learning minimizing the impact of the Corona virus pandemic on curriculum coverage while some public primary schools in townships were completely closed. In light of the fact that all learners were required to take standardized tests at the end of the school year, this was a significant problem, as learners of public township primary schools were substantially disadvantaged. If this could be done in urban schools, why could it not be done in public primary schools in townships?

It is also worth noting that integrating ICT into education helps learning and teaching in a variety of ways, as the Corona virus pandemic revealed. The Corona pandemic highlighted the lack of capacity for ICT capabilities of historically vulnerable communities. More than half of the participants (51.3%) claimed to receive information about learning related to school via WhatsApp, and more than a third (34.6%) claimed to access integrated online learning primarily through platforms like Zoom and Microsoft Teams (Statistics South Africa 2020).

Msila (2015), states that, when teachers are reluctant to embrace and use tools that are already available to them, time and preparation would be the primary barriers to technology adoption. Teachers need to learn how to integrate ICTs effectively to deliver their curriculum. Msila (2015) notes the barriers to effective ICT utilisation

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include a lack of awareness among teachers about the technologies at their disposal that they can use to help in the delivery of curricula.

The researcher experienced that when Grade 7 learners returned on the 8th of June 2020, the majority of those who had not participated in online learning during the lockdown had entirely forgotten what they had learnt during term one. Grade 7s who attended online lessons were ready for school, and the online learning greatly enhanced their performance and attitude towards learning.

1.6 Purpose of the study

To comprehend the problems listed in the problem statement more fully, this study was carried out with Grade 7 teachers from a township and an urban primary school. The study's goal was to investigate the challenges Grade 7 teachers in township and urban schools encounter when attempting to deliver lessons online. Researchers, lecturers and students who are interested in the effects of online teaching in public primary schools will find this study to be a priceless academic resource. It will increase primary school teachers' comprehension of online instruction.

The Department of Basic Education and the research community will have access to the findings for further study.

1.7 Research questions

Main research question

How can teachers in public primary schools incorporate cell phones into online teaching of various Grade 7 subjects?

Sub research questions

1. What is the extent of technology knowledge of Grade 7 teachers in terms of using cell phones in online teaching of Grade 7 students in various subjects?
2. How can public primary school Grade 7 teachers integrate cell phones in their pedagogy and subject content?
3. What challenges exist preventing Grade 7 teachers to integrate cell phones in their pedagogy and subject content?

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1.8 Literature review

To establish the requirements for teachers in public primary schools using cell phones for online classes in grade 7 subjects, this research was conducted. The literature on teachers and their crucial role in teaching and learning is discussed in this section. A review of the literature on online teaching in schools, especially in township schools, partially revealed the expected results of the current research. There is research on the effectiveness of online education in other nations, including Singapore. It is crucial to remember that there isn't much written about South African classrooms, particularly township schools. In the literature review, various forms of online learning were examined in a variety of settings, including Zoom, Microsoft Teams, Google Classroom, Webex and social media applications like WhatsApp. E-learning in South Africa is in danger of failing due to the serious problem of the disparity between those who have access to digital technology and internet and those who do not (Van Deursen & Van Dijk, 2019). In urban and township schools, this is also noticeable.

The literature review continues to explore various platforms for the delivery of online instruction as it addresses the levels of technology integration in education. The literature review also addressed the potential problems in implementing online teaching in South African primary schools, particularly in Gauteng province. The challenges faced by South African school learners and teachers during the Covid- 19 study, such as technical barriers, inadequate technology and learner participation in online teaching, had an impact on learning.

1.9 Theoretical framework

The Technological Pedagogical and Content Knowledge framework (TPACK) was used for this research. However, according to Baran et al. (2011), this structure makes it easier to analyse the various types of capacities that teachers need when trying to teach using technology, along with the various connections that exist between these fields of study. It is significant because it allows teachers to incorporate technology into their classrooms to help learners understand the content. The lack of computer knowledge contributes to inadequate implementation of TPACK amongst teachers.

1.10 Research design and methodology

In order to learn more about how teachers in township and urban schools are utilizing cell phones to teach Grade 7 subjects online, an exploratory comparative multiple

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case study research design was chosen because the research focused on one urban and one township school with different environments and resources. The research included strategies for data collection, sampling and research design. In this study, the socio-constructivist paradigm and the interpretive ontological positions were both employed. Social constructivism is a theory about how understanding develops through interpersonal relationships, according to Taylor (2018). Information came from teachers of Grade 7 in a random sample in an urban and a township public primary school. In the township school where the researcher currently works and an urban school, the researcher chose semi-structured interviews, field notes and document analysis of ICT school policy, lesson plans and Department of Education policies on e-Education as part of tools for data gathering.

The research paradigm, which serves to direct or formally establish a study, is fundamentally a worldview, a comprehensive collection of beliefs, attitudes and research methodologies (Ajagbe et al., 2015).

A theoretical approach, assertions, a viewpoint and an investigation of the importance that people or groups place on a human or social problem situation, are all used as the starting points for the analysis of research problems in qualitative research (Creswell & Miller, 2000).

These are all rational reasons to do your own research rather than relying on what you have read in the literature or on the findings of previous research studies. We needed a complex, in-depth understanding of the topic, so the researcher conducted a qualitative study. This kind of information can only be obtained through personal interaction with individuals, by visiting them at home or at work and allowing them to tell us about their experiences without regard to what we expect or what we have read in the literature (Creswell & Miller, 2000).

The sample design in qualitative research is intentionally chosen to include the most relevant people in the most ideal circumstances to achieve the aims of the study (Creswell & Miller, 2000).

According to Morse (2017), the semi-structured interview is used to elicit the subjective responses of individuals to a particular event or phenomenon they have experienced. The researcher used Atlas.ti to analyse all the participants' transcripts. This software is used to analyse qualitative data and to manage and save all the data collected for

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a research project in one place. Atlas.ti can consolidate all the information needed to organise an analysis and has mechanisms that allow statistical analysis within the programme (Paulus & Bennett, 2017).

1.11 Conclusion

The research plan was explained in this first chapter. The study's justification is the researcher's experience teaching Mathematics and Natural Sciences online to primary school learners while they were on cell phones from April to August 2020. Investigating the challenges teachers encounter when attempting to teach Grade 7 subjects online was one of the study's objectives. Researchers, professors and students who are interested in learning more about the effects of online education in public primary schools will find this study to be a useful academic resource. Data collection techniques used included semi-structured interviews and field notes. Ten Grade 7 teachers from the researcher's township public primary school and five teachers from an urban public primary school made up the convenience sample for this study. The transcripts of each participant were examined by the researcher using Atlas.ti.

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Chapter 2: Literature review and theoretical framework

2.1 Introduction

In Chapter 1, the researcher addressed the purpose, background of the study, objective and research questions of the study in addition to providing a brief review of the literature and describing the study's setting. The research questions for the study were looked at, and a description of the planned investigation was provided. The second chapter includes a literature review as well as the theoretical framework. An understanding of the technology platforms that can be used is provided by this review of the literature on electronic learning, internet, online education and websites for social media like Facebook, WhatsApp and Cisco Webex.

The draft South African White Paper on e-Education, according to Walls et al. (2015), must close the digital divide. Like the rest of the world, the South African education and training system must adjust to the demands and difficulties posed by the digital revolution. As a result, the government has committed significantly to ICT use in education. ICT integration in education helps learners learn how to live and work in the modern information age. The TPACK framework was employed by the researcher to direct this study (Mishra & Koehler, 2006).

2.2 Online learning in schools

2.2.1 Challenges

It seems that learners do not see structured online learning spaces, live online classrooms and synchronous learning methods such as the Loop (Moodle) forum as conducive to creating a sense of belonging within the group. In fact, these platforms only allow interaction during live sessions, and when the session is over, communication ends (Voogt & Tondeur, 2015). Furthermore, due to several issues, including a lack of electricity, infrastructure, connectivity and funding, as well as difficulties building the capacity of stakeholders, training teachers in underdeveloped countries to incorporate technology in the classroom is demanding (Voogt & Tondeur, 2015).

Many previous African programmes failed due to a lack of support for teacher professional development, notwithstanding the ICT gadgets that are present in schools (Voogt & Tondeur, 2015). According to Mhlanga and Moloi (2020), the most important

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problem in their study was targeting learners in remote areas, especially those without internet access. The digital divide between populations with and without access to computers and the internet has proven to be a serious problem that limits the feasibility of e-learning in South Africa (Van Deursen & Van Dijk, 2019). This also applies to urban and township schools as well as the location of the study.

When implementing an online learning environment, according to Allo (2020), teachers need to consider the financial capabilities of learners, the availability of internet access for learners and the identification of successful and effective online learning applications.

The capability of communication, irrespective of the location or time, is a crucial component of online learning. Financial limitations, sub-standard internet connections and a lack of laptops and computers were among the teaching issues that surfaced during the COVID-19 pandemic.

The country's education sector, which includes primary, secondary and tertiary education, was given a wake-up call by the Covid 19 pandemic, argue Mhlanga and Moloi (2020). They also argue that a return to traditional teaching methods will be difficult for the school sector, as problems of social division will remain for some time to halt the virus's spread. To improve the results related to online teaching of Grade 7 subjects using a cell phone in public primary schools, a qualitative study such as the one proposed in this study is needed.

2.2.2 Benefits

In their study, Stone and Logan (2018), indicated that teachers and learning technologists must encourage the development of social media groups, emphasising the advantages of constructing connectedness and, as a result, a learning community. Learners have extra affect over their gaining knowledge of studies and mission submissions (Annamalai, 2019).

Social media systems are nicely tailored to the increase of out-of-magnificence discussions, and for online learners, technology may be the only choice for building connectedness (Stone & Logan, 2018). Voogt and Tondeur (2015) noted that the potential advantages of the online support education system are for learners to learn

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by way of demonstrating ICT as an effective device for submitting content components, additional resources and help to learners, and through expanding opportunities for ICT-supported social communication between teachers and learners.

Consistent with Mohamed (2011), the delivery method allows for access from anywhere and at any time. However, the learning must adhere to sound innovative learning principles. Correct implementation takes effort and time. Online learning resources must be properly designed with learners and learning in mind, as well as good enough support. There are not any time zones in online learning, and learners are not constrained by using geography or distance.

Asynchronous online studying allows learners to access online sources every time they want, whereas synchronous online learning permits learners and teachers to have interaction in real time. Learners can use the internet to obtain modern-day and relevant study materials, in addition to communicate with experts of their subject of study. The ability of learners to complete online courses at the same time as at work or in their own surroundings, as well as contextualize their learning, allows situated studying, or the software of information and skills in particular circumstances (Mohamed, 2011).

Teachers can train learners at any time and from any area. Online sources can be updated, and learners can see the adjustments without any delays. Consistent with the researcher, getting access to materials on the internet permits teachers to quickly direct beginners to applicable facts based on their needs. Online learning systems, which are well designed, can be used to assess learners' needs and modern level of skills, which can assign appropriate substances from which learners can select to attain their intended ‘getting to know’ dreams (Mohamed, 2011).

According to Gilbert et al. (2015), the establishment of effective online learning materials needs to be based primarily on tried-and-true learning theories. As previously said, the medium of delivery has no effect on the high-quality of gaining knowledge. Instead, course layout determines the efficiency of learning. Online learning techniques should display the materials and employ strategies that allow learners to effectively reap the materials. Due to the fact that running memory has a restrained ability, information must be prepared or chunked into potential

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components to facilitate processing. Learners must be given the opportunity and space to mirror. Online learners require time to reflect and digest the material. Consistent with Habibi et al. (2018) while social technologies were used, learners shared knowledge with one another. This was accomplished by means of using wikis to proportion materials acquired for organization initiatives, or with the aid of responding to remarks made by means of different inexperienced persons. Learners who have been constantly online to maintain a connection with path development, were often the supply of records change. Some other advantage referred to by most learners, in step with Habibi et al. (2018), became the ease of self-directed learning made feasible through social technology. In this example, the learners' courting the expertise being discovered is extraordinarily beneficial.

Social media is regarded as making studying exciting and providing a greater secure way of contact for learners who are hesitant to speak up (Habibi et al., 2018). On a personal level, the researcher is of the same opinion as Habibi et al. (2018) that learners use technology to communicate with their friends and own family participants. Learners should collaborate with greater efficiency because of digital networks, which enables them to do so at any time and from any area. This progressed collaboration among social groups advantages classroom learners. The ability of social technology to help inexperienced persons speak and collaborate with greater effectivity is matched with the pedagogical issue of social technology.

According to Habibi et al. (2018), post-secondary establishments are eventually taking note of the way online learning can assist learners expand collaboration and evaluation competencies. In fact, the general public now sees the web as a device for digital teamwork or collaboration, critical thinking and multiplied studying motivation, as opposed to creative and personal expression alone. Learners can accumulate, compare and document actual world facts and initiatives with the use of online surveys, making them learner centered. Learners can work from far and when convenient for them with online gaining of knowledge (Habibi et al., 2018).

According to Gilbert et al. (2015), this is the case within the United States of America (USA). There was a push in recent years to increase courses that offer secondary learners both college credit scores and secondary faculty credit scores for enrolling

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in and finishing the courses. Many schools and institutions benefit from the available funding.

2.3 Learning Management Systems

2.3.1 Edmodo

Edmodo is an interesting online portal. It uses web media which makes learning fun and interesting and provides new learning opportunities. Furthermore, learners may quickly and easily access it from anywhere and at any time (Widyaningrum et al., 2020). In other words, learners can access Edmodo regardless of location, time or distance. Edmodo is making learning easy and makes the lesson effective and organised. Due to the extra time and flexibility, the flipped classroom technique has some advantages, in that it is very suitable to be implemented by using Edmodo web media and provides new experiences in learning. It has no limitation of space, time or distance, which means more effective discussion activities and easier completion of a learner's work. In their conclusion, Widyaningrum et al. (2020) state that using Edmodo applications in flipped classroom learning, has a better impact on learners' creative thinking abilities in the Indonesian language and literature.

2.3.2 Google Classroom

Google Classroom is a teacher-focused Learning Management System (LMS). It is widely regarded as one of the most effective tools for increasing teacher productivity. It has a lot of beneficial features that make it a great tool for dealing with learners. Google Classroom offers the potential to simplify communication and workflow for learners by offering a single point of access to discussion threads and assigned assignments (Etm & Google, 2019). This software acts as a hub for engaging with learners, asking questions and performing projects. Google Classroom supports digital learners with online learning in today's increasingly digital environment.

According to Etm and Google (2019), online learning is easy to use, and the teaching interface and choices for delivering and tracking assignments are purposely streamlined in Google Classroom. Announcements make it easier to communicate with the entire class or with specific individuals. It has been effectively used to upload assignments, manage classes and communicate with learners. This application acts as a hub for communicating with learners, asking questions and performing

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projects. Google Classroom supports digital learners with online learning in today's increasingly digital environment (Etm & Google, 2019).

2.4 Social networks

2.4.1 Introduction

WhatsApp, Facebook, Twitter and Myspace are some of the social networks that may be accessed using a cell phone. A social network, according to Rehman et al. (2020), is a website where users meet new people and share their latest information, photographs, films and activities. Users of social networks can share a wide range of information, including spatiotemporal data, in real time, either publicly or privately. When built with scientific and information demands in mind, social networks have revolutionary potential, and their influence on the educational environment is rising rapidly every day, especially with the help of internet-enabled mobile technology (Rehman et al., 2014).

2.4.2 WhatsApp

WhatsApp is a smart phone instant messaging service that has grown in popularity, with one of its distinguishing features being its ability to facilitate group collaboration (Bouhnik & Deshen, 2014). In the context of teaching reading, WhatsApp is being used as a teaching and communication tool (Stone & Logan, 2018). According to Annamalai (2019), learners were routinely participating in the WhatsApp discussion group and notifying group members about crucial events relating to their schoolwork and exams. WhatsApp is the most appropriate platform to use during online lectures and its advantages are that it is perceived to be less expensive and more widely used as both teachers and learners have knowledge on its use (Annamalai, 2019). WhatsApp has a better level of participation than traditional teaching method as learners like the anytime, anywhere learning using WhatsApp (Maske et al., 2018). The researcher agrees with these authors about the advantages of WhatsApp, especially taking into consideration the environment where the study was done, which is an economically challenged community. WhatsApp is feasible and user friendly, it is easily accessible to learning and teaching material and learning anytime anywhere. Learners can receive slides or information to their cell phones which they can retrieve anytime and learn at their own pace especially in the township school where the study was conducted, as some learners share the gadgets with other family members. This means they are not always in possession of the gadgets but can access it later and

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still be able to follow the lesson discussion. However, the disadvantages according to Maske et al. (2018) are that the teacher can witness irrelevant messages such as learners' posts regarding birthday wishes and message flooding sometimes in awkward times which may cause discomfort. Again if it is a large group, especially with township schools where learner numbers are very large, monitoring of individual earner participation in the discussion is not possible. The other disadvantages are too much communication and off topic communication (Maske et al., 2018). However, according to this researcher the advantages outweigh disadvantages. This is so because some disadvantages like birthday messages and awkward messages may be curtailed by having fixed set times of opening and closing of the group chat and setting clear rules and regulations from the beginning.

WhatsApp technology has the potential to be a natural teaching tool with educational features that should not be disregarded. The most critical issue that learners consider to be negative regarding sending information messages via WhatsApp appears to be the timing of the messages (Bouhnik & Deshen, 2014). Ethical issues related to privacy and data ownership can be a negative thing, however WhatsApp is making an effort to address this issue.

In their results from a pilot study, Goyal et al. (2017) state that many participants using social media platforms for learning find conversations to be beneficial, with less interruption of routine tasks. Hamad (2017) supports the view that WhatsApp has additional advantages, such as serving as an alternative to virtual lessons, allowing learners to catch up, and to learn from the mistakes of other learners. Since some of our learners, where the researcher is based, do not have cell phones, subject content sent to their parents' phones can be accessed later. According to Goyal et al. (2017), a combination of mediums such as videos, photographs and voice notes, as well as educators' constant availability and learning at any time, has made WhatsApp a modern uncomplicated medium for classroom activities.

2.4.3 Facebook

Facebook is presently the world's most popular social networking platform. It allows users to build or maintain friendships, convenience to share information, and connect with others instantly (Marino et al., 2017). Learners utilise Facebook to meet new people and reconnect with existing ones, which benefits their academic achievement. According to Saikaew et al. (2011) Facebook has some disadvantages such as being

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time consuming, it is difficult to find and keep resources, too open to public and it disturbs personal space.

2.5 Zoom, Microsoft Teams, and Cisco Webex

Lestiyanawati (2020) asserts that their study utilized three well-known tools - Zoom, Microsoft Teams, and Cisco Webex - to objectively evaluate the level of quality of multimedia. However, 59 percent of respondents used WhatsApp, 8 percent Zoom, 4 percent Facebook and 3 percent Google Classroom, according to Statistics South Africa (2020). According to Widyaningrum et al. (2020), teachers used three teaching strategies in their findings: using video conferences alone, online chat, or a combination of both during online teaching and learning.

2.5.1 Zoom video conferencing

As video conferencing primarily based meetings grow to be greater common place occurrences, as substitutes for individual meetings, the level of interaction provided through traditional structures turns into an impediment to using them for multi-consumer far flung collaborative initiatives. Losses of bandwidth or protocols that don't provide first-class service are problems that result in bad audio and video. Sutterlin (2018) states that Zoom video conferencing is easy to use and dependable. As soon as they are signed in, learners are the hosts of their conferences and may participate on a webcam or a presentation on their computer or from a cellular device. Zoom without difficulty, links across room structures, desktops and cellular gadgets to deliver our many university websites and accommodate lengthy distance participants collectively. Zoom can host up to 100 people right away through audio and video. The platform is designed to feature efficiently despite minimum bandwidth.

2.5.2 Microsoft Teams

Microsoft teams are a cloud primarily based digital hub that carries discussions, conferences, documents and applications into a single LMS. Microsoft teams have features that e-mail does not, like chat rooms, video conferencing and equipment that resembles popular social media networks. It mixes audio, video and computing device sharing, with a social constructivist emphasis on an individual's gaining knowledge due to channel interactions (Singh & Awasthi, 2020).

2.5.3 Cisco Webex

Cisco Webex is a web conferencing solution that does not require reservations and allows you to meet anywhere at anytime. It has easy-to-use features to improve

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corporate collaboration and cut travel costs. It allows employees to be more productive and have more work-life flexibility. The user can join meetings via any video device that supports standards, such as a mobile device, a desktop endpoint, a soft client or a room-based video system. You can share content in real-time with remote attendees without having to submit files to a server (Singh & Awasthi, 2020).

All three models produce comparable results. While popular programs like Zoom, Microsoft Teams and Cisco Webex are very useful, they all require additional data and a consistent internet connection, both of which are difficult to come by in the context of the study. In accordance with my school context, it is a challenge to conduct teaching and learning using the three modules as they are synchronous, they are live meaning in real time and again need a lot of data. The majority of the learners in my school context coming from economical disadvantaged families find it difficult to participant using these three models. Other models which are asynchronous such WhatsApp, where information can be accessed later and do not need learners to be live and also use less data is better in my school context.

2.6 Theoretical framework

This study's theoretical framework is TPACK (Technological Pedagogical Content Knowledge). The three components of effective teaching are content, pedagogy and technology. The technologies themselves, with which many teachers are least familiar, are where many attempts at technology integration start (Harris & Hofer, 2009). It is extremely difficult to prepare teachers in developing nations to use technology effectively in the classroom because of issues with power outage, infrastructure, connectivity and assets, as well as issues with skill-building for everyone involved (Ziphorah, 2014). According to Harris and Hofer (2009), most technology integration techniques start by concentrating on the advantages and disadvantages of technologies, or what they can and cannot do to help us.

Online coaching and learning were prepared for lecturers by a group in KwaZulu-Natal, South Africa, Naidoo and Singh-Pillay (2020). Working with teachers, they looked at the use of educational and online technologies and discovered that the factors that contributed to ineffective online learning and teaching were insufficient technical schooling, improper pedagogical matching to learners' exceptional learning styles, a lack of stability in terms of work and home life, inconsistent connectivity and a lack of technological devices for learning and teaching.

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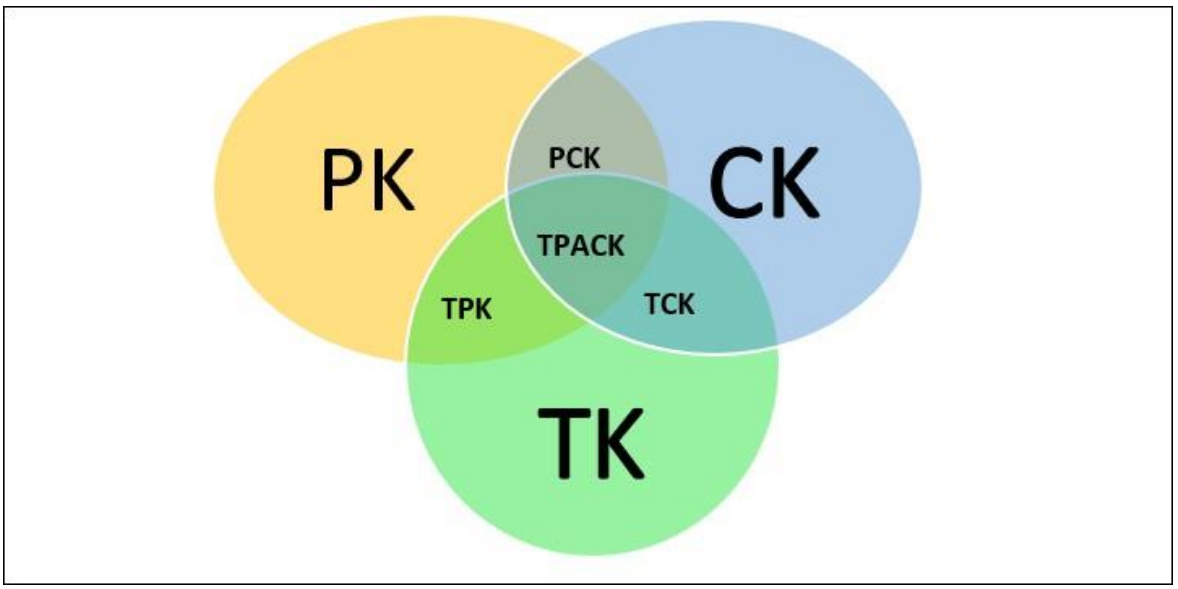
This is significant because teacher training for online learning and coaching cannot assume that teachers need to learn primarily about the technology they use. This is significant because it enables teachers to implement strategies that aid in the full comprehension of content by Grade 7 learners in the study's participating schools. Content, pedagogy and technology - and how these three things work together - are the three key elements of a successful technology-enhanced teaching strategy (Mishra & Koehler, 2006).

It recognises and recommends that the multiple and interrelated roles of content, technology and pedagogy are diagnosed in authentic teaching and learning contexts that consist of more than just content, technology and pedagogy. Harris and Hofer (2009) suggest that technology integration methods should be immediately linked to familiarisation activities, rather than requiring teachers to adapt their teaching to the possibilities of educational technologies.

As a result, according to Ziphorah (2014), using educational technologies effectively necessitates knowledge of, and sensitivity to the dynamic, transactional relationship between the three components of knowledge represented by the Technological Pedagogical Content Information Framework: technology, pedagogy and content (TPACK). The balanced use of four essential components—imagination, skills, content and resources—is necessary for ICT integration (Ziphorah, 2014).

Figure 2.1: TPACK framework (Mishra & Koehler, 2006)



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2.6.1 Technology Knowledge (TK)

If teachers have knowledge of technology (TK) they understand how to use ICT software and hardware in educational settings. TK addresses the need to adapt to and learn emerging technologies (Mishra & Koehler, 2006). The competencies required for ICT integration are related to educational attitudes and content planning as well as technology use. These competencies are all interconnected and cannot be viewed in isolation.

Mishra and Koehler (2006) created (TPACK) strategy to help with technology integration in teacher education. When teachers grasp how these three knowledge domains are interconnected and interact, ICT integration in education becomes easier. However, the research literature suggests that the move from TK to TPACK in teacher education programs is not that simple.

2.6.2 Content Knowledge (CK)

This is the basic essence of a discipline or subject matter at various levels of learning. Teachers are supposed to know something about the subjects they teach (Mishra & Koehler, 2006). Mathematics, English Home Language, Natural Sciences, Technology, Economic and Management Sciences, Life Orientation, Social Sciences, Creative Arts and Setswana / IsiZulu / IsiXhosa are currently available to Grade 7 learners in the schools where the research was conducted, and teachers must be familiar with ways to deliver them.

2.6.3 Pedagogical Knowledge (PK)

This is knowledge unique to the field of education. It is a set of abilities that teachers must possess in order to manage and arrange their classrooms. Lesson planning, learner engagement, evaluation and classroom management are just a few of the teaching and learning activities that must be completed to acquire the desired learning outcomes (Mishra & Koehler, 2006). Participants have the pedagogical knowledge to teach their various subjects because they are qualified teachers.

2.6.4 Pedagogical Content Knowledge (PCK)

This speaks to how various teaching methodologies are well suited to various types of content. You must comprehend how pedagogy and content interact. Different approaches are needed for various subjects. Mishra and Koehler (2006) defined PCK as the fusion of pedagogical and content knowledge. It demonstrates the intimate

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relationship between content knowledge and pedagogical knowledge. In order to combine strategies that assist learners in fully understanding a topic, teachers must have a firm grasp of the relationship between pedagogy and content. Beyond simple subject knowledge or general pedagogical principles, understanding the precise relationship between content and pedagogy is a prerequisite for PCK.

2.6.5 Technological Content Knowledge (TCK)

This is an instance of how to use a specific technology in a specific type of content (Mishra & Koehler, 2006). Teachers and learners can learn how to operate in the current information age by incorporating Information and Communication technologies in their education. Based on its applicability, it helps teachers to choose the best tool for their subjects. Teachers in this study had to learn how to teach online using a cell phone, which is a low-cost technology tool that is widely used.

2.6.6 Technological Pedagogical Knowledge (TPK)

Technology integration, according to Mishra and Koehler (2006), is the combination of technology with general pedagogical techniques and pedagogy (teaching strategies, classroom management, lesson planning and delivery and assessment).

2.6.7 TPACK

It is essential to integrate pedagogy, content and technology. TPACK, according to Mishra and Koehler (2006), is essential for integrating ICT in teaching. Despite the fact that technology is used in classrooms, a major problem with many earlier African initiatives has been the lack of support for teachers' professional development (Ziphorah, 2014). The COVID 19 pandemic, which accelerated the adoption of technology in the educational system and had an impact on both the public and private sectors of society, makes this especially true. According to Ziphorah (2014), in order to effectively use educational technology, one must understand and cultivate responsiveness to the dynamic, transactional interaction between the three areas of knowledge—technology, pedagogy and content—as represented by the TPACK framework.

The TPACK model offers a thorough explanation of how technology pedagogical approaches to instructional design and subject content, are all customized to each learner's needs and abilities.

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2.7 Conclusion

This review of the literature provided a perception into the pros and cons of online learning and teaching through WhatsApp, Webex, Microsoft Teams and Zoom. According to teachers and learners, the social networking platform WhatsApp is the most beneficial in terms of facts utilization and the most popular in the groups studied. Similarly, this study explored the relevance and applicability of the TPACK theoretical framework inside the context of online ICT integration.

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Chapter 3: Research design and methodology

3.1 Introduction

Research paradigm, research method, research design, validity of the study and ethical considerations are all covered in this section. The research design, sampling and data series techniques are part of the research methodology. This study has made use of the socio-constructivist and interpretive ontological paradigms.

3.2 Paradigm

3.2.1 Introduction

Research paradigms are science philosophies that shape ontology (how reality is viewed), epistemology (the nature of knowledge), axiology (how science is performed), rigour (how the paradigm outlines methods involved in performing science) and methodology (how the paradigm outlines methods involved in performing science) (Kivunja & Kuyini, 2017). A paradigm is a set of presumptions that guide research concepts and methodologies and are used in ideology to characterize someone's beliefs and points of view (Kivunja & Kuyini, 2017).

3.2.2 Ontology

Ontology, according to Hurtado and Nudler (2019), is the study of whether things exist or not. It tries to determine if abstract things are real, are fact. As a result, ontology can help you examine the form and meaning of reality, as well as your thoughts on the subject. Studying reality's nature is known as ontology. The aim of this study was to determine how difficult it is for public primary school teachers to use cell phones to teach different Grade 7 subjects online. To determine if difficulties existed, the researcher used semi-structured interviews conducted in their workplace to gather data on the realities of the situation. The presence of the researcher on the actual study environment enabled the researcher to examine the things in their reality which responds to ontology examining the issues in their reality.

3.2.3 Epistemology

The study of knowledge is called epistemology. It aims to provide answers to issues like "What is knowledge?" What processes produce knowledge? (Goertz & Mahoney, 2012).

Activism believes that knowledge can and should be developed objectively, regardless of the personal beliefs of the researchers or the participants. Properly developed

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information is certain, accurate and correct. Active learning encourages active learning and participation of learners. The engagement of learners in activities enables them to develop skills and acquire new concepts which may lead them to solve problems in the present and future. This is regardless of whether teachers have more information in online teaching or not, but the capacitating of the learners in active participation will enable them to understand concepts. Chowdhury (2014) defines hermeneutics as an approach that emphasizes the existence and meaningful participation of individuals in social and cultural life. According to Kivunja and Kuyini (2017), the interpreters demonstrate that, among other things, the researcher is aware of a real and obvious connection between the study participants and the researcher. This study explored the thoughts, feelings, beliefs and passions of participating teachers as they worked to improve their skills, as well as their differences as individuals. All of this data was collected through the inevitable interaction between this researcher and the participating teachers using semi-structured interviews.

Social constructivism is a type of conceptual constructivism that emphasizes the interdisciplinary nature of learning (Chowdhury, 2014). According to this theory, information is developed by society and strongly influenced by the society in which it is formed. Social constructivism, according to Taylor (2018), is based on the development of understanding through interpersonal relationships. The social interaction among the Grade 7 teachers participating in this study allowed them to learn new things and deepen their understanding of what they already knew about cell phone online teaching. Knowledge has been co-constructed in this approach.

3.3 Methodology

The nature of this study is qualitative. According to Vindrola-Padros and Johnson (2020), qualitative research includes all types of studies that produce findings without relying on specific statistical methods or quantitative methodologies. Qualitative research examines the division of factors but is not statistical. Qualitative studies, which range from evaluation to quantitative research, focus on the individualized or socially beneficial meaning of issues, practices or routines through the gathering of non-standardized and controlled data. Verify the text and images (Vindola -Padros & Johnson 2020). A thorough (complete) description of the participants' thoughts, ideas and experiences, as well as an explanation of their behavior, is produced by qualitative research techniques. This became very relevant for this investigation because the

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researcher wanted to collect the thoughts and experiences of the participants in order to achieve the research purpose.

According to Vindrola-Padros and Johnson (2020), qualitative research methods have both advantages and disadvantages. Some of its benefits are comprehensive information about the human experience in unique contexts. Researchers are able to study reports on the lives of contributors and how meanings are formed by and within lifestyles using qualitative research methods. Consistent with Creswell and Miller (2000), qualitative research is used to enable people to define themselves, listen to their voices, and reduce the electrical dynamics that frequently exist between a researcher and other researchers. Individuals are observed.

According to Vindrola-Padros and Johnson (2020), its limitations in the sentence research approach are that qualitative research processes sometimes ignore context sensitivity in favor of those who specialize in meaning and experiments, and the smaller sample size increases the problem of generalization to the general population. In a qualitative study, the researcher gets to understand in-depth the real issue in a small context. Because the qualitative model assumes that reality is created by society and is determined by what members understand it to be, the final report must be scrutinized to ensure members' reality exactly as they are presented. The researcher explored a number of demanding situations faced by teachers, mainly in township and urban schools, and their proposal for integrating online education for Grade 7 school learners in all subjects.

3.4 Research design

The research design for this study was a comparative case study between an urban and township school looking at technological infrastructure and resources. An in-depth examination of a participant, a group of individuals or a component that will be used to study a variety of topics is known as a case study (Gustafsson, 2017). Case studies have the benefit of "focusing" on actual circumstances and assessing claims about phenomena as they actually occur; they address the why and how of the participant's experience (Ajagbe et al., 2015). Case studies make it possible to analyze and comprehend complex problems by using the findings of earlier research. By moving beyond quantitative statistics, the case study approach allows the researcher to examine behavioral conditions from the perspective of the particpants.

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A case study, according to Gustafsson (2017), is a study of a case or situations that fit the aforementioned description by addressing "how" or "why" questions regarding the current situation. Case studies stem from a desire to understand complex social facts. The study was based on the researcher's observations, interviews and also documents analysis. It helps researchers retain the completeness and important aspects of the real-world experience. As the researcher was based in one of the schools where the study was carried out, time and money were saved. In the urban school the researcher relied on the outsiders participants view through online interviews at the convenience of the participants.

This study examined the nature and severity of the challenges faced by study participants through an exploratory analysis of the situation. Exploratory case studies seek to delve deeper into any data phenomenon that captivates the researcher's curiosity. On the other hand, by using replication logic rather than sampling logic, multi-case design can be applied in real-world scenarios with multiple sources of evidence.

3.4.1 Advantages of case studies

Through case studies, the researcher can gain access to subjective traits and spend as much time as you like directly observing the surroundings of your field of study. Data is frequently gathered by qualitative researchers in the field, at the locations where people are exposed to the issue or issue being studied, or by providing them with equipment to use. For qualitative research, talking to people and observing how they behave in their environment can provide useful information (Creswell & Miller, 2000). Yazan (2015) suggests that the novice researcher should conduct the data collection and analysis process simultaneously. He further suggests the use of some procedures that constitute efforts that go beyond simple repetition of data gathering to deliberative effort to find the validity of data observed. The researcher made an effort to follow the suggestion and it was possible due to the fact that the sample size was small and the researcher was based where most of the participants were.

According to Ogawa and Malen (1991), the main goal of exploratory case studies is to improve our understanding of complex social processes. Exploratory case studies are used to generate ideas emotionally. Researchers can use information about the phenomenon of interest to conduct extensive and open searches of relevant data, identify key themes and patterns related to the phenomenon of interest, and design or apply constructs consisting of patterns instead of validating them by inference (Isiko,

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2021).

3.4.2 Disadvantages of case studies

Because of the nature of the case study, case study findings and suggestions cannot be tested or denied in terms of value and truthfulness. Case studies are extremely difficult to summarize (Yazan & De Vasconcelos, 2016). The fundamental problem is that the studies are highly specific, meaning they only apply to a specific context or a small number of units. Case study subjects are frequently too small to yield scientific conclusions. However, with regards to this study, the researcher found that the findings can be tested as the facts indicated so. The researcher in the same school conducted online lessons with the same learners who study different subjects.

3.5 Sampling

A sample, according to Etikan (2016), is a population that takes part in a study. Non-probability or non-random sampling is one kind of convenience sampling. This occurs when members of the chosen target audience satisfy certain functional criteria, such as fundamental accessibility. The study considered factors like willingness to participate, availability at a specific time, and proximity to participants (Etikan, 2016).

The researcher sets out to find participants who can answer the research questions after determining what to study. Ten Grade 7 teachers from a township and five teachers from urban schools who are currently teaching some Grade 7 subjects participated in the study.

Tables 3.1 and 3.2 present demographic information for sample participants in township and urban schools. All participants have undergraduate degrees ranging from the Certificate of Advanced Education to the four-year Bachelor of Education. However, they all expressed a desire to enhance their teaching skills in teaching grade 7 learners online in a variety of subjects.

Table 3.1: Township primary school participants

Township Participant	Gender	Age	Subjects taught	Years of experience
TP1	Female	48	Natural Sciences	20

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TP2	Male	28	Mathematics, Economic and Management Sciences,	5
TP3	Female	45	Mathematics, Economic and Management Sciences	16
TP4	Male	26	English Home language, IsiZulu FAL	4
TP5	Male	35	Technology, Economic and Management Science	8
TP6	Male	28	Technology, Economic and Management Sciences, Creative Arts	5
TP7	Female	48	IsiXhosa, Social and Sciences	14
TP8	Male	58	Mathematics	32
TP9	Female	24	Social Sciences and Setswana	3
TP10	Female	28	IsiZulu and Technology	6

Table 3.2: Urban primary school participants

Urban Participant	**Gender**	**Age**	**Subjects taught**	**Years of experience**
UP1	Male	49	Technology and Mathematics	15
UP2	Female	32	Natural Science and Technology	7
UP3	Female	26	English and Life Orientation	4
UP4	Female	30	Social Science	9
UP5	Male	27	Mathematics	5

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The deliberate selection of a participant based on the participant's characteristics is known as purposive, also known as judgement sampling. It is a non-random approach without participants or underlying ideas that have been chosen in advance (Nigam et al., 2016). In order to accomplish the research goals and objectives, participants in this study were specifically chosen (Vindrola-Padros & Johnson, 2020), for example, those who only teach Grade 7 learners in both urban and township schools. Participants weren't picked based on their age or level of teaching experience.

3.6 Data collection methods

3.6.1 Semi-structured interviews

According to Morse (2017), a semi-structured interview is designed to elicit a participant's subjective response to a situation or experience. Using prepared questions, the researcher can guide the conversation during semi-structured interviews, allowing for two-way interaction between the interviewer and the interviewee. The reliability of semi-structured interviewing as a qualitative research technique has increased with the creation of a comprehensive semi-structured interview guide (Taherdoost, 2020).

By asking the same questions to each participant in the same language and in the same order as the other participants, the researcher can discover new avenues that emerge during the interview that were previously unexplored (Ajagbe et al., 2015).

a) Advantages of semi-structured Interviews

To avoid influencing participants' responses, the main theme often dominates the interview model and the only follow-up question needed is "mention", which is used if participants have difficulty understanding the main topic (Ajagbe et al., 2015). Since the interviews were semi-structured, participants were encouraged to provide additional information.

b) Disadvantages of semi-structured interviews

According to Ajagbe et al. (2015), one limitation is that inexperienced researchers may be unable to identify where to ask prompt questions or probe responses, resulting in the omission of some pertinent information. It employs an extensive interview guide or timetable that can be used when enough analytical information about an experience is available. Data processing from unstructured interviews can be difficult and time-consuming, because it requires collecting comparable statements from a wide range

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of people and identifying connections can be difficult at times (Fontana & Frey, 1994). However, they may not be suitable for inexperienced researchers, and they are vulnerable to researcher bias, which can result in inappropriate questions being asked. Participants may also discuss unrelated topics, complicating coding and analysis.

Because the goal of this study was to examine only material related to cell phone usage and its impact on online teaching of several Grade 7 subjects in public primaryschools, the aforementioned factors are critical. As a result, the researcher used semi-structured interview questions to gather data. Time management was used to ensure that no teacher's leisure time was completely consumed. The interview was held in a private setting, and audio was recorded to document exactly what the participants said.

3.6.2 Field notes

Qualitative field notes are now widely recognized as a necessary component of competent qualitative research. Most qualitative research techniques advise taking field notes in order to improve information and providing context for analysis (Creswell & Miller, 2000). Field notes can be used for a variety of purposes. They are primarily used to generate precise, thorough evaluations of the study context, encounter, interview, focus group and contextual data for documents. The field notes were used in this study and also during the semi-structured interview process. This assisted to give an insight on the interest shown by the participants as they discussed about the online teaching in their respective subjects.

3.6.3 Documents

Document analysis can be used to achieve a variety of goals in a research project. Documents such as lesson plans, ICT school policy and Department of Education policies on e-Education could, for example, provide information about the working environment of research participants as well as additional research data. Document-derived data and insights can make significant contributions to a knowledge base (Bowen, 2009).

Documents enable you to keep track of changes and progress. When a researcher has access to multiple drafts of a document, he or she can compare them to see what has changed. We must approach them based on who they are and what they can provide (Bowen, 2009). This study made use of the following documents:

- The schools ICT policy documents, which were also scrutinised to see the

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relevance and the information contained to enable ICT integration to take place at the school level.

- The GDE Policy on 10 Pillars of Strategic Education
- The Draft White Paper on e-Education
- Lesson plans of Grade 7 teachers

3.7 Data analysis

3.7.1 Semi-structured interviews

Discussion techniques are employed in qualitative analysis to outline the procedures for analyzing various types of qualitative data. This makes data distribution, segmentation and collection possible (Zinn, 2010). Knowledge can be organised, structured and interpreted more easily thanks to data analytics. The researcher utilised Atlas.ti to review transcripts of each participant. It allows the researcher to aggregate all the information needed to organise your analysis, and there are mechanisms for performing statistical analysis within the program (Paulus & Bennett, 2017). Atlas.ti allows you to code your content automatically (Friese, 2002). This software is used to analyse qualitative data as well as manage and store all the data collected for a research project in one place. The researcher first transcribed the entire text verbatim and then encoded key phrases or topics in the participants' responses. The researcher was able to identify key words in all participants' contributions, such as lack or inadequate training, lack of resources and poor or lack of technological infrastructure especially in a township school. In urban schools the responses were predominantly about adequate training and resources and good technological infrastructure.

In the first set of analysis, automatic coding was used to identify and flag portions of the dataset that cited Atlas.ti as citations. These citations were compiled and checked for context several times throughout.

The use of cell phone devices by teachers in online classes of Grade 7 subjects is the subject of the study. The data is read several times and then analyzed to look for recurring themes and patterns. The researcher received verbatim answers to the semi-structured interview questions. Text segmentation, coding and memo writing are all part of the text level, which focused on raw data.

To clarify the content of the data, the first step in the coding process was to mark the topics that respondents mentioned or noted in their observation notes. Qualitative analysis was carried out all through the data collection. As a result, when gathering

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data, researchers always pay attention to impressions, experiences and connections. The continuum approach includes looking for analogies, differences, types, patterns, concepts and ideas. Reading all the data and then breaking it down into smaller, more precise units is the first step in any analysis (Paulus & Bennett, 2017).

Next, data segments or units are organized into a structure derived primarily from the data, involving inductive analysis. Comparisons are used by researchers to develop and refine categories, explain conceptual similarities and discover patterns. During the analysis, the categories were adjusted and revised. It is essential that the research accurately reflects the views of the respondents. To analyze simply means to divide or decompose data into parts. An analysis that leads to a higher order synthesis, such as trends or themes, evolutionary theory or content.

3.7.2 Field notes

Making sure that what participants claim to be doing is what they are actually doing is the main goal of taking notes while conducting fieldwork. It is obvious that observations can be used to check for consistency between what participants report doing and what they actually do (Mulhall, 2003). Close to their field observations, they stress the value of thorough field records. The researcher of this study recorded specific events such as trying to send homework to their learners and processes of attaching learning material in the form of pictures and links to other related content. that the participants mentioned in the interview regarding their experiences teaching Grade 7 learners online using cell phones. This was done to make sure everything was logged correctly.

The researcher thoroughly scrutinized the participant data. This was done to better understand their operational environment and the various responses and attitudes they encountered when using ICT for online classroom teaching and learning in urban and township schools. Participant observation was facilitated by field note analysis. This was done through observation during the interview process. Taking field notes as events happen, as opposed to after informants have forgotten the specifics, is when they are most effective (Mulhall, 2003).

3.7.3 Document analysis

Skimming, reading, and evaluating documents such as ICT policy documents, lesson plans and Department of Education policy on e-Education are all part of document analysis. Document analysis is less expensive than other types of research because

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it is unobtrusive and non-reactive. This was done to find out the non-negotiable in terms of implementation of ICT integration in teaching in schools. This interactive strategy incorporates elements of content analysis as well as a qualitative approach (Bowen, 2009). The researcher must possess the ability to distinguish between pertinent and unimportant facts. The researcher was able to assess the documents' relevance to the research problem and purpose as an analyst given the study's objective and design. In order to generate empirical data and deepen understanding, document analysis requires assessing documents; it goes beyond simply arranging a series of extracts from printed material to communicate whatever thought occurs to the researcher (Bowen, 2009).

Such knowledge and insight can assist researchers in understanding the historical roots of certain challenges as well as the variables that influence the phenomenon under investigation. Data from documents, for example, can be used by the researcher to contextualize data gathered during interviews. Documentary evidence is frequently combined with data from interviews and observations to reduce bias and establish credibility (Yin, 1994). The research showed how one method can interact with another to supplement it. Throughout the process, interview data proved useful, and the researcher attempted to strike a balance between objectivity and sensitivity.

Table 3.3: Documents selected for analysis

Documents selected	**Data analysed**
GDE Policy on 10 Pillars of Strategic drivers in Education	Implementation of this policy in particular the ICT Integration in teaching
E-Education White Paper Draft	ICT development and resource provision in schools
Policy on ICT Integration in Teaching and Learning	Practical implementation of this policy at school level and its challenges
Teacher lesson plans	Using cell phones to integrate ICT into education and learning

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A thorough, systematic analysis of documents provided background information that assisted the researcher in comprehending ICT integration in education, specifically teachers' use of cell phones in online teaching of Grade 7 subjects, and how it is carried out. The documentary data served as the foundation for policies that could be used to implement ICT integration in education. Documents were extremely useful in pre- and post-interview scenarios, as well as for adding contextual depth to the research. The researcher used data extracted from documents to cross-check interview data and vice versa in this regard.

Documents contained more specific information. Furthermore, documented data identified occurrences or situations that should be monitored. ICT integration in schools is one of the ten strategic education pillars that must be implemented without fail. In order to equip students with computer skills, the Draft White Paper on e-Education stresses the significance of incorporating ICT into teaching and learning across all schools, as well as the availability of resources to facilitate ICT integration (De Clercq, & Shalem, 2014).

The ICT school policy outlines the guidelines for implementing ICT in a school using computers as well as online teaching using low-cost technology such as cell phones. Document analysis was useful in clarifying concepts, defining conceptual boundaries, and determining the fit and functionality of categories (Thornberg & Charmaz, 2014). When all the evidence from the documents, interviews and field notes created a consistent picture of how teachers use cell phones in online teaching of Grade 7 subjects, the researcher was satisfied that the data collection and analysis processes were complete.

Documentary evidence is frequently combined with data from interviews to reduce prejudice and establish trustworthiness. One of Gauteng's top ten education pillars is ICT in education, and both schools have an ICT policy statement outlining the various ways ICT is used in the classroom.

These policy documents set out the goals, principles and strategies for providing ICT in schools, as well as online teaching and learning. It lays the foundation for the advancement of IT in schools. All learners, regardless of race or gender, have the opportunity to improve their ICT skills through mobile online teaching and learning. Schools promote equal access to computers, e-learning and equitable distribution of ICT resources according to their availability.

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Some teachers' lesson plans included the use of computers only for content study, while others included additional mobile monitoring but only for help with homework. The literature reviewed therefore complemented the interview and observational data and played an important role in this study.

3.8 Methodological norms

The purpose of dependability in a qualitative research is to support the claim that the findings are "worthy of consideration". The four proposed alternatives for determining the reliability of qualitative research are credibility, reliability, relevance and transferability (Elo et al., 2014).

Credibility includes both a thorough description of fascinating phenomena and the creation of credible studies (Liao & Hitchcock, 2018). The researcher tried to present the participants' responses as accurately as possible. This was done by returning research data to the participants, allowing them to double-check their answers. When accounts of human experience are immediately recognized by people who have been in similar situations, a qualitative study is considered reliable (Malmqvist, et al., 2019).

Because it proves that a study's findings are accurate and repeatable, reliability is crucial for validity. When something is reliable, it can be observed or found to have the same result in similar circumstances (Kivunja & Kuyini, 2017). The researcher made an effort to make sure that the participant's results matched the collected raw data. This implies that the data must remain consistent over time and under various circumstances for the study to produce similar results in the same setting if it is repeated. Reliability is defined in terms of accuracy by Korstjens and Moser (2018). That the analysis satisfies the predetermined standards for the specific design should be ensured. Here, the interpretive process is what is being emphasized.

If the choices made at each stage of the research process are accepted by other researchers, this is feasible. If the outcomes were replicated with comparable subjects under comparable circumstances while following the procedure and the investigator's description, the study would be regarded as reliable (Malmqvist et al., 2019). Transferability reflects the researcher's effort to give the reader of the results enough context for the study so that they can use the results to their own situation (Kivunja & Kuyini, 2017).

According to Rodon and Sesé (2008), transferability is the mechanism by which

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readers can infer that the research results would be similar in their situation. Second, the researcher must provide enough background information for the reader to judge the applicability of the results (Rodon & Sesé, 2008). The similarity or concordance between environments determines the degree of transfer. In other words, the degree of similarity between the researcher's context and the context in which the research results are expected to be transferred affects how the research findings are applied in other contexts (Kivunja & Kuyini, 2017).

A qualitative study meets this requirement if the results are relevant to non-study participants and the reader could be related to the results. By fully understanding the informants and the research context, the results' transferability will be discernible to the reader (Malmqvist et al., 2019).

According to Kivunja and Kuyini (2017), validation refers to the extent to which people in the field can validate the results of a research project. The possibility of confirmation regarding the neutral aspect, data continuity should be ensured and interpretation should not be based on one's personal opinions and views but should be supported by data (Korstjens & Moser, 2018). Confirmability is the capacity of a researcher to show that data accurately reflects participant responses as opposed to bias or opinions of the researcher (Malmqvist et al., 2019).

3.9 Ethical considerations

Priority is given to preserving the participants' dignity, safety, rights and wellbeing over all other research-related interests. Participants must voluntarily and firmly express their informed consent in writing (Edmundson et al., 2018). The study's participants were informed that participation was entirely optional and that they could renounce participation at any time. Participants have access to all data generated as a result of their participation in the study. The researcher must take all necessary precautions to guarantee the participants' safety as well as their psychological well- being and dignity (Gonsalves et al., 2015).

The degree to which the identity of the message source is unknown and uncertain is known as anonymity (Whelan & Carolina, 2007). The participants' identities are not connected to any other data they gave the researcher while they were conducting the study; the researcher is aware of this.

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For confidentiality, pseudonyms were used. Fictional names should be used for a specific and often limited purpose to protect the identities of participants (Lahman et al., 2015). When an individual discloses to a researcher information that is considered confidential or private, the researcher agrees (implicitly or explicitly) not to disclose this knowledge to those who do not already possess it (Edmundson et al. associates, 2018). Qualitative research relies heavily on participants. In this case, it is believed that only a human being can be flexible, adaptive and comprehensive enough to investigate unusual or peculiar reactions that emerge during an interaction. Therefore, qualitative research relies on people as a tool to collect and interpret data.

In qualitative research, participant treatment is crucial. Therefore, in this kind of research, ethical issues are more important. Prior to the start of data collection, the researcher made sure that each participant had received information about the research methodology and had consented to take part in the study. According to Skrzypek et al. (2018), participants could leave the study without fear of retaliation, and the goals of the study must be disclosed.

One of the most important contributions of the University of Pretoria to South African society and the international community is research. In this regard, the University fosters a research culture that values both exceptional competence and ethical responsibility in the pursuit of knowledge, as well as the creation, preservation and transfer of knowledge (Bothma, 2016).

3.10 Conclusion

This chapter describes research strategies and techniques. The philosophical perspective was explained, as well as its implications for the study. The model is constructivist-social and interpretive applied philosophy. Interpretation theory, according to Chowdhury (2014), is an approach that emphasizes the meaningful presence and participation of individuals in social and cultural life. This research followed the method of interpretive philosophy and the constructivist model of society, a theory of the development of understanding through interpersonal relationships, upholding the fact that understanding is generated by social processes and historically and culturally contextualized.

The Grade 7 teachers participating in the study were able to learn new things and improve on what they already knew about cell phone online teaching through their

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social connections. In this study, a qualitative research method was used. The researcher also described research techniques and highlighted the University of Pretoria's research guidelines in this chapter.

The study design is a comparative case study. Ten teachers from a township school and five teachers from an urban school were recruited for the case study using convenience and selective sampling methods. The collection and analysis of research data was discussed. Semi-structured interviews, field notes and documents were used for data collection. Transcripts of all the participants were analysed using Atlas.ti. This tool is used to analyse qualitative data as well as manage and store all data collected for study in one place. One of the important issues emerging from one of the participant's responses was that they have basic computer knowledge but is willing to be developed in online teaching using cell phone. They also mentioned that they do not have enough data to conduct online teaching.

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Chapter 4: Data analysis

4.1 Introduction

The primary focus of this chapter is the interpretation of participant data. This entails analysing the lesson plans as well as the standards that guide the participants' teaching and learning. Teachers in township schools without ICT lack online teaching and learning strategies compared to those used by teachers in urban schools with ICT.

The objective of this section should be to present the findings from the school interviews and to conduct a thorough analysis of the supporting literature on ICT integration in schools. Data gathered from teachers who participated in the daily teaching of Grade 7 learners in a variety of subjects was used to study the use of cell phones by teachers in online teaching of Grade 7 subjects.

According to research, township schools do not use cell phones for teaching or learning nearly as frequently as urban schools do. Every discovery clarifies the project's research issues. To accomplish the aforementioned goals, the following questions were put forward:

Main research question

1. How can teachers in public primary schools incorporate cell phones into online teaching of various Grade 7 subjects?

Sub research questions

1. How well-versed in technology are Grade 7 teachers in terms of using cell phones to teach their learners various subjects online?

2. How can public primary school Grade 7 teachers integrate cell phones in their pedagogy and subject content?

3. What challenges prevent teachers of learners in grade 7 from incorporating cell phones into their lesson plans and content?

The first set of data was collected qualitatively through semi-structured open-ended interviews and is presented in Section 4.2.

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4.2 Presentation of analysis of semi-structured interviews

The researcher provided an introduction and explained the purpose of the interview questions, as well as allowing the process to be recorded to ensure that all responses were recorded. Biographical information of the teachers is presented in the table below.

All the participants were Grade 7 teachers and their views on using ICT or digital teaching were influenced by their years of experience and qualifications. Traditional teaching methods appear to be preferred by long-tenured teachers, while teachers who are new to the system and have used ICT to study at university seem more comfortable and prefer using ICT to support learners. It was clear from the inteviews that Participant 2, who has less than 5 years in teaching and is a university graduate has more computer knowledge and is more positive towards ICT integration and interest to learn than Participant 1 with many years of teaching, who has no technical development in cell phone usage for teaching, prefers her traditional way of teaching and showed less interest to be trained in ICT integration.

Table 4.1 presents biographical information of the township primary teachers interviewed; they will be called the Township Teacher Participants (TTPs). The implications of this table for the study are that experience, academic training, internet connectivity, intended use of mobile phones and technical developments in mobile education all have an impact on one's field of thought. The data in Table 4.1 indicates that training in ICT integration programs such as Online Teaching and Learning of Primary School Teachers program (OTLPST), has more impact regardless of the years of experience a teacher has. TTP 2 and TTP 6 have the same number of years in teaching and have access to internet connectivity, but because TTP 6 has attended OTLPST; he is able to conduct online teaching, whilst TTP 2 cannot.

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Table 4.1: Summary of the results of the interviews with selected Township Teacher Participants (TTPs)

Township Teacher Participant (TTP)	Cell phone usage at school				
	Purpose of usage of cell phone	**Has internet connectivity**	**Technical or development in cell phone usage for teaching**	**Learning programme**	**Years of teaching experience**
1	Own use, planning and admin	Yes	No	None	20
2	Own use, planning and admin	Yes	No	None	5
3	Own use, planning and admin	Yes	No	None	16
4	Own use	Yes	No	None	4
5	Own use and online teaching	Yes	Yes	OTLPST	8
6	Own use and online teaching	Yes	Yes	OTLPST	5
7	Own use and planning and admin	Yes	Yes	None	14
8	Own use and online teaching	Yes	No	OTLPST	3
9	Own use	Yes	No	None	6
10	Own use	Yes	No	None	32

*OTLPST stands for Online Teaching and Learning of Primary School Teachers

The participants' biographical data for the urban primary school teachers sampled for the interview are presented in Table 4.2 below; they will be called Urban Teacher Participants (UTPs). Again, the relevance of this table to the study is experience, academic curriculum, internet connectivity, intent to use cell phones and technical developments in teaching. Cell phones and laptops all affect a person's field of thought. Although there is internet, teachers at the township school use cell phones for administration, there is no technology support and no learning program, except for three teachers.

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Table 4.2: Summary of the results of the interviews conducted with selected Urban Teacher Participants (UTPs)

Urban Teacher Participant (UTP)	Cell phone usage at school				
	Purpose of usage of cell phone	**Has internet connectivity**	**Technical or development in cell phone usage for teaching**	**Learning programme ICT**	**Years of teaching experience**
1	Own use, planning and admin online teaching	Yes	Yes	OTLPST	20
2	Own use, planning and admin	Yes	Yes	OTLPST	5
3	Own use and online teaching	Yes	Yes	OTLPST	8
4	Own use and online teaching	Yes	Yes	OTLPST	5
5	Own use and online teaching	Yes	Yes	OTLPST	14

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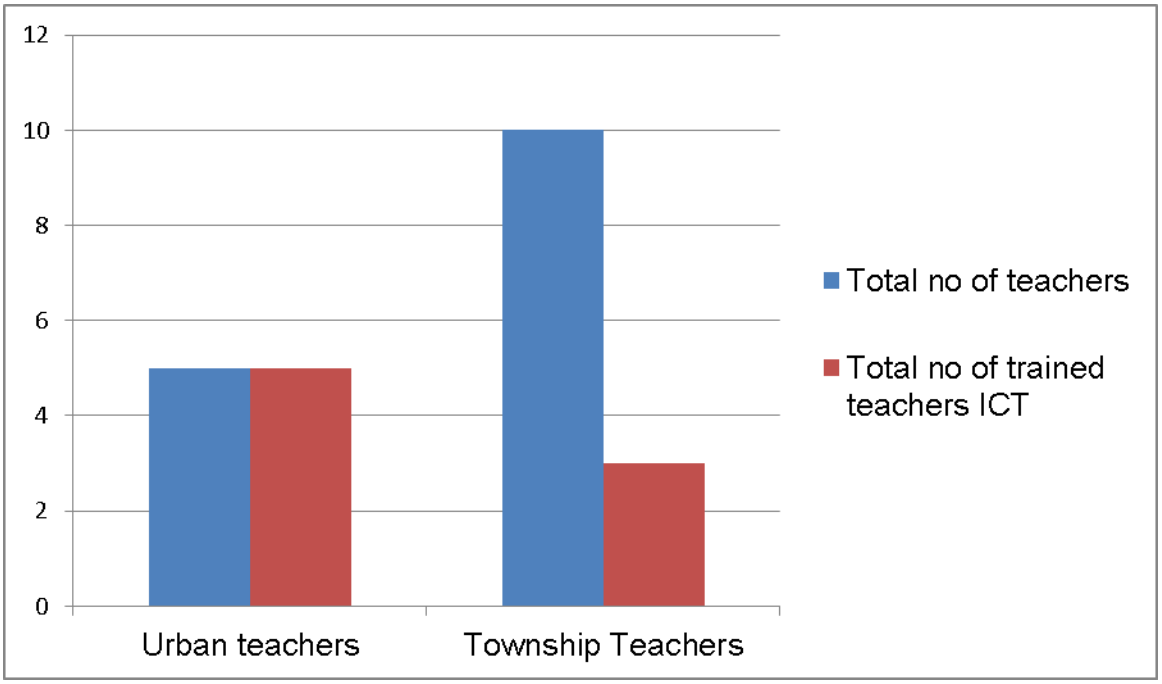
Figure 4.1 shows the distribution of both urban and township primary teachers who were part of the study. It seeks to illustrate the total number of teachers in relation to those trained in ICT integration in online teaching.

Figure 4.1: Presentation of participant teachers from urban and township settings



Teachers in urban schools receive more training in ICT integration than those in township schools. According to the study's findings, three out of ten township teacher participants received Online Teaching and Learning of Primary School Teachers (OTLPST), while all five urban participants received this training.

Urban schools provide teachers with more access to technology. The data also shows that teachers in urban and township schools used technology differently. While teachers in township schools only use technology for personal use and lesson planning, teachers in urban schools use it to streamline the curriculum, communicate with learners online, and improve learner motivation and class interaction. Integration of pedagogy, content and technology is crucial for teaching and learning.

4.2.1 ICT integration at school level

Teachers from both township and urban schools were asked to share their experiences with ICT integration using cell phones in online teaching of Grade 7 subjects.

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Technology has frequently been too expensive to be widely applicable, and it has been implemented without regard for local conditions. According to Scott et al. (2004), governments have increased their support for educational technology due to the increased use of cell phones and improved network coverage at a lower cost in these economically challenged communities. UTP 2 said: "*Technology, when implemented correctly, can result in greater learning results at a lesser cost than traditional techniques*". TTP 9 also shared similar sentiments by saying: "*Technology has the potential to lower the cost of education, offer higher-quality education to community schools".* Supporting teachers and democratising access to ICT education for all is very important (Payne & Curtis, 2006).

Teachers must first comprehend the TPACK framework in order to effectively incorporate technology into their classrooms. This framework, according to Baran et al. (2011), facilitate an analysis of the different types of skills teachers need when teaching using technology, as well as the different ways in which these sets of knowledge relate to each other.

a) Computer knowledge

It turns out that the government's hopes for its approach to e-education may have been communicated when people were asked about the ICT implementation forums they attended in schools. While others attended OLTPST in-service training seminars where they learned that ICT improves teaching and learning if used properly and effectively but has no intention of replacing them as teachers, some of the teachers who responded did not take part in any forums. All the teachers in the township schools stated that they would be prepared to use ICT integration with cell phones use if given the necessary training and resources.

However, there are differences between the two groups of teachers. Teachers with average or higher computer skills, interact with learners more than teachers with average or poor computer skills in terms of general technology integration. "*I exploit ICT integration in my teaching because it makes my life simpler and smarter*," explains UTP 1. TTP2 explains: "*I want to incorporate ICT in my teaching, but I don't. Maybe it's because I don't have the ability to use them. I simply use them to design my lessons."*

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Similarly, teachers' experiences with technology integration vary from site to site. The researcher found that teachers in urban schools felt more comfortable with the Internet, PowerPoint presentations and simplified teaching content. When assessed, teachers in township schools preferred to use technology in the classroom for PowerPoint presentations, animations and interactions. TTP 3 replied: *"Teaching the web using cell phones requires appropriate training or development, and therefore most teachers are cautious about using them without proper training."*

In addition, teachers indicated that they would like to acquire additional skills such as internet browsing and layout. Some teachers were confident in their use of ICT. UTP5 explains: "*I was self-taught because the internet allowed me to emerge as an autonomous, modern living person and overcome my fear of technology."*

Teachers have cell phones, however, they are often used for content studies instead of online teaching and learning.

b) Integration of technology in subject teaching in primary schools

Most primary school teachers in the township responded negatively when asked if they use technology to teach their subjects. They lack the necessary competencies, particularly in terms of carrying out on-line lessons with the use of a cell phone, whereas urban schoolteachers with above-average computer expertise, confirmed using technology in their subject teaching.

In keeping with the responses of participants, teachers accept as true that ICT allows them to communicate with others, along with learners and colleagues. "*I am getting to know plenty every day*," said player TTP4. "*I did not understand the way to use email before, but now I do,*" TTP10 stated. "*I also talk with a number of my learners through Twitter and WhatsApp, and we have a Facebook page, you may not believe it. Yes, it is extremely suitable as it goes past the notational time and allows learners to be supported beyond the teaching time,*" UTP4 stated, regarding the usage of online teaching with cell phones to cover the curriculum for Grade 7s.

Therefore, according to Ziphorah (2014), knowing and becoming more aware of the evolving, contractual relationship between the TPACK's three components of knowledge: technology, pedagogy and content are important. TTP 8 stated: "*I utilize*

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technology best when creating, planning learning activities for learners and studying, because I struggle with incorporating ICT in teaching even though I am familiar with the subject matter". "I am unable to incorporate technology into my lesson due to a lack of technical expertise", according to TTP10, a teacher with more than 30 years' experience.

To correctly combine technology into teaching and learning, teachers must first comprehend the TPACK framework, coupled with their computer knowledge. This framework, consistent with Baran et al. (2011), helps the examination of the numerous forms of capacities that teachers require while teaching with technology, as well as the various ways in which those bodies of information are linked to each other. The statistics revealed a huge disparity within the availability of technology in township and urban schools, including the number of interactive whiteboards, desktop computers in labs, pocketbook computers, notebook computer systems and tablet computers.

The general degree of high-tech integration amongst teachers varied throughout township and urban schools. Township teachers only established "understanding and alertness" of the method, while urban teachers demonstrated information and competence.

c) Teaching platforms

When asked to name the various online platforms used in teaching and learning, most participants could name all of them, but teachers in township schools could only name three. "*Possible, through WhatsApp, but have no idea on video, YouTube, Microsoft Teams, Zoom, and others*," TTP5 said. "*Using mobile phones can be better than other platforms because they are portable and everyone can afford to acquire them, especially in the community I teach*," UTP1 stated.

d) Challenges

All the township school participants agreed that they were in an economically disadvantaged community where most of the learners could only afford cell phones, and some could share their family gadgets to do online learning. Teachers in urban primary schools, such as UTP1, stated, "*We use cell phones because our communities can afford these gadgets*," whereas one township primary teacher, TTP6, stated, *"The majority of our learners do not have individual cell phones; those who do have them are shared by the entire family."*

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Participant TTP1 stated, "*Availability of cell phones for all learners, availability of data or internet coverage for them to access the numerous platforms to access learning."* They went on to emphasize the importance of using WhatsApp as a teaching tool. *"Yes, different teachers can use this platform to maintain consistency in their curriculum.*" Participants UTP4 and UTP9, who have a combined teaching experience of more than ten years in English Home language, isiZulu, Setswana and Social Sciences, expressed similar thoughts on the things needed to engage in online teaching, saying: "*Data provision and developmental training is needed to further empower us with more ICT skills in online teaching using cell phones.*" Most participants' responses emphasized similar issues, such as data.

All participants agreed that ICT integration training or development is essential in this regard. To effectively implement technology into education, teachers must first understand the TPACK framework. This framework, according to Baran et al. (2011), makes it simpler to examine the different types of abilities teachers require when teaching learners using technology, as well as the connections between these bodies of knowledge. TTP3, a teacher with more than 15 years' experience, responded, "*Yes, it is possible, because nearly all learners have cell phones, even if not all of them can afford data bundles for educational purposes".*

The results show that disadvantaged schools (township with predominately black pupils) still have trouble accessing and utilizing ICT for teaching and learning. Either their physical infrastructure, teachers' and learners' digital literacy, or both, is lacking. No matter whether a township school has a computer or not, if the teachers aren't using it, the computer won't be used. These interviews demonstrated that a significant problem with computer literacy for teachers exists in almost all township schools. Clearly, township schools lack the ICT resources that are available to urban schools.

4.3 Presentation of the analysis of the field notes

Descriptive information, according to Schwandt (2014), is your "effort to accurately document facts [e.g., date and time] as well as the locations, activities, behaviours, and conversations that you observe." Opinions that proved analytically useful frequently surprised the researcher. The interviews were conducted during the participants' free time in a comfortable and calm environment. For example, the field notes contained numerous direct quotes and descriptions of casual meetings with

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participants that the researcher did not expect to be noteworthy but nonetheless recorded.

Several of these quotes ended up being included in the analysis. *"We don't use cell phones for teaching at this school because we don't know how,*" said TTP1, a Mathematics teacher. “It's always better for me to use it for myself." I had no idea that this was just one of several issues that TTP1 and other teachers were dealing with at the time. TTP1 spends a significant amount of time each day learning how to use a cell phone to integrate ICT into teaching. If the researcher had not spent time interacting with TTP1, he could have missed an important analytical point about the visibility of some teachers' attempts to comprehend ICT integration in education. This finding in the present study has shown that self-exploration leads to oneself understanding their shortfalls on a certain skill and working on self-development.

Teachers' expressions indicated that there are some barriers to integrating ICT in township schools, whereas it was positive in urban schools. Teachers in township schools were less optimistic about parental support for ICT resources, indicating that they are aware of the financial constraints that their students' parents face. Urban teachers were impressed with the support they received from the parents of their learners when incorporating ICT into their classrooms. Both groups of teachers stated that their school administration strongly supported them. However, in township schools, they stated that their administration does not have the resources to support them, despite their support for their views. Teachers in urban schools expressed gratitude to their school administration for providing them with ICT resources.

This process taught the researcher a lot. Teachers may appear uninterested at times, but they are motivated to assist their learners in growing. According to the study, township schoolteachers, like the researcher, aspire to provide the same level of education to their learners as urban schoolteachers, which is positive.

4.4 Presentation of the analysis of documents

According to the study, while cell phone use in class was not very common in township schools, it was relatively common in urban schools. The study's findings on teachers' use of technology integration are quite interesting. Each discovery clarified the research problems for the project. The importance of each of the documents was highlighted because they gave clear instructions on what is expected and what is

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actually done in both schools. In contrast to township school lesson plans, which only used computers to type their lesson plans and the information the learners would research, urban school lesson plans clearly implemented ICT integration as it is used in teaching and learning. Both have similar ICT policies and make an effort to integrate ICT into teaching in both urban and township schools.

4.4.1 The GDE Ten Pillar Strategic Drivers' education programme

The GDE ten Pillar Strategic Drivers' education programme, as provided in 2014 through the GDE MEC of education.

This entire ten-year strategic driver's goal is to enhance schooling in the Gauteng Province. They work to ensure that effective teaching and learning takes place within the classroom on a daily basis, and the pillars are as follows:

1. Curriculum and assessment development

2. Support and provision for teachers

3. Management and leadership pillars

4. Infrastructure development and maintenance

5. Planning, financing and useful resource allocation

6. ICT in education

7. Social cohesion

8. School functioning, including community participation

9. Skill improvement

10. Access to early childhood improvement (ECD).

Designing the classroom of the future is a main objective of pillar 6, which deals with integrating ICT into teaching and learning. By providing schools with ICT infrastructure, resources and assistance, it hopes to establish an information hub, improve or establish connectivity in every classroom, and more (De Clercq & Shalem, 2014). This study is pertinent to ICT Pillar 6 because it relates to the incorporation of ICT in teaching and learning. The study looks at how cell phones are

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used in online classes for learners in Grade 7 to integrate ICT into teaching and learning. Thus, the incorporation of ICT into cell phone-based teaching strategies enhances learners' ICT proficiency. Without the aforementioned infrastructure, using ICT in teaching and learning may be very challenging.

4.4.2 Draft White Paper on e-Education

Mooketsi and Chigona (2014) highlight that the White paper on e-education highlights that all South African teachers and learners, irrespective of race, should be capable to:

- Use information and communication technology to get right of entry to, analyse, compare, combine, present and communicate information.
- Increase information and facts through adapting, making use of, and designing information.
- Feature in an understanding society through using appropriate technology and developing communication and cooperation competencies using or excluding the usage of ICTs.
- Use ICT to enhance teaching and learning.
- Plan, manage and carry out administrative tasks using ICT.
- Look for and use ICT resources to support in the delivery of curriculum.

According to Mooketsi and Chigona (2014), provincial administrations in South Africa were in charge of enforcing the e-White paper. The Western Cape Department of Education launched the Khanya program. The initiative, which was launched in 2001, aims to equip all the province's public schools with ICTs. The Khanya project's main goal was to help schools, especially those with low incomes, acquire ICT resources for curriculum delivery. It will try its best to provide ICT resources to all teachers, but due to limited ICT resources, including computers and laptops, as well as technical support, the objective ran into some issues that made it difficult to integrate ICT into teaching and learning (Mooketsi and Chigona 2014).

Scrimshaw (2004) asserts that ICT is applicable in education as a means of facilitating learning improvement, and its high-quality used to facilitate the process of value advent in teaching and learning. Random access to ICTs inside the classroom

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will not assist, and the purpose of ICT in support of teaching and learning needs to be applied genuinely. Giving learners digital access to getting to know materials (through tablets which can get entry to facts from a local server, for instance) is equal to giving them a textbook (Scrimshaw, 2004).

However, without a teacher to assist learners through the process of transitioning from remembering information to making use of information to construct new knowledge, this type of technological intervention could produce mainly restricted outcomes. When a school has (TPD), ICT competency, developmental educational ideals and an ICT vision and policy, ICT integration is successful; when these traits are lacking, ICT integration is unsuccessful. In terms of the two schools analysed, the urban schools are properly resourced, and the teachers are accurately skilled to integrate ICT into their classroom teaching. Township schools are under resourced, and teachers lack the important ICT competencies to integrate ICT into their classroom teaching.

All South African schools are predicted to enforce the government's e-training policy. However, the truth is that this implementation is taking place in a post-democratic society with unequal resources. Laptop technology is only occasionally used because of the low learner-to-computer access ratio. As a result, neither teachers nor learners receive adequate exposure to ICT literacy or ICT integration into teaching and learning (Mooketsi & Chigona, 2014).

Technology integration in the classroom requires pre-service and in-service teachers to develop certain attitudes, abilities and knowledge (each technical and pedagogical). Each technological skill should be developed, as well as using technology in the classroom, in the proper technology integration framework.

4.4.3 ICT Integration policy in teaching and learning

In both schools, these GDE Policy on 10 pillars of Strategic drivers in education and e-Education White Paper Draft policies explain the school's goals, values and strategies for delivering ICT and online teaching and learning. It lays the groundwork for the expansion of ICT in the school.

a) The schools' aims for ICT

Both schools have the same ICT policies because they are based on GDE provincial policy. ICT's main objective is to enhance teaching and learning, while also ensuring that teachers gain the confidence and expertise they need to successfully use ICT to

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teach their subjects (Donnelly, et al. 2011). Learners should search for, explore, analyse, exchange and display information using ICT tools like cell phones in a responsible, creative and discerning manner. They learn how to access ideas and experiences from a variety of people, communities and cultures quickly using information and communication technology (ICT). Increased ICT proficiency encourages initiative, inventiveness and independent learning, because learners can decide when and where to use ICT most effectively and weigh its implications for both home and school.

Donnelly et al. (2011) argue that ICT enables teachers to:

- Teach online using a cell phone, beginning with senior phase learners.
- Improve their ICT skills and understanding of the importance of information, as well as how to select and prepare it.
- Become more adept at manipulating information by becoming familiar with both software and hardware.
- Enhance their ICT capability and use of ICT to support their language and communication use.
- Investigate their attitudes towards ICT, its importance to them, others, and society, as well as their understanding of its benefits and limitations.

This plan incorporates subject-related ICT delivery and meets the statutory requirements of other national curriculum subjects. Teachers should encourage research and give learners opportunities to use ICT creatively in their classes.

b) Access to ICT

All learners, regardless of race or gender, have the opportunity to enhance their ICT skills through online and cell phone teaching and learning. Schools promote equal access to computers, online learning and equitable distribution of available ICT resources. Learners with home computer systems or cell phones are encouraged to use them for learning purposes, and parents are instructed in their appropriate use. Because there aren't many computers around, WhatsApp and SMS messages are sent and received using cell phones.

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The use of ICT in the classroom is significantly influenced by policies governing ICT planning, ICT support and school-level ICT education. The most crucial factor influencing how successfully ICT integration works in schools is school management (Salla, 2015). However, the characteristics affecting the effectiveness of ICT integration in the township school for which the study was conducted, are the lack of ICT resources as well as technological devices and community access, in addition to the improvement of teachers.

4.4.4 Sample of a lesson plan integrating ICT

Some teachers' lesson plans included only the use of computers for content research, whereas others included additional follow-ups via cell phones but only for homework assistance. As a result, the evaluated materials supplemented the interviews and observational data, and played an important role in this study.

Subject: Mathematics

Grade 7A in a Township School

Topic: Data handling

Duration 2 days

Lesson content: Tables and graphs, analysis of graphs

Scenario: The learners are to acquire information about the modes of transportation used by Grade 7a to get to school. The tasks in the working plan are to develop and present a questionnaire to learners and to create a table built from the findings. The information must be displayed using graphs and statistical forms.

Outcomes

1. Observe and interpret the data in appropriate statistical forms.
2. Calculate and interpret the most and least methods of transport used.
3. Explain the reason for the method of transport used by most learners.

ICT resources

1. Word processing programs to prepare lists
2. Communication using WhatsApp to discuss findings amongst themselves.

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Summary

The other four lesson plans from the township schools did not include ICT integration. However, the three lesson plans from the urban schools did, through engagement with learners after school online by cell phone. To confirm the effects of ICT integration in teaching and learning, the researcher looked at the lesson plans created by the teachers in both schools.

4.5 Conclusion

The researcher was able to identify four key factors from the data that are both limiting and enabling the use of Information and communication technology for both learning and teaching. Those components appear to concentrate on the following major issues:

- Sensible factors that seem to cover the tangible problems which are taken into consideration essential to teacher take-up and use of ICT
- Coverage-related factors that include authorities and individual school policy.
- Pedagogy-associated elements that consist of ongoing teacher education and teachers' willingness to evolve and change, considering the challenges that ICTs present.

Hardware, software programmes, connectivity, technical assistance and schooling are all realistic issues. The most commonly stated hardware constraint was a lack of computers in the classrooms, which totally agrees with prior studies according to Akinsola et al. (2005).

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Chapter 5: Findings

5.1 Introduction

The purpose of this study is to better understand how teachers in urban and suburban schools use their mobile devices to deliver online lessons for students in Grade 7. With the introduction of ICT elements into schools as a result of ICT policy, teachers began using technology for their own purposes that weren't always in line with the government's online education policy. They also developed their own symbolic meaning for these ICT elements. Therefore, in order to interact with technology, people must first understand it. As a result, they created their own set of presumptions, expectations and understanding of the technology.

Research delves into emerging topics, such as the need for online training with cell phones, the provision of resources such as data and utilities, and more help from the Department. The ability to use cell phones for online teaching is essential to accessing curricula during lockdowns, especially during pandemics like Covid-19. The teachers said in the semi-structured interview that much of the curriculum would be applied to their township school like the urban schoolteachers who could use it. Teaching learners will be successful if they are thoroughly trained and backed with data.

Therefore, it is essential to understand how to apply a particular technology to a particular type of content, also known as technological content understanding (Mishra & Koehler, 2006).

"*When teaching about earthquakes, learners can see images in many forms that we didn't even know about, we didn't even see in our time*," says UTP4. However, learners today are aware of what they are doing. Technology facilitates learning and teaching, and even learners who struggle in class can see the content, according to TTP.

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5.2 Computer knowledge

Because most teachers have a basic understanding of computers, they should be trained in ICT integration in education so that they can assist Grade 7 learners even when they are in lockdown. "*I have minimal computer experience, but I am eager to expand my ICT knowledge*," TTP 6 stated. Teachers and learners can learn how to operate in the information age by incorporating ICTs into their teaching and learning. It assists teachers in selecting the best tool for their subjects based on its applicability (Mishra & Koehler, 2006). Those with limited computer skills and knowledge rely entirely on technology to schedule classes and conduct research. In practice, teachers discovered meaningful ways to interact with ICT devices.

5.3 Incorporation of technology in subject teaching

When asked if they use technology in subject teaching, the participants in the township school said no, citing a lack of competence, particularly in conducting online classes using a cell phone. Technology is only used to schedule classes and conduct research. "*I have basic computer knowledge, but I am more than willing to increase my ICT knowledge in order to integrate ICT in my teaching*," stated TTP 6, whereas UTP 5 stated, *"I am able to integrate ICT in my teaching because I was trained, and I am confident in using a cell phone, for example, to teach online."* This suggests that some participants lack the technical knowledge which is essential for using technology in the classroom (TCK). Understanding a specific technology in a specific type of content is known as technical content knowledge (Mishra & Koehler, 2006). Learning how to function in the current digital era can benefit both teachers and learners by incorporating ICT into teaching and learning. Using cell phone devices, it allows teachers to choose the best tool for their topics based on its applicability.

Educational outcomes can improve with teachers' participation, leading to greater universal attainment of education in schools. Department officials, on the other hand, must exercise extreme caution regarding the application and use of technology in the classroom. Technology is not a wand that can magically improve learners' academic performance. It should only be used with caution and in the appropriate context. The extent to which teachers integrate technology has been shown to have a significant influence on learners' perceptions of computer importance (Christensen, 2002). It is critical to enhance teachers' real use of these tools in order to raise township

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learners' choices and expectations of cell phone technology integration, particularly in township schools with limited technological resources and expertise.

In information and communication technology studies, the importance of support for learning new technologies cannot be overstated. General software overviews and a discussion of how to use WhatsApp for teaching were among the requests for assistance. The findings indicate that township primary schools have few or no resources, or that they are underutilized due to skill deficiencies. In contrast, many urban primary schools have computers, internet access and technical assistance in terms of both resources and training (Ngcobo & Tikly, 2010).

5.4 Platforms used for teaching

When asked about the various online platforms used in teaching and learning, eight township school participants could name a few but had no idea how to use them. *"I'm familiar with Facebook and Zoom, but I prefer WhatsApp because most of my learners use it and it's very convenient,"* UTP 3 explained. *"I know Teams and Zoom, but I'll recommend WhatsApp because my learners can afford it and data charges are low,*" TTP 5 said. They chose WhatsApp as the most cost-effective option for their community.

The researcher discovered that teachers were eager not only to use WhatsApp to educate and learn, but also to share what they had learnt with colleagues who did not teach Grade 7s. It is critical to select WhatsApp to use because it must correspond to the community to which they belong (Stone & Logan, 2018). In the classroom, WhatsApp is being used as a reading and communication tool (Annamalai, 2019). Learners who use WhatsApp regularly participate in the WhatsApp chat group, informing group members about important events related to their assignments and exams. WhatsApp is the best platform for online teaching because it is less expensive and more widely used (Annamalai, 2019).

5.5 Viability of teaching using cell phones

Some participants acknowledged that they were in an economically disadvantaged environment where most learners could only afford cell phones and others had to share family cell phones to complete online learning. "*The issue we have with our learners is that they don't own these cell phones, but they belong to the entire family, the cell phones which are readily available are not smartphones*," TTP 9 explained.

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5.6 Resources needed to conduct online teaching using cell phones

All learners should have access to cell phones as well as data or internet service in order to use the various learning platforms. According to the analysis of their responses, some of the participants' comments pointed to the same issues, such as data provision, cell phones, and guidance in the use of cell phones for teaching Grade 7s various subjects online. According to research, disadvantaged South African township schools lack computer hardware and software (Bukaliya & Mubika, 2011).

To illustrate, a few participants highlighted that utilizing the technology could offer the ability to connect various types of information and create networks that show relationships. Most teachers, despite their reservations, think it is important to start training teachers and provide technology equipment, particularly in township schools. TTP 3 said, *"I can't even begin to imagine what it would have been like if we had been using cell phones to teach all Grade 7 learners online during the lockdown."* However, this research did not go so far as to monitor how applications were used outside of the classroom. It was inspiring to see that several teachers were interested in doing so.

ICTs can be incorporated into teaching and learning with the right training and support for online teaching. To make this a success, the researcher stresses the necessity of having excellent training and support. This is especially noticeable in township primary schools. One of the ten pillars of South Africa's ICT integration policy is adequate teacher support, which shows a dedication to the importance of high-quality education. When planning successful teacher training for online learning and teaching, it is critical to consider the physical and environmental context of teachers and learners, like load shedding and network connectivity issues.

5.7 The obstacles that teachers face when transitioning to online education

All participants agreed that ICT integration in education, training or development is necessary; it is also extremely relevant as it will allow them to support the learners after the teaching session. This study shows a lack of resources and teacher training in township primary schools to teach Grade 7 subjects online, using cell phones. The sustainability of e-learning in South Africa is being hampered by the widening gap

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between those who have access to computers and the internet and those who do not. (Van Deursen & Van Dijk, 2019). An important finding to emerge in this study is that there is a challenge between the haves and the have-nots, because the have-nots are disadvantaged in terms of ICT integration and it was evident to a larger scale during the Covid-19 global pandemic in the country. The economical disadvantaged township school learners stopped learning during the national lockdown whilst the urban school learners continued with their learning. The township schools did not cover the curriculum adequately, although they were expected to write the same common tests as urban school learners who had adequately learnt during the lockdown. This posed a great challenge.

However, this study found that these programs have not been as successful as anticipated. School programs that increase teachers' use of ICT and making sure they integrate ICT methodically is also essential for success. Managers have a huge impact on how employees develop.

5.8 Findings associated with field notes

Teachers in urban and township schools want to incorporate ICT into their lessons, but they must also develop their skills and ICT resources. According to Molise and Dube, COVID-19 has presented most learners in towns and rural areas with unprecedented challenges (in 2020). Molise and Dube (2020) conducted research on the development of online education during COVID-19 and found that many rural learners were excluded from school and had limited access to online resources due to lack of physical infrastructure, electricity, electronics and most importantly, qualified teachers who could support online learning and teaching.

The study has shown that teachers have great interest in computer training in ICT integration and were willing to use their cell phones if the school cannot afford to procure some smartphones. They further indicated that they may make better use of their cell phones to improve teaching and learning rather than what they were using their phones for. Their body language showed positive energy as they thought it will assist them in using the traditional method less by sending the learners work rather that rewriting every time on the board.

Therefore, e-learning and teacher development are more important than ever, and the plan must include all stakeholders and be context-specific. Teachers from both schools

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appreciated the administration support they were offered. Teachers at township primary schools only reported receiving emotional support because their schools lacked sufficient ICT resources, whereas teachers at urban primary schools reported receiving support with ICT resources as well. Teachers in both township and urban schools were observed having a positive attitude, as their body language revealed a growing interest in incorporating ICT into their teaching, even when resources were scarce or non-existent.

5.9 Findings associated with document analysis

A clear picture of what both schools intend to do regarding the use of ICT in teaching was provided by document analysis, which included the GDE policy on the ten Pillars of Strategic Drivers in Training, the E-education White Paper Draft, the coverage on the teachers' lesson plans and the use of ICT in the classroom. They are all relevant to this study, which looked at online teaching with cell phones to Grade 7 learners, therefore, the researcher examined these specific documents. Shields (2011) claims that technology has essentially become another "compass factor in education, through which people (whether or not they are learners, teachers, policymakers or businesses) create modern and innovative identities".

The researcher discovered from the analysis of the aforementioned documents that at both schools' the primary focus of the documents is the incorporation of ICT in the classroom.

5.10 Reflections on the theoretical framework

The investigation's conceptual model is the TPACK model (Technological Pedagogical Content Material Knowledge). According to Baran et al. (2011), TPACK is a crucial structure for comprehending the various types of knowledge that teachers require when teaching with technology, as well as the various ways in which these bodies of knowledge interact. This is crucial because it enables teachers to use methods that help learners fully understand the subject. Content, pedagogy and technology, as well as their connection, are three essential components of successful technology-based teaching (Mishra & Koehler, 2006).

TPACK theory attempts to describe how course content, course delivery methods and technology all match each learner's content acquisition potential. According to the findings, teachers in township schools have subject and pedagogical knowledge, but

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lack technology skills, making online learning inaccessible. However, because teachers in urban schools have access to technology-integrated education, they can incorporate ICT into teaching and learning. According to Mishra and Koehler (2006), TPACK is essential for incorporating ICT in the classroom.

Accessibility to hardware, software, the internet and technical support for educators is the first and most important component of the digital divide. In keeping with the findings, facility access remains a vital issue, which may additionally lead to various degrees of technology integration between township and urban schools. The findings assist the hypothesis that should the lack of excessive-tech devices, including tablets and computers, turn out to be greater extensively, the digital divide will widen (Shin et al., 2021). The adoption of technology has not been consistent throughout South Africa, and many township primary schools are at a disadvantage in terms of accessibility and the value of additional devices. In South Africa, the difference in computer access between those who have it and those who don't have internet has grown to be a significant issue, which limits the viability of e-learning (Scheerder et al., 2019).

5.11 Reflections on the research design and methods

The researcher determined that the exploratory case study approach was the best approach for this study, because it allowed him to meet the participants where they worked and where they were teaching, and because the impact of online education for Grade 7 learners using a variety of materials with cell phones was clear. Semi-structured interviews used to gather data were able to show that many participants did not use the cell phone or internet (Ajagbe et al., 2015). The findings add to our understanding that teachers do have cell phones with capacity to conduct online teaching but lack training which has led to low confidence levels and interest.

Purposeful sampling was especially beneficial because it enabled the researcher to select participants based on their grade teaching level, which is Grade 7. It is also beneficial because it allowed the researcher to identify teachers who can provide needed information in both urban and township schools. The researcher recorded and analysed the data using the Atlas.ti software. This program, according to Paulus & Bennett (2017), allows users to collect all the information needed to organize their research and provides tools for statistical analysis. It allowed the researcher to systematically organise and analyse data from 15 participants.

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5.12 Conclusion

Teachers at the township primary school face several demanding situations, along with using cell phones to assist them in on-line teaching to Grade 7 learners, while teachers at the urban school face fewer barriers in enforcing ICT integration. This research confirms previous findings from other researchers and contributes to our understanding that township teachers are very much interested to integrate teaching even to lower grades using their cell phones if they can be provided with data and training in ICT integration in teaching. They have the same focus in learners teaching as urban teachers have. Earlier studies found that learners in urban schools had more exposure, experience and a greater high-quality mind-set closer to computer use than learners in traditionally disadvantaged establishments. According to the study's findings, teachers in previously underprivileged schools are shifting their attitudes. Teachers stated that they encouraged learners to interact with ICT, which paid off due to the fact that learners have been using it.

Three points had been made within the conclusions: 1) Both urban and township teachers consider that generation is an essential component of their classroom. 2) Urban teachers want extra software and devices in their classrooms. 3) Township teachers need software and devices in their classrooms. According to research, township schools lack teachers with equal qualifications and levels of confidence in technology integration, compared to urban schools. The divide in access to the internet between those with access to computers and those without it persists (Van Deursen & Van Dijk, 2019). That is also obvious in urban and township schools. Township schools have struggled with a lack of qualified teachers, in addition to technical schooling (Akinsola et al., 2005).

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Chapter 6: Conclusions and recommendations

6.1 Introduction

The investigation's topic was: "Teachers' use of cell phones in online teaching of Grade 7 subjects." This chapter summarises the research and details the research project's limitations, contribution and recommendations.

6.2 Summary of the research

According to the Department of Education's White Paper Draft on e-Education (2015), it will support national initiatives to increase access, improve management, boost teacher and learner capabilities and offer top-notch technical equipment. The Covid-19 pandemic made the year 2020 one of the most devastating ever for South Africa. Based on the literature, this research investigation was guided by the TPACK theoretical framework.

The study's exploratory multiple case study design was chosen because it was thought to be appropriate given the objective of better understanding the phenomenon being studied. The objective of the study was to determine whether Grade 7 learners at two primary schools in Gauteng West could be taught online using cell phones.

The following sub-questions were developed to ensure the study's direction:

1. What is the extent and amount of technology knowledge of Grade 7 teachers in terms of using cell phones in online teaching of Grade 7 students in various subjects?

According to the study's findings, both township and urban instructors are aware of some technology devices and apps. Nevertheless, township teachers lack adequate technology expertise to teach online using cell phones to Grade 7 learners in various subjects, but urban teachers do. They did, however, express enthusiasm and a good attitude towards ICT integration through the use of cell phones.

2. How can public primary school Grade 7 teachers integrate cell phones in their pedagogy and subject content?

Grade 7 teachers in public township schools require training and resources in order to incorporate cell phones into their pedagogy and subject matter for ICT integration in teaching and learning. Enhance PLCs (Professional Learning Communities) in

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schools with, and without adequate funding, so that the practical application of ICT integration in teaching and learning can be applied.

3. What are the challenges preventing Grade 7 teachers from integrating cell phones in their pedagogy and subject content?

The main barrier to effective ICT integration application in using cell phones in online education to Grade 7s, according to the research findings, are a lack of resource provision, technical assistance and training. The study has shown that many teachers poses adequate content knowledge of their subjects but urban school teachers have more confidence in ICT integration whilst township school teachers have less confidence although are more positive to training programs to be equal to their counterparts in urban schools. Teachers have subject knowledge but lack the potential to use technology in the classroom. Many township schools remain at a disadvantage in terms of access to and cost of supplementary technologies. The data from the interviews show that there is less peer support among teachers in township schools, which results in a lower level of technology integration.

To answer the research questions, teachers for this study were carefully selected based on their geographic location and proximity to the researcher. In order to obtain first-hand information from those directly involved in the daily teaching of Grade 7 learners across a variety of subjects, individual teacher interviews were conducted at two schools.

6.3 Limitations of the study

Only two schools in the Gauteng West district were included in the study. This makes it difficult for the researcher to establish the use of cell phone online instruction in other schools in the same cluster for Grade 7 learners studying a variety of subjects. No directors or SGBs were interviewed. This can lead to discrepancies between what the teachers have said.

Research is limited because other teachers at different levels in the same school were not allowed to participate. This result is not likely to apply to all Grade 7 teachers. The teachers were chosen because they teach a wide range of Grade 7 subjects.

6.4 Contribution of the study

As was mentioned in Chapter 1, there hasn't been much research on teachers using

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cell phones for online teaching in primary schools with learners in Grade 7. This study aimed to close the knowledge gap by examining the issue as well as how Grade 7 learners' online learning in several subjects using cell phones could help to reduce curriculum loss, particularly during devastating pandemics like the Covid-19 pandemic.

6.5 Recommendations

Teachers in township schools need appropriate training in ICT integration to use ICT devices such as cell phones in online teaching of Grade 7s in a variety of subjects. Directors, SGBs and DBEs should support them where resources such as cell phones and data are scarce.

Regarding the integration of ICT in education, teachers should strive to use technology in their teaching, innovate and seek knowledge rather than wait to be provided with knowledge. Schools should strive to implement departmental ICT policies and education. Further research should be done to investgate the teachers' use of cell phone online teaching of Grade 7s learners, in both township and urban schools.

The Department of Education should invest in national initiatives to increase access, improve the capacity of administrators, teachers and learners and provide high- quality technology equipment (Meyer & Gent, 2016).

6.6 Conclusions

According to numerous comments from teachers in both township and urban schools, most respondents in both township and urban schools firmly believed that ICT deployment in their community could improve and elevate the quality of their lives. Many literature reviews from various authors support these conclusions. D'Orville (2007) believes in his literature review that ICT can be used to drive economic growth and human development, but for this to be true, ICT must be viewed with fresh eyes and in novel ways. To address this issue, the ICT diffusion process must be tailored to the needs of the township context. According to Shield (2011), technology has effectively become another compass point in education.

These are the conclusions reached as a result of the research findings:

- Primary school teachers should be trained in ICT integration so that they can offer online classes for Grade 7 learners in a variety of subjects using cell phones.

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- Teachers are knowledgeable about their subject material and pedagogy, but they lack the technology skills necessary to successfully integrate ICT into their teaching.

- Teachers use ICTs to support learning and teaching, proving that implementation wasn't a complete failure. Teachers also contend that ICT has improved their social standing and personal lives by enabling them to keep up with global technological advancements. Despite the limitations imposed by their environment, teachers appear to be doing a good job, despite issues like insufficient training on how to use ICT for teaching.

- It is also crucial to promote awareness about the value of using ICTs in schools, as well as their function in empowering learners and harvesting important ICT skills in preparation for the job market and possible entrepreneurial groups that can emerge within the community. This is to argue that the community should not see the gadgets carried by learners as lavish instruments that may provoke a criminal element among community members, but rather as an important and required part of vital and necessary learning resources.

- Developmental information and communication technology should recognize and support the unfulfilled right to information. To address these issues, the study suggests three approaches: technological, institutional and policy- based. This study is thought to be beneficial, especially for impoverished township schools.

- Additionally, putting ICT resources (infrastructure, skills, and technical support) in place would be more beneficial if solutions to teacher skill limits were offered. If the aforementioned schools' aims are to be realised, solutions should include computer skills for teachers, technological assistance and infrastructure protection measures.

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Appendices

Appendix A: Research Approval letter

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	06 July 2021
Validity of Research Approval:	08 February 2021– 30 September 2021 2021/169
Name of Researcher:	Moyo K
Address of Researcher:	34 Sunningdale 3, Olienhout Street
	Birchleigh, Kempton Park
Telephone Number:	0615449424
Email address:	khumbumoyo@gmail.com
Research Topic:	Teachers' use of cell phones in online teaching of grade 7 subjects at a township school.
Type of qualification	MEd degree CIE
Number and type of schools:	1 Primary School
District/s/HO	Gauteng West

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

06/07/2021

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1. *Letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

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2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. ***Because of COVID 19 pandemic researchers can ONLY collect data online, telephonically or may make arrangements for Zoom with the school Principal. Requests for such arrangements should be submitted to the GDE Education Research and Knowledge Management directorate. The approval letter will then indicate the type of arrangements that have been made with the school.***
4. ***The Researchers are advised to make arrangements with the schools via Fax, email or telephonically with the Principal.***
5. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
6. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
7. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
8. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
9. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
10. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
11. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
12. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
13. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*

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14. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
15. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
16. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Mr Gumani Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: 06/07/2021

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Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355-0488
Email: Faith.Tshabalala@gauteng.gov.za

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Appendix B: Consent letter to the principal

Dear Madam,

REQUEST FOR YOUR SCHOOL'S TEACHERS TO PARTICIPATE IN AN INTERVIEW FOR A RESEARCH PROJECT:

Title: Teachers' use of cell phones in online teaching of Grade 7 subjects

My name is Khumbulani Moyo and I am currently enrolled for a Master's degree at the University of Pretoria under the supervision of Dr. Maryke Mihai. The title of my approved research study is: *"Teachers' use of cell phones in online teaching of Grade 7 subjects."*

The aim of the study is to investigate the challenges encountered in online teaching with cell phones by teachers of various Grade 7 subjects in a public primary school in a township. The data collection for this study will require semi-structured interviews with teachers on how they use cell phones in online teaching to the Grade 7 learners in various subjects. The interview with each teacher will take approximately 45 minutes outside of dedicated teaching time. I have included here for your information a schedule of interview questions. I hereby request your permission to allow grade 7 teachers at your school to participate in the interview.

All participation is voluntary. No harm or injury will come to the teachers during the interview. Please note that the decision for teachers to participate is completely voluntary and this will not affect their livelihood. None of the results obtained during the interview will be used for assessment purposes. The teachers may request to leave the interview at any time without any explanation or consequences.

As part of the data collection I will be using an audio recorder to capture the interviews for research purposes. The purpose of the audio recorder is to capture and transcribe the data accurately. All information obtained during the research study will be treated confidentially. My supervisor and I will have access to the data. The names of teachers, principal or school will not be mentioned during any phase of the study. Furthermore, pseudonyms will be used to avoid identification of the teacher and school.

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At the end of the study, I will provide the school with a copy of the study containing both the findings of the study and recommendations. In addition, I would like to request your permission to use all data, confidentially and anonymously, for further research purposes, as the data sets will become intellectual property of the University of Pretoria. Further research may include secondary data analysis and use of the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

All the information obtained during the research study will be treated confidentially, with not even the University of Pretoria or the Department of Education having access to the raw data obtained from the interviews. At no time will either you as an individual or your school be mentioned by name or indeed be allowed to be identified by any manner or means whatsoever in the study.

Thanking you in anticipation.

Mr. K. Moyo

Student Researcher

University of Pretoria

khumbumoyo@gmail.com

0615449424

Dr. M. Mihai

Supervisor

University of Pretoria

maryke.mihai@up.ac.za

082 430 2928

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LETTER of CONSENT

SCHOOL PARTICAPATION

VOLUNTARY PARTICIPATION IN THE RESEARCH PROJECT ENTITLED

Teachers' use of cell phones in online teaching of Grade 7 subjects

I, _____(Full name) the principal of

_____

Please tick the appropriate block

Give consent ☐

Do not give consent ☐

to allow my school to participate in the above-mentioned study introduced and explained to me by Mr. Khumbulani Moyo, currently a student enrolled for a Master's degree at the University of Pretoria.

I further declare that I understand, as explained to me by the researcher, the aim, scope, and purpose of collecting information proposed by the researcher, as well as how the researcher will attempt to ensure the confidentiality and integrity of the information he collects.

_____ _____

Full name Signature

_____

Date School stamp

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Appendix C: Consent letter to teacher participants

Sir/Madam,

REQUEST TO PARTICIPATE IN AN INTERVIEW IN A RESEARCH PROJECT:

Title: Teachers' use of cell phones in online teaching of Grade 7 subjects

My name is Khumbulani Moyo and I am currently enrolled for a Master's degree at the University of Pretoria under the supervision of Dr. Maryke Mihai. The title of my approved research study is: *"Teachers' use of cell phones in online teaching of Grade 7 subjects."*

The aim of the study is to investigate the challenges encountered in online teaching with cell phones by teachers of various Grade 7 subjects in a public primary school in a township. The data collection for this study will require semi-structured interviews with teachers on how they use cell phones in online teaching to the grade 7 learners in various subjects. The interview with you will take approximately 45 minutes outside of dedicated teaching time. I have included here for your information a schedule of interview questions. I hereby request your permission to participate in the interview.

All participation is voluntary. No harm or injury will come to you during the interview. Please note that the decision for you to participate is completely voluntary and this will not affect your livelihood. None of the results obtained during the interview will be used for assessment purposes. You may request to leave the interview at any time without any explanation or consequences.

As part of the data collection I will be using an audio recorder to capture the interviews for research purposes. The purpose of the audio recorder is to capture and transcribe the data accurately. All information obtained during the research study will be treated confidentially. My supervisor and I will have access to the data. The names of teachers, the principal or school will not be mentioned during any phase of the study. Furthermore, pseudonyms will be used to avoid identification of the teachers and school.

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At the end of the study, I will provide the school with a copy of the study containing both the findings of the study and recommendations. In addition, I would like to request your permission to use all data, confidentially and anonymously, for further research purposes, as the data sets will become intellectual property of the University of Pretoria. Further research may include secondary data analysis and use of the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

All the information obtained during the research study will be treated confidentially, with not even the University of Pretoria or the Department of Education having access to the raw data obtained from the interviews. At no time will either you as an individual or the school be mentioned by name or be allowed to be identified by any manner or means whatsoever in the study.

Thanking you in anticipation.

Mr. K Moyo

Student Researcher

University of Pretoria

khumbumoyo@gmail.com

0615449424

Dr. M. Mihai

Supervisor

University of Pretoria

maryke.mihai@up.ac.za

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LETTER of CONSENT

INDIVIDUAL PARTICIPANT

VOLUNTARY PARTICIPATION IN THE RESEARCH PROJECT ENTITLED:

Teachers' use of cell phones in online teaching of Grade 7 subjects

I, _____(Full name)

Please tick the appropriate block

Give consent ☐

Do not give consent ☐

to participate as an individual in the above-mentioned study introduced and explained to me by Mr. Khumbulani Moyo, currently a student enrolled for a Master's degree at the University of Pretoria.

I further declare that I understand, as explained to me by the researcher, the aim, scope, and purpose of collecting information proposed by the researcher, as well as how the researcher will attempt to ensure the confidentiality and integrity of the information he collects.

_____ _____

Full name Signature

_____

Date

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Appendix D: Interview questions for the participants

1. What subjects do you teach?

2. How would you describe your technology knowledge?

3. Do you integrate technology in your subject teaching? If so, how? If not,

   Why not?

4. What is your understanding of online teaching?

5. How do you feel about online teaching?

6. What is your understanding of online teaching using cell phones?

7. What platforms do you think can be used for online teaching using cell phones?

8. Looking at this community where you are teaching, do you think using cell phones in online teaching of your grade 7 subjects will be viable? Please explain your answer?

9. If asked to conduct online teaching using cell phones, what will you need to implement online teaching in your subject and pedagogy?

10. What, in your view, have been the most challenging obstacles for teachers in making the transition to online education?

11. Are there any specific challenges concerned with online cell phone teaching? Describe.

12. Do you think using cell phones in online teaching of different grade 7 subjects at this school will assist in curriculum coverage to the grade 7s? Explain why or why not.

13. What, do you think, are the most important aspects for teachers to encourage online learning during school shutdown?

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Appendix E: Field note schedule

Context		
Activities		
Interaction		
Lesson delivery		

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Appendix F: Sample of Interview responses

Interview Questions:

Full names (s) P3

1. Maths 7,EMS,Maths 6,LS 4
2. Average. I only know basic computer skills.
3. Yes but to a limited extent because data is not provided by the school.
4. Teaching learners through a phone, computer etc.
5. Online teaching is the best way of teaching.
6. Using cell phones can be better than other resources because it is portable and everybody can manage to buy it.
7. WhatsApp, Zoom, Facebook.
8. Yes because most of my learners can afford to buy or use their parents' cell phones.
9. I will need a cell phone, data and training or development.
10. Data and proper training
11. Data provision, development training.
12. Yes because we can cover even the topics that we didn't teach in the class.
13. I will encourage them to buy data and respond when we send the activities.

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