IMPLEMENTATION OF BLENDED LEARNING IN SEKHUKHUNE DISTRICT SCHOOLS IN LIMPOPO PROVINCE, SOUTH AFRICA

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THESIS

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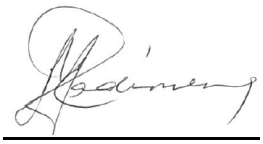
DECLARATION

I, Nkadimeng Mampuru Philemon declare the following with regard to the study titled: "**Implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa".**

The research reported in this thesis is my original work.

This thesis has not been submitted for any degree or examination at any university.

The thesis does not contain other persons' data, pictures, graphs, writings, or any other information, unless acknowledged and referenced.



Nkadimeng MP (Dr) Signature: Date: 09 May 2022

DEDICATION

Firstly, I give all praise to our Lord the Almighty who allowed me to bring all the strands together in this study. I dedicate this work to my late father, Nkadimeng Ngwananta James (Napo A Morwaswi) and my late mother, Nkadimeng Maletele Sephorah (Ngwatladi A Bauba). I also dedicate this study to my wife, Nkadimeng Kedibone Constance, who always stood by me as patient, supportive and encouraging until the completion of the study. This accomplishment is yours.

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LIST OF ABBREVIATIONS USED IN THE STUDY

ANC	African National Congress
AOs	Area Offices
BL	Blended Learning
CEM	Council of Education Ministers
CLT	Connected Learning Theory
CoLab	Colaboratory
CPD	Continuing Professional Development
CPTD	Continuing Professional Teacher Development
CT	Connectivism Theory
DBE	Department of Basic Education
DDP	District Development Plan
DHET	Department of Higher Education and Training
DTDCs	District Teacher Development Centres
EMGDs	Education, Management and Governance
EMIS	Education Management Information Systems
ETDP SETA	Education Training and Development Practices Sector Education and Training Authority
FET	Further Education and Training
FP	Foundation Phase
HEDCOM	Heads of Education Department Committee
HR	Human Resources
ICT	Information and Communication Technology
IQMS	Integrated Quality Management System
ISPFTED	Integrated Strategic Planning Framework for Teacher Education and Development
IT	Information Technology
LMS	Learning Management Software
LTSM	Learner Teacher Support Material
MOU	Memorandum of Understanding
MTSF	Medium Term Strategic Framework
NCS	National Curriculum Statement
NDP	National Development Plan
NEEDU	National Education Evaluation and Development Unit
NEP	National Education Policy

NGOs	Non-Governmental Organisations
NICPD	National Institute for Curriculum and Professional Development
NSLA	National Strategic for Learner Attainment
NTEDC	National Teacher Education Development Committee
OECD	Organisation for Economic Cooperation and Development
PD	Professional Development
PDFDL	Professional Development Framework for Digital Learning
PEDs	Provincial Education Departments
PIRLS	Progress in International Reading Library Study
PLCs	Professional Learning Communities
PPs	Professional Practices
PPSs	Professional Practice in Schools
PTD	Professional Teachers Development
PTDIs	Professional Teachers Development Institutes
PTECs	Provincial Teachers Education Committee
SACE	South African Council for Educators
SACMEQ	Southern and East Africa Consortium for Monitoring Education Quality
SGB	School Governing Body
SMME	Small, Medium and Micro Enterprises
SMT	School Management Team
TAM	Technology Acceptance Model
TED	Teacher Education Development
TEIs	Teacher Education Institutions
TIMSS	Trends in International Mathematics and Science Studies
TSs	Teaching Schools
TVET	Technical and Vocational Education and Training

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ABSTRACT

The introduction of technologies in our lifetime necessitates transformation in our lifestyles. This expectation is not an exception to the education system. The curriculum and the ways of teaching and learning are affected the most by new technologies. It is therefore imperative that schools, educational officials and teachers change in tandem with these new technologies. The transitioning to technologies, therefore, tends to make it obligatory for schools, principals, deputy principals, heads of departments and teachers to be competent in these new innovations and the accompanying digital strategies. The aim of this study is to investigate the implementation of blended learning as one of the technological platforms in Sekhukhune District schools in Limpopo Province, South Africa.

The study was guided by blending Connected Learning Theory (CLT), Technology Acceptance Model (TAM) and Connectivism Theory (CT) frameworks. The theories assisted in the formulation of research questions which led to the study findings. The research questions of the study included How do teachers perceive the usefulness of blended learning approaches in teaching and learning? How do teachers connect information using technology resources in blended learning? “To what extent do teachers display the necessary skills for successful implementation of blended learning?” What are teachers’ recommendations for the introduction and improvement of blended learning in rural schools? and What are the elements to be considered for the designing of blended learning model?

The study used mixed methods research (MMR) to achieve the aim of the study. Convergent parallel design was used to collect, analyse and interpret data. The study was guided by a pragmatic paradigm where 10 schools were purposively sampled for the QUAN strand while 4 schools were purposively sampled for the QUAL strand. The participants of the study comprised

principals, deputy principals and teachers. For the QUAN strand 10 principals, 9 deputy principals, 35 heads of departments and 123 teachers participated while for the AQUAL strand 4 principals, 4 head of departments and 4 teachers took part in the investigation. The total sample for the QUAN was 177 participants and 12 participants for the QUAL strand. A questionnaire was used to collect data in the QUAN strand while for the QUAL strand interviews and document study were used. Data gathered through questionnaires was analysed through the IBM SPSS version 28. Thematic, content and narrative analyses were used to assess data collected from the interviews and document study.

The results of the two strands were merged to obtain the final results of the study. The study established that teachers embraced the introduction and implementation of blended learning in schools. However, challenges such as lack of e-technological supply and internet connection; inadequacies in the use of classroom technologies; lack of e-tech policies; lack of teachers' digital training; insufficient teachers′ technological competencies; and inadequate teacher support in technologies impede the effective implementation of blended learning in Sekhukhune-Limpopo schools. The study therefore recommends that the Limpopo Department of Education (LDE) should prioritise the supply of e-tech in Sekhukhune-Limpopo through fiscal policies. The study further recommends that the Department of Basic Education, through the provincial education departments and districts, train and develop officials and teachers in digital technologies for the successful implementation of blended technologies in teaching and learning.

The study also suggested a proposed Blended Learning Model (BLM) which might assist in the implementation of blended learning in schools.

Keywords: blended learning, blended learning model, E-Tech, E-Education policy, teachers' digital framework

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The world-wide changes in education from face-to-face (f2f) teaching and learning methods to more sophisticated and technologically-assisted methods have brought along innovative ways of teaching and learning, tools of the trade as well as learning content (Ololube, 2011). The changes have also necessitated transformation of education systems all over the world (Olelewe, 2014; Thaba-Nkadimene, 2017a). Novel digital technologies and social media have captured, of late, the societal imagination across the world conscripting into the armoury the students' day-to-day learning, hence, they are variously perceived as the "Net- Generation", "Y-Generation" or "digital natives" (Oyedemi, 2015; Domingo and Gargante, 2016; Salminen, Gustafsson, Vilen, Fuster, Istomina and Papastavrou, 2016). Ololube (2011) submits that the new teaching and learning approaches provide the most resourceful and effective instructional experiences when f2f learning and online learning are combined and he defines this combination as blended learning and is supported by Kanuka and Rourke, (2013); Charbonneau-Gowby, (2018); Kintu and Zhu, (2016). However, Cronje (2020) defines blended learning differently as "the appropriate use of mix theories, methods and technologies to optimise learning in a given context."

Due to the introduction of technologies in the teaching and learning, teachers, who are the implementers of the curriculum, are expected to possess appropriate technological skills. It is therefore imperative that before the schools and the Department of Basic Education can think of implementing blended learning, they should have developed teachers in technologies. However, not much is known about the teachers′ perceptions and technological skills in teaching and learning in rural areas. This study investigates the perceptions and technology skills in the implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa. The investigation focuses upon sampled schools, principals, deputy principals, heads of departments and

teachers through interviews and questionnaires. Derivative from the study findings, a blended learning model which might be used in schools is proposed.

Based on the world-wide transformation of education systems by technologies, the Department of Basic Education (DBE) in South Africa crafted some policies to address the challenges of transformations. These policies include e-Education (2004), Action Plan 2019-2030, Integrated Strategic Planning Framework for Teacher Education and Development (ISPFTED) (DBE, 2011), Guidelines for Teacher Training and Professional Development in ICT (GTTPDI) (DBE, 2007) and the Professional Development Framework for Digital Learning (PDFDL) (DBE, 2018). The overall aims of the policies are designed to:

- Ensure provisioning of quality education through technologies.
- Improve teacher education and development.
- Improve teacher qualifications and competencies; and
- Ensure quality learner achievement.

For the purpose of this study, the above named legislatives are presented in detail in the sections. This is undertaken to enable the researcher to establish whether the legislation frameworks and policies are effectively implemented in schools. Furthermore, the full details explication of each relevant legislative policy and framework will enable the researcher to establish relevant findings from data collected from the participants and document study.

Oyedemi (2015); Domingo and Gargante (2016) and Salminen, *et al.* (2016) highlight that the implementation of the policies and new teaching and learning approaches require the skills of the existing principals, Heads of Departments (HoDs) and teachers who, unlike the Net Generation, were not socialised into digital technologies, social media, computers and Internet. Regardless of their status, the existing teachers are obliged to integrate digital technologies into their instructional designs because they are teaching digital natives who are conversant with such novel technologies (Peck, 2014; Hanus and Fox, 2015; Salminen, *et al.,* 2016). Furthermore, the teachers are expected to “create

technology-rich lesson modules" in their instructional activities (Boschman, McKenney and Voogt, 2015; Kavanoz, Yuksel and Ozcan, 2015; Ninlawan, 2015; Orr Kukner, 2015; Park, Yu, Jo, 2016). To this extent, teachers' competencies in implementing digital technologies in their instructional activities is critical for the attainment of quality education in schools as advocated by DBE policies. Recently, this has become even more critical because of Covid-19 pandemic and its attendant lockdown initiatives which cut off direct interaction between teachers and learners (Prakash and Srivastava, 2020:257; Zayapragassarazan, 2020). It is therefore necessary to investigate the implementation of new innovative approaches in education which could stand the test of time, specifically in the rural areas like Sekhukhune District in Limpopo Province. The aim of this study is to investigate the perceptions and technological skills of teachers in the implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa.

1.2 BACKGROUND TO THE STUDY

The South African education system is characterised by underperforming and dysfunctional schools, specifically in rural areas of the Provinces (Thaba-Nkadimene, 2017b). This has compelled the DBE to take drastic measures to attain the quality of education the country envisages. To address the situation DBE established ISPFTED, GTTPDI and PDFDL (DBE, 2011; 2007 and 2018). The aim of these policies is to enhance the performance of students and schools through the effective deployment of technology education. However, to date the realisation of the policies seem to be minimally evidenced.

In its endeavour to enhance integration and quality results, DBE further tried several learning approaches. Amongst others, blended learning was adopted as a possible panacea. Archee (2015) traces blended learning to the 1920s distance learning courses wherein face-to-face (f2f) instruction with print-based course materials and radio, TV or telephone were combined. Archee further suggests that the widespread rollout of blended learning happened during the 1990s due to the fall of prices for technology devices. Nuruzzaman (2016:126)

concurs that blended learning has been in use “since the popular advent of the Internet and the World Wide Web in the late 1990s.”

Internationally, blended learning has proved to be an effective and efficient learning approach which ensures quality education provisioning to students. For example, Moore and Gilmartin, (2010); Dzakiria, Mustaffa and Abu Bakar, (2006); Higgins and Gomez, (2014) that blended learning provides better learning opportunities to students; Mirriahi, Alonzo, McIntyre., Kligyte, and Fox (2015) found that blended learning improves leadership learning; Shannon, Francis, Chooi, and Ng (2013) contend that blended learning has been used successfully for architectural design and engineering students; Fetters, and Duby (2011) argue that it provided support for faculty students; while McPhee and Pickren, (2017) recognise that blended learning has benefitted international students in their various studies across the world.

In the South African context, online learning at public school level is in its infancy (Barbour, Brown, Waters, Hoey, Hunt, Kennedy, Ounsworth, Powel and Trimm, 2006). Blended learning is used mostly in higher education institutions (Mayisela, 2013; Tshabalala, Ndeya-Ndereya and van der Merwe, 2014; Boitshwarelo, 2009; Van Niekerk and Webb, 2016; Purnawarman, Susilawati and Sundayana, 2016; Padayachee, Boshoff, Olivier and Harding, 2011). Significant investments on the use of ICTs have only been made by wealthy provinces such as Western Cape and Gauteng (Rakoma, 2019). In Limpopo Province, the case study province, competing priorities and lack of adequate resources have exerted negative impact on the application of ICTs (Motshekga, 2016). However, Motshekga (2016) applauds the support given by the Non-Governmental Organisations (NGOs) in providing ICT infrastructure even though the initiatives have been uncoordinated, unfocused and unsustainable. For example, TV White Space Pilot Project in partnership with University of Limpopo, Microsoft South Africa, Centre for Scientific and Industrial Research (CSIR) and MultiChoice South Africa provide technology-assisted learning to some secondary schools in Mankweng District (Rakoma, 2019:108).

It is the vision of the DBE that all the provinces, districts and schools implement technology-assisted learning as per e-Education policy, ISPFTED and PDFDL policies. It is also the DBE's intention that all teachers are technologically competent. Presently, it seems there might be some gaps in the implementation of digital technologies schools, specifically in rural schools like Sekhukhune District. This present study investigates teachers' perceptions and their technological skills in the implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa.

1.3 RESEARCH PROBLEM

The progress of learners is directly influenced by the instructional strategies employed by teachers (Ololube and Egbezor, 2009). Ololube (2011) further emphasises that a learning strategy which can provide the most resourceful and effective instructional experiences is blended learning. Blended learning necessitates knowledge of application of technologies. Rakoma (2019) posits that blended learning cannot be achieved without the training of teachers, especially at local level. It is therefore critical that the teacher's competencies in using digital technologies in their instructional activities be professionally developed (Boschman, *et al.,* 2015; Park, *et al.*, 2016).

This study addresses teachers' perceptions and technology skills in implementing blended learning in Sekhukhune District schools. Connected Learning Theory, Technology Acceptance Model and Connectivism Theory theoretical frameworks guided the study. The overarching of these theories assisted the researcher to investigate problems related to the implementation of blended learning. The study concludes by proposing elements which might be considered in the designing of blended learning model.

1.4 RESEARCH AIM AND OBJECTIVES

1.4.1 Aim of the Study

The aim of this study is to investigate teachers' perceptions and technological skills in the implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa.

1.4.2 The objectives of the study are designed to:

- Determine teachers' perceptions on the usefulness of blended learning.
- Establish how easy teachers think they will find blended learning use.
- Ascertain how teachers will connect information using technological resources in their teaching and learning environment.
- Determine teachers' current skills in blended learning.
- Devise a list of recommendations on implementing blended learning in schools; and
- Suggesting the elements to be considered in designing blended learning model which can be implemented in schools.

1.5 RESEARCH QUESTIONS

The choice of the research design, methods and the aim and objectives of a study was guided by the research questions posed. The study strove to answer the research questions guided by Technology Acceptance Model (TAM) and Connectivism theories. With respect to TAM, the study focuses on the question "How do teachers understand the usefulness of blended learning approach in teaching and learning? and What are teachers' recommendations for the implementation of blended learning in rural schools?

Regarding the use of connectivism, the study sought to find answers for the questions beneath.

- How do teachers connect information using technology resources in their instructional teaching and learning?
- To what extent do teachers in rural schools have the necessary skills for the successful implementation of blended learning? and

- What are the elements to be considered for the designing of blended learning model for schools?

1.6 CONTRIBUTION TO THE FIELD OF THE STUDY

The findings of this study are significant to the teaching and learning profession, which is currently haunted by poor learner performance. The research contributes to the practical, methodological and theoretical knowledge of the teachers, learners in schools; scholars; researchers and the Department of Basic Education. The following segment outlines the envisaged contributions of the study to new epistemological horizons.

1.6.1 Practical contribution

Firstly, teachers are anticipated, through this study, to develop their technological skills in teaching and learning. Furthermore, they are likely to remain up-to-date with new technological approaches relevant to 21st century and benefit from improved utilisation of new skills relevant to today's technological world. Secondly, the learners' understanding of the subject content could be improved through the implementation of blended learning. Finally, schools and the Department of Basic Education will garner quality results which will boost their esteem and their rating nationally and globally. In addition, schools and the Department of Basic Education will be enabled to develop pertinent programmes for blended learning implementation by using the results of the study.

1.6.2 Methodological contribution

Mixed methods research approach imparted valuable knowledge to the participants and the researcher in the technological field. The knowledge gained from this included:

1. The ability of participants to provide rich answers to questions put to them and thus the generation of valuable insights into the study phenomenon.

2. The ability of the researcher to explore a phenomenon by using a variety of data resources (Baxter & Jack, 2008:44).
3. Knowledge of the researcher to understand the experiences and attitudes of people (Merriam, 2009:13). In the context of this study these were senior management teams (SMTs) and teachers in the implementation of blended learning.
4. Furthermore, a qualitative research approach offered methodological knowledge related to future studies. The research approach contributes towards methodology in technology education.

1.6.3 Theoretical contribution

The study contributed theoretical knowledge to the researcher, teachers, and DBE that includes:

- Enriching the researcher's understanding on fundamental concepts and know-how about the usage of technologies in schools.
- Knowledge of theories suitable to 21st century teaching and learning practices.
- Understanding the status of blended learning implementation in rural schools.
- Researcher's ability to reach a logical conclusion in the study.
- Understanding the role played by schools and DBE stakeholders in the implementation of blended learning in rural areas; and
- Adding to the existing theories used in similar rural areas studies.

1.7 CHAPTER SUMMARY

This chapter began with the introduction of the study. Then after, the background of the study was outlined. The subsequent sections were the research problem, the aim and objectives of the study and research questions. The chapter concluded with a section outlining the significance of the study. The next chapter offers a critical literature review that connects the research to other studies for both theoretical and conceptual integration.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides a detailed discussion of literature relevant to the research topic, that relates to the implementation of blended learning. The relevant literature is discussed in relation to the challenges of novel technologies in the educational frontiers, the adoption of such technologies and the challenges that are contextually embedded in the implementation of such blended practices in classrooms to uncover insights related to the study (Huff, 1999). Firstly, to clarify the research study, discussion of relevant international, regional, and national literature on the implementation of blended learning, blended learning models and South African legislative policy frameworks and policies on blended learning is undertaken. This is followed by a sustained explication of the South African education system, the status of e-Education in South Africa and education provisioning in Sekhukhune District, Limpopo. The chapter interrogates ICT for educators training and blended learning with respect to what blended learning is, the rationale for blended learning, its requisites and implementation within the defined parameters. Lastly, the chapter demonstrates the linkages derived from CLT; TAM and CT theories which are pivotal in framing the study.

2.2 IMPLEMENTATION OF BLENDED LEARNING

Most of the developing countries favour usage of blended learning due to its purpose of producing combined blended learning atmosphere, that is combining online and face-to-face pedagogical methods (Gaol and Hutagalung, 2020). For the reason that these countries are developed, they are able to afford the demands incurred in the development, management, monitoring, and evaluation of blended learning.

Contrarily, in the developing countries such as Nigeria, Uganda and South Africa implementation of blended learning is still at its infancy due to obstacles encountered (Ololube, 2011; Ayoo and Lubega, 2008; Tshabalala, *et.al.*, 2014;

Ramoroka, 2019). These obstacles include, among others insufficient of infrastructure to support learning, lack of technology resources, lack of training and development of teachers.

With regard to South Africa, the focus for this study several initiatives have been undertaken to ensure successful implementation of blended learning in the teaching and learning situations. To achieve the initiatives, several blended learning models have been developed and implemented in teaching and learning environment.

2.3 LEGISLATIVE AND POLICY FRAMEWORK

The efficacious application of legislative and policy frameworks stimulates the successful implementation of technological programmes, specifically in an educational environment. It is for this reason that the Department of Basic Education in South Africa has developed legislation and policies to guide the implementers. Various legislations and policy frameworks are employed to guide the successful implementation of technology education. Legislative and policy frameworks relevant to this study include the following:

a. The White Paper on e-Education Policy of 2004, Action Plan to 2019: Towards the realisation of schooling,
b. Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011-2025 (ISPFTED),
c. Guidelines for teacher training and professional development in Information and Communication Technology (ICT),
d. Professional Development Framework for Digital Learning (PDFDL),
e. National Strategy for Learner Attainment (NSLA) and Connectivity school policy.

The following segment discusses and annotates on the legislations and policy frameworks listed above.

2.3.1 The White Paper on e-Education Policy of 2004

One of the policies relevant to this study is The White Paper on e-Education Policy of 2004. This policy frames and outlines learning and teaching through the usage of electronic devices, informed by the national education goal of providing quality education through ICT. It states clearly that "every South African learner in the General and Further Education and Training bands will be ICT capable (that is, use ICTs confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community by 2013" (DBE, 2004:17). However, the achievement of this goal seems to be problematic because as late as 2020, the seeds of this goal seem not to have been realised. It is noteworthy that the success of this goal could be influenced by a well-developed and skilled teacher who guarantees quality education, particularly in ICT.

2.3.1.1 E-Education Policy

E-Education views ICT as an important tool in the provisioning of quality in the teaching and learning situations due to the following reasons:

i. ICT connects learners and teachers to get better information and ideas via effective combination of pedagogy and technology.

ii. ICT Enables end-users to:

- Apply ICT skills to access, evaluate, integrate, present and communicate information.
- Create knowledge and new information by adapting, applying, designing, inventing and authorising; and
- Function in a knowledge society by using appropriate technology and mastering communication and collaboration skills.
- ICT is a resource for organising schooling and a tool for management, administration, production, a source for curriculum integration, a communication tool, a collaboration tool for teachers and learners and a learning environment that advances creativity, communication collaboration and engagement.

- ICT is a vehicle which ensures meaningful interaction of learners with information, advances high order thinking skills such as comprehension, reasoning, problem-solving, creative thinking and enhances employability.
- Enables learners to utilise e-Government processes, thus enhancing interaction between citizens, governmental organisations, public and elected officials; and
- Enables learners to invent new ways of using ICT to realise the Department of Education's vision of developing citizens who are critical and active lifelong learners (DBE, 2004).

2.3.1.2 The significance of e-Education

We are living in technological era in which our ways of living have dramatically changed, and this includes our education system. It is therefore very significant that education provisioning must be electronically provided. It is therefore critical that the type of education provided by teachers must be such that it caters new models of learning which are in-keeping with the drastically changes in education, creates access to learning opportunities, redress inequalities, improve the quality of teaching and learning and provides lifelong learning and enabling teachers and learners to move away from traditional approaches of teaching and learning to an inclusive and integrated practice of collaboration, shared practices, meaningful engagement, development of creative thinking and problem-solving skills as stipulated by DBE (2004).

To achieve the anticipated ICT education which has the potential to yields positive results for learners and teachers such as application and production of knowledge for real world problems, the implementers who include the principals, heads of department and teachers need to be efficiently developed.

In tandem, learners would be empowered to manage their own learning, promote their achievement, and alleviate barriers. Equally, such a platform would allow learners to access information that increases knowledge, enquiry and depth of investigation. In this type of education there is the more patent improvement of inventive thinking (creativity, problem-solving, high order

thinking skills, reasoning, effective communication) and interpersonal skills (writing, public speaking, teamwork and collaboration as well as improved production skills which include creating high-quality products and methods (DBE, 2004). It is also clear that e-tech provides opportunities, alternative methods of instruction and flexible assessment of learners with barriers. There is also the broader range of benefits for society by providing increased opportunities for lifelong learning, communication and exchange of essential life needs and the creation of globally competitive human resources.

2.3.1.3 E-School development

As alluded previously, technology controls all activities in our lives. It is therefore imperative that schools be developed into e-schools, that is, schools in which technological tools are used in all the activities of the school including teaching and learning. This transformation involves schools which are using traditional approaches of teaching and learning. e-Education Policy highlights three important dimensions that have to be considered in developing teachers and learners for an e-school. These are the operational, the cultural and the critical dimensions.

a. The operational dimension

This operational dimension involves skills that are necessary for the use of new information and communication technology. The dimension therefore is about the development of the end-user in technologies. In this dimension skills that are necessary for the use of a new information and communication technology are learned. The human networking and collective approaches to knowledge construction and problem-solving are employed for the facilitation skills. It is the responsibility of GET and FET institutions to learn ICTs together and from each other, specifically in schools in the context of this study.

b. The cultural dimension

As teachers are used to their prevailing school cultures, there is a need to initiate them and make them agents in the new culture. In this dimension the

culture that supports the practice of ICTs usage for educational purposes is learned. This enables teachers to view ICTs not as add-on to teaching and learning practices but “something that poses interesting and important questions for administration, curricula and pedagogy” (DBE, 2004:17).

c. The critical dimension

The critical dimension challenges the end-users on the value and critical use of ICTs in schools. It requires that schools, teachers and learners challenge the assumptions of ICTs successes. It also requires a “critical dialogue, analysis among teachers, research resource to provide and expand teachers’ perspectives on the benefits of ICTs” (DBE, 2004:19).

d. Characteristics of e-school

For a school to be called an e-school it must have the following characteristics:

Learners who use ICTs to enhance learning.

Qualified and competent leaders who use ICTs for planning, management, and administration.

Access to ICT resources that support curriculum delivery; and

Connections to ICT infrastructure (DBE, 2004:19).

This suggests that this kind of school needs to have sufficient ICT infrastructure and facilities (resources) and well-developed teachers and leaders in technologies.

e. Connection of e-school with community

e-Schools connect with communities by:

Allowing community access to its computer facilities after hours,

Receiving support from the community and local Small, Medium and Micro Enterprises (SMME) to maintain and sustain ICT interventions; and

Serving as a venue for business advisory services and training for community based small computer and repair business. It is important that community members participate fully in e-schools to guide their children as well as safeguarding the technology resources from vandalism and theft.

2.3.1.4 The use of ICTs in education

The invasion of technology has devastating impact in our lives. Unlike previously, the provisioning of education is generally expected to be provided through the use of ICTs, and hence many talks about the concepts e-learning and blended learning. In the context of this study this education provisioning is referred as blended learning. In this type of learning, learning is undertaken through combining face-to-face approaches and technology-related approaches. The intentions of using ICTs for teaching and learning include:

Improving the quality of teaching and learning across the education and training system.

Focusing on teaching and learning for a new generation living in digital world.

Using ICTs to extend and enrich educational experiences across the curriculum.

Enhancing the quality and richness of teaching time constrains and administration without replacing teachers.

It follows then that the usage of ICTs for learning encourages:

- Learner-centred learning.
- Active, exploratory, enquiry-based learning.
- Collaborative work among learners and teachers.
- Creativity, analytical skills, critical thinking and informed decision-making.

Use of ICTs also enables teachers and learners to have access to:

- High quality, relevant and diverse resources beyond what school libraries are currently providing.
- Means of communicating and collaborating with other learners and teachers; and
- Opportunities to create and present new knowledge.

Use of ICTs also supplements the quest for active contextual learning to promote understanding by the application of multimedia.

It depends on the learners' understanding, high order thinking skills provision and taking learners "beyond recall", recognition and reproduction of information to evaluation, analysis, synthesis, and production of arguments, ideas, and

performance (DBE, 2004:20). e-Learning also offers teachers and learners access to a variety of teaching and learning support material that promote diversity, collective identity across institutions and connect them to the broader societal goals.

The DBE clearly highlights potential and significance ICT in the teaching and learning. However, the benefits of ICT in education can be realised if all the school stakeholders are competent in the technologies. Furthermore, schools need to be well-equipped in technology resources which is not the norm, especially in rural schools like Sekhukhune District in Limpopo Province. This suggests that there might be problems in the implementation of e-Education policy.

The usage of ICTs is also underpinned by equity, access to infrastructure, capacity building and norms and standards (DBE, 2004). These concepts are explained next.

Equity

All institutions need to be given equal access and provision of ICTs and a technology baseline to address equity. However, distribution of ICTs in schools is subject to various setbacks such as unequal supply of ICTs to schools. The urban and rural schools seem to be not equally supplied with rural schools the most hit (Herselman, 2003).

According to DBE (2004) to respond to the ICTs challenges the government, private sector, parastatals, and non-governmental organisations (NGOs) joined hands to assist schools in ICT professional development (School Net; INTEL), electronic content resources (Mindset, Educational Portal) and infrastructure and connectivity (Microsoft, Digital Partnership Programme, SENTEC, Telkom Foundation). However, it is regretful that rural schools are not equally serviced with regard to ICT resources as their counterpart urban schools (Herselman, 2003). Due to the unequal servicing of rural and urban schools, rural schools lack access to quality education and resources Herselman, 2003:945).

It is however promising that despite of the economic and schools situations, teachers are still willing to employ ICTs in teaching and learning (Chigona, Chigona, Kayongo & Kausa, 2010). This suggests that if the rural schools can be provided with sufficient ICT resources integration of technologies in the teaching and learning can be successful.

Access to infrastructure

Availability of relevant technology infrastructure is key to the application of technologies in the teaching and learning. Mtebe (2013) informs us that the implementation of blended learning is faced with challenges such as acquiring of ICT infrastructure and the management thereof. Mwapwele, Marais, Dlamini and Van Biljon (2019) give us courage that despite infrastructural challenges and lack of institutional support rural teachers are still striving to use technology for teaching and learning. For the fact that teachers have the willingness to use technologies in their teaching, it can be argued that if ICT resources can be made available and accessible then implementation of blended learning can be possible in schools.

Capacity building

Teachers are at the coal face of curriculum implementation. It is therefore crucial that they be capacitated in technologies for the successful technology education provisioning. Contrarily, in their study Ravhuhali, Mashau, Kutame and Mutshaeni (2018) showed that teachers are not provided with adequate time for professional development. Boitshwarelo (2009) also revealed deficiencies in policy implementation in schools and training in blended learning.

Norms and standards

According to DBE (2004:24) the aim of the national standards for educational ICTs in teaching and learning is “to clarify compliance, requirements, responsibilities and mechanisms” in the education system. These standards include teacher development, content, connectivity, hardware, software and

community engagement. However, due to the deficiencies in policy implantation and training (Boitshwarelo, 2009), this aim is not visible in rural schools.

2.3.1.5 Use of ICTs in assessment

Assessment in teaching and learning is sometimes cumbersome for teachers. It therefore needs sufficient provisioning of ICT infrastructures and teachers who are skilled in technologies. The use of ICT can be of benefits to teachers and learners in assessment as it reduces the tedious work teachers and administrators encounter in assessment issues, assists teachers in data analysis and enabling them to track learner achievements and do need intervention strategies; enabling teachers to give learners immediate feedback on progress, identifying areas of weakness and designing necessary support interventions; makes administration of assessment easy and effective; simplifies assessment administration and saves time; and

has the potential of increasing participation in adult education and training due to its potential of saving time, cost and location (DBE, 2004).

2.3.2 Action Plan to 2019: Towards the realisation of schooling 2030

The South African education system aims to provide quality education to all its citizens in the democratic dispensation, in contrast to the apartheid architecture that was discriminatory. To achieve this mission, the country needs quality teachers with good teaching skills, subject content knowledge and technologically literate. Perhaps it is for this reason that the Department of Basic Education developed Action Plan to 2014: Towards the realisation of schooling 2025 and the subsequent extension that is called Action Plan to 2019: Towards the realisation of schooling 2030. The aim of the plans is to strengthen the education system so as to provide quality education that caters for blended technologies.

2.3.2.1 Composition of Action Plan

The Action Plan is composed of 27 goals that have to be achieved. These consist of Goal 1-13 dealing with the outputs to be achieved in relation to the

learning and enrolment and Goal 14-27 which deal with how to achieve 1-13 output goals. This means the Action Plan to 2019 is composed of 27 goals. Due to the fact that the goals cannot be achieved simultaneously, the DBE prioritised five goals which are: Goal 11; 16; 19; 21 and 27. The rationale behind this was, according to DBE (2015:8) to promote focus within the system. For the purpose of this study, Goal 16 and Goal 27 become the primary focus. Goal 16 is about the improvement of teacher professionalism, teaching skills, subject knowledge, and computer literacy of teachers throughout their entire careers while Goal 27 deals with the improvement of the frequency and quality of monitoring and support services provided to schools by districts, partly through better use of e-education (DBE, 2004).

This study addresses the views of teachers' professional teaching skills, their subject knowledge and computer literacy in the implementation of blended learning in rural schools. Several initiatives are in place to improve the professionalism, teaching skills, subject knowledge, and computer literacy of teachers. These include Integrated Quality Management System (IQMS), Continuing Professional Teacher Development (CPTD), National Education Evaluation and Development Unit (NEEDU), development programmes in universities as well as institution-based training. However, these initiatives seem to be faced by a number of problems. For example, the report of 2012 IQMS indicated that only 12% of teachers were rated as "outstanding", 57% as "good", 31% as "meet minimum standards" and 0.5% rated as "unacceptable" (DBE, 2011:34). CPTD also confirms that there are "serious hurdles, in terms of budgets and human capacity" to get teachers developed (DBE, 2011:35). NEEDU indicates that due to apartheid history, there are a number of underdeveloped "South African teachers [who] produce worse learner performance than what is produced by similarly capacitated teachers in other countries in the region" (DBE, 2013:3).

The unsatisfactory picture depicted by the outcomes of teacher development initiatives seem to be contrary to the goals formulated by the ANC's 53rd

Conference, (ANC Manifesto 2014 Elections; NDP, Action Plan 2014 – 2019 towards 2030; Medium Term Strategic Framework (MTSF) 2014 – 2019 on professionalism, teaching skills, subject knowledge and computer literacy of teachers). Table:2.2 reflects the alignment of the goal 16 which seeks to develop the professionalism, teaching skills and computer literacy with other initiatives according to Department of Basic Education.

Table: 2.1 Alignment of Goal 16 with other initiatives

ANC's 53rd Conference	ANC Manifesto 2014 Elections	NDP	Action Plan 2014 - 2019	MTSF	Baseline
Address both content knowledge and methodology through development of quality teaching leadership and management	Teacher development will receive ongoing attention	Teacher development should build teacher subject knowledge and provide training in effective teaching methods	Goal 16: Improve the professionalism teaching skills, subject knowledge, and computer literacy of teachers throughout their entire careers throughout their entire careers	The average hours per year spent by teachers on professional development activities	39 hours (2011)

Source: DBE: Basic Education Sector Plans and Goals (2014:15)

Table 2.1 displays alignment of Goal 16 with the ANC's 53rd Conference resolutions, ANC Manifesto 2014 Elections, NDP and Medium Term Strategic Framework (MTSF) 2014 – 2019 on professionalism. The implementation of Goal 16 together with the other initiatives were planned according to stipulated timeframes. To date (2020) it is not clearly evident if the stipulated timeframes were achieved.

According to the Action Plan, the baseline time for teacher professionalism is 39 hours per year. Contrary to this, NEEDU stated that teachers spend few hours on professional development with Limpopo Province standing out low from all

the provinces with the level of effort and perceived quality teacher development (DBE, 2011:36). Ravhuhali, Mashau, Kutame and Mutshaeni (2018) concur that teachers are not provided with adequate time for professional development, workshops and are not financially supported by both the department and their schools. Ravhuhali, et al. (2018) further verified that teachers undergo professional development initiatives to gain financial rewards rather than the ideal.

To resolve the teacher development hurdles, NEEDU developed programmes to strengthen teaching methods and grades standards, created stronger enabling framework for teacher-initiated professional development activities, provided in-service training to teachers and accelerated access to and educational use of digital resources by teachers.

The other Goal which this study focused on was Goal 27. This goal is about improving the frequency and quality of the monitoring and support services provided to schools by district offices, partly through better use of e-Education. According to DBE, NDP: Vision 2030, districts have the responsibility to "provide targeted support to improve practices within schools" (DBE:2013). This means that districts need to provide frequent and quality monitoring and support to schools

The DBE emphasised provision of support to schools as an obligation in the meeting between the Deputy Minister of Education, Educational Committee and National Committee of Provinces when it said that it would provide quality education and services through focusing on ensuring that districts operate at the required levels, by establishing a clear policy for the work of districts in the form of provisioning appropriate norms and standards, by manning districts with relevant people, ensuring that districts have suitable resources, have defined and monitored standard operations for supporting schools and districts as well as having a platform for sharing best practices among districts (Parliamentary Monitoring Group, 2016).

Monitoring and support services

Support services statistics show that the support given to districts is minimal. Support service survey on principals of schools about the support of teachers in their class teaching, support and assistance of the principal in performing the duties of school, supporting SMT members, supporting learners, supporting administrative staff and supporting a school-based support team/institutional level support team to identify leaners with special educational needs established that 96% of schools were visited once in a year and 88% of schools visited twice in a year (DBE, 2013:34). This clearly suggests that not enough support is given to the districts. The findings also confirm that the more historically disadvantaged a school is, the lesser the visits and hence the least visited schools are those in the Eastern Cape and Limpopo provinces (DBE, 2013:34.

With regards to the monitoring of the districts the survey rated 17% “not satisfied”, 11% “somewhat satisfied”, 61% “satisfied” and 10% “very satisfied” on the 10 monitoring areas, namely: checking management and/or financial documents (policies and registers), checking educators planning and preparations documents, checking school assessment records, checking school infrastructure including maintenance, checking LTSM management including ordering; control and retrieval, checking the SGB including election of members, validation of EMIS information, checking HR matters and matters related to learner discipline.

Achievement of Goal 16 and Goal 27 of the Action Plan is taken as a pivotal point for the success of quality education, particularly in the implementation of blended learning. It is crucial to improve teacher’s professionalism, skills and subject content knowledge continually. It is also necessary to provide appropriate monitoring and support services to districts, schools and teachers for the achievement of quality education. Thus, the researcher argues that the

achievement of Goals 16 and 27 could earnestly ensure the successful implementation of blended learning.

2.3.3 Integrated Strategic Planning Framework for Teacher Education and Development (ISPFTED).

A detailed discussion of the ISPFTED is presented in the next sections underneath.

2.3.3.1 Development in South Africa 2011-2025

Teacher Education and Development (TED) in South Africa has been challenged by lack of access to quality development opportunities for prospective teachers. This is confirmed by Department of Higher Education and Training (DHET) (2011:1) when it submits that TED lacks access to quality opportunities for practising teachers. The system has apparently failed to achieve dramatic improvement in the quality of teaching and learning in schools. There is also a palpable tenuous involvement of teachers and inefficient and poorly monitored funding mechanisms.

Due to the above named challenges the Declaration of the Teacher Development Summit of 2009 established an Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (ISPFTED). The aim of this plan was to improve the quality of teacher education and development. The focus of the plan is on the classroom teachers, school leaders and managers, subject advisors and other professionals who support teaching and learning at the school level. The timeframe of the policy framework was 15 years as reflected in Figure 2.1

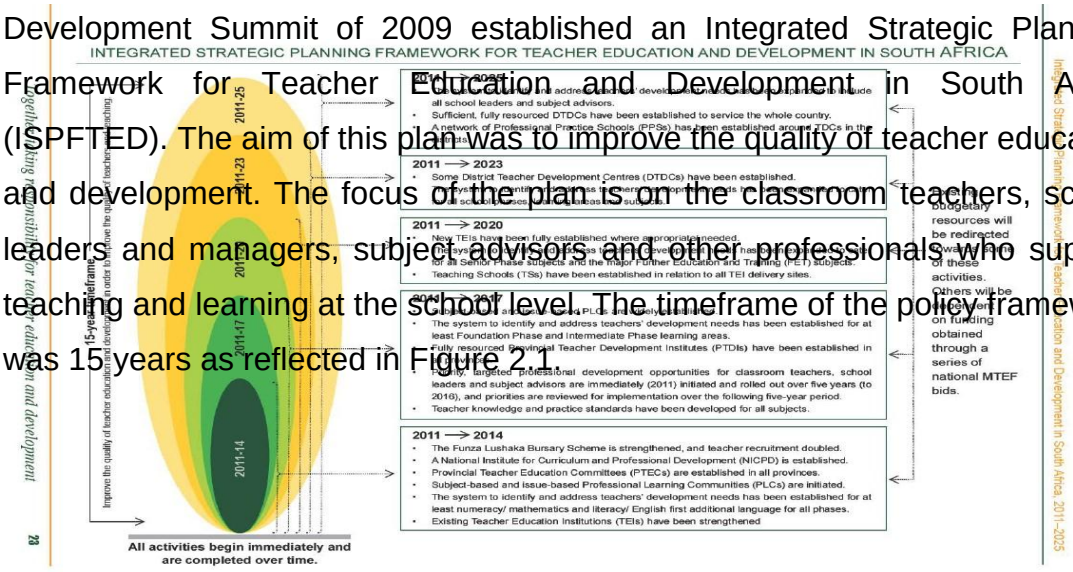


Figure 2.1: Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (ISPFTED) Timeframe (Source: ISPFTED in South Africa (DBE, 2011:23)

Figure 2.1 illustrates the implementation of ISPFTED timeframe. According to the timeframe activities such as teacher knowledge and practice standards should have been developed for all subjects; targeted professional development opportunities for classroom teachers and school leaders should have been initiated and rolled out. In addition, the system should have identified and addressed teacher's development needs and expanded these for all Senior Phase and Further Education and Training (FET) subjects (DBE, 2011:23). However, these activities have not been undertaken as at 2020.

ISPFTED is aligned to Action Plan 2019, specifically Goals 14, 16 and 17 and DHET's Revised Strategic Plan (2010/11-2014/15) on monitoring the production of initial teachers and development of pre-school and school system teachers, including the provision of pre-school and schoolteacher education in universities.

The operation and coordination of ISPFTED is the responsibility of the national education departments (DBE, DHET, Provincial Education Department (PED)). It is the responsibility of these departments to ensure that development programmes are in place to get teachers adequately developed. ISPFTED places teachers at the centre of all the efforts, thus, it calls for DBE, PEDs, DHET, teacher unions, South African Council of Educators (SACE) and Education, Training and Development Practices Sector Education and Training Authority (ETDP SETAs) to support these initiatives.

2.3.3.2 Approaches of ISPFTED plan

The plan is implemented through DBE/PED and DHET. Each of these structures have responsibilities to carry. DBE has a responsibility to establish a National Institute for Curriculum and Professional Development (NICPD) and attendant processes to assist teachers identify their areas of development and priorities. For example, SACE and IQMS strive to develop teachers' competencies and professionalism.

The responsibilities of PEDs are to establish and develop Provincial Teacher Development Institutes (PTDIs), District Teacher Development Centres (DTDCs) and Professional Learning Committees (PLCs).

DHET is responsible for ensuring enough supply of new teachers for all teaching specialisations, ensuring the development and provision of qualification-based programmes for all types of teacher.

Teacher unions also have a role to play in teachers' development: promotion of teacher professionalism through advocacy, supporting and encouraging teachers to identify their areas of developments, encouraging them to participate and recruit new entrance in the teaching fraternity.

SACE plays a quality management role in promoting and supporting the system for identifying teacher development needs. It also ensures that teacher development programmes are fully approved, endorses the professional development courses and accrue the professional development points on successful completion of a course.

Universities are responsible to ensure that their programmes are accessible to the teachers. Furthermore, they need to ensure that programmes offered are responsive to the national, provincial and individual teacher priorities and needs and that the programmes are of high quality.

The full implementation of the plan necessitates collaboration among all role-players, a coordinated national system for teacher education and development, adequate time for quality teacher education and development, sufficient funding for teacher education and development.

The responsibilities of ETDP SETAs about this plan are ensuring that the plans activities are directed towards the support of teachers, making funds available for teachers or aspirant teachers to register for short courses or qualification programmes and supporting new teacher inductions.

2.3.3.3 Outcome and output of ISPFTED

The intended outcome of the plan is to improve the quality of teacher education and the quality of teaching and learning. To achieve the outcomes of the plan the following outputs and activities need to be undertaken by each agency:

Outputs and activities to be led by DBE

Output 1: Individual and systemic teacher development needs are identified and addressed

Activities:

- Establishment of National Institute for Curriculum and Professional Development.
- Develop and deliver teacher diagnostic self-assessment to assess curriculum competence.
- Develop and deliver high quality content-rich, pedagogically sound CPD courses for teachers.
- Develop and deploy a TED ICT support system.
- Identify and address immediate to medium-term systemic teacher development needs; and
- Avail qualification programme interventions.

Output 2: Increased number of high-achieving schools-leavers are attracted into teaching

Activities:

- Implementation of a strengthened teacher recruitment campaign.
- Implementation of enhanced bursary funding schemes for initial teacher education students.

Outputs and activities to be led by PEDs

Output 3: Enhancement of teacher support at local level

Activities:

- Support to teachers and access to provincial development opportunities is enhanced at the local level.
- Establishment of PTDIs.
- Establishment of DTDCs.
- Establishment of PLCs to strengthen teacher professionalism.

Outputs and activities to be led by DHETs

Output 4: An expanded and accessible formal teacher education system establishment

Activities:

- Develop teacher knowledge and practice standards.
- Optimising, extending, and expanding of the capacity of Teacher Education Institutions (TEIs).
- Establishment of Provincial Coacher Education Committees (PTECs) to inform enrolment planning at public TEIs, to match evidence-based TED targets.
- Strengthening of Foundation Phase teacher provisioning.
- Strengthening the teaching practice/school experience component of teacher education programmes through the development of Teaching Schools (TSs) and Professional Practices (PPs).

2.3.3.4 Implementation of ESPFTED

The successful implementation of ESPFTED is underpinned by four essential requirements which are:

A. Collaboration and coherence in teacher education and development.
B. A coordinated national system for teacher education and development.
C. Adequate time to quality teacher education and development; and
D. Enough funding for quality teacher education and development.

A. Collaboration and coherence in teacher education and development.

Collaboration and coherence are key to the success of any programme. In this plan this can be achieved by:

- Establishing NTEDC to ensure that all stakeholders are collaborative and coherent.
- NTEDC advices on and monitors the implementation of the plan; and
- Council of Education Ministers (CEM) and Heads of Education Department Committee (HEDCOM) continually steer teacher education and development (DBE, 2011).

B. coordinated national system for teacher education and development

It is very important to coordinate all the activities of a programme. This is necessary for all the structure in the plan and need to be undertaken as follows:

- Putting all activities in the progress and structures together and coordinate them.
- Building up all the various items of the plan in a single coordinated TED system at the different levels of the national system.

C Adequate time to quality teacher education and development

Availability of enough time is key for a complete implementation process. Thus, adequate time for teachers to participate in professional learning communities and engagements in teacher development programmes should be made available. According to DBE (2011) e-Education policy time need to be made available for teachers to engage in pedagogically deep and content rich CPD courses or qualification programmes. The availability of time will result in suitably qualified teachers who will provide technology-based education. The question which arises is: Are teachers professionally developed in technologies?

D. Enough funding for quality teacher education and development.

According to the plan the DBE need to make financial resources available for the effective utilisation for ICTs and teacher development. However, this seems to be a challenge as schools lack funding for infrastructure and teacher professional development (Fisher, Bushko and White, 2017:69; Beyers and Hlala, 2015). This will therefore deter a successful implementation of technology education, particularly in blended learning

2.3.4 Guidelines for teacher training and professional development in ICT

Guidelines provide a directive for the success of any programme. They avoid trying and error approaches which can be costly in the implementation of technological programmes such as blended learning. It is therefore very important that in the initiatives such as teacher training and professional development of teachers in ICT guidelines are established. Hence the formulation of Guidelines for Teacher Training and Professional Development in ICT (DBE, 2007). The guidelines policy is relevant to this study because it deals with the training and development of teachers in the use of technologies in the teaching and learning environment.

2.3.4.1 Establishment of the policy guidelines

The DBE emphasises the provision of quality education in schools. To achieve this DBE adopted the use of ICTs. The guidelines for teacher training and professional development in ICT seek to create access to learning opportunities, redress inequalities of the past, improve the quality of teaching and learning and to provide personalised learning experiences to teachers and learners (DBE, 2007:1). The guidelines policy framework stipulates that “all teachers are required to acquire knowledge, skills, values and attitudes necessary to support the integration of ICTs into teaching and learning.”

The aims of this policy are in keeping with the purpose of the National Education Policy (NEP) Act 27 of 1996 which seek to ensure that:

- Teachers are properly equipped to undertake their essential and demanding tasks.
- Teachers are continually enhancing their professional competence and performance, and
- That there is a community of competent teachers dedicated to providing education of high levels of performance as well as ethical and professional standards of conduct.

The same policy framework emphasises that all teachers need to strengthen their subject knowledge base, pedagogical content knowledge and teaching skills. It also stresses that teachers need enhance their skills, not necessary qualifications for curriculum delivery (NEP, Act 27, 1996).

2.3.4.2 Approach to teacher development in ICT

The guidelines policy framework incorporates essential principles which guide the development of teachers in ICT. It stresses that the development of ICT skills and knowledge for teachers need to be integral part of the initial and continual teacher development programs as reflected in the National Policy Framework for Teacher Education and Development in South Africa. The guidelines approach the teacher training and development in three dimensions, namely: pedagogical, technical collaboration and networking.

Pedagogical dimension

This dimension deals with understanding the application of ICTs for teaching and learning in a local curriculum context.

Technical dimension

The dimension is about the ability to select, use and support a range of ICT resources appropriate to enhance personal and professional effectiveness. It also deals with the willingness of users to update skills and knowledge considering the new developments.

A collaboration and networking dimension

This dimension includes a critical understanding of the added value of learning networks and collaboration within and between partners and the ability to create and participate in communities of practice.

2.3.4.3 Alignment of the policy framework with others

The policy framework is aligned to other policy frameworks such as e-Education Policy (2004) and National Curriculum Statement Policy (NCS). The alignment is informed by the integration of the curriculum goals implemented through ICT technologies. The NCS goals which are aligned to this guidelines policy framework include:

- The social transformation of post-apartheid South African society.
- The implementation of an outcomes-based approach to education.
- The development of high levels of knowledge and skills.
- The integration of applied competence across subjects and fields of learning.
- The valuing of indigenous knowledge systems, and
- Increasing the credibility, quality, and efficiency of education in South Africa (DBE, 2007).

According to DBE (2007), the usage of ICTs in NCS promotes the development of learners' advanced cognitive skills such as comprehension, problem-solving, creative thinking. Higher order skills allow learners to identify and solve problems and make sound decisions; work effectively with others as members of a team, group, organisation and community; organise and manage themselves and their activities responsibly and effectively; collect, analyse, organise, and critically evaluate information; communicate effectively using visual, symbolic and/or language skills in various modes; use science and technology effectively and critically. The ultimate skills should be evident in their ability to demonstrate an understanding of the world as a set of related systems by recognising that problems cannot be separated from other contexts (DBE, 2007).

The e-Education supports NCS to develop learners' ability in applying ICT skills to access, analyse, evaluate, present and communicate information, create knowledge and new information by applying, designing, inventing and authoring, and function effectively in a knowledge society by using appropriate ICT and mastering communication and collaboration skills (DBE, 2007).

2.3.4.4 Principles of ICT in teacher development

Like any other programmes, the guidelines policy framework has some key principles for guiding the professional development of teachers. According to the DBE (2007) the guiding principles include:

- Educational goals should hold a primary centre of the development.
- Teacher development programmes should provide teachers with situated contextualised learning experiences.
- Teacher development programmes should be needs driven.
- Ongoing support should be consistently available; and
- Teacher development should be ongoing, due to the changing nature of ICTs.

2.3.4.5 Implementation of the policy framework

The purpose of the guidelines policy framework is to identify the ICT knowledge and skills that the teachers need to acquire to integrate ICTs into the curriculum in order to support teaching and learning. In the implementation of the teacher development consideration need to be given on the following:

- There is no single best practice or general recipe for success, which means that errors would be made and be corrected in the process.
- Teacher development programmes should be flexible in access, modes of delivery and content in order to make learning possible in meaningful and equitable ways.
- Teaching practice, including classroom organisation will change if ICT is integrated effectively in teaching and learning.
- Teacher development should be managed.

- Programmes need not necessarily provide training in advance of requirements but concentrate on giving essential training as the need arises.
- Development programmes should not take teachers out of classrooms during normal school hours, so flexible delivery modes for training will be required.
- ICT development for teaching and learning does not happen in isolation, it also impacts on the management and administration of a school.
- ICT development has an impact on the whole-school development; and
- Teacher needs and interests should be the driving force for their professional growth (DBE, 2007:5).

2.3.4.6 Teacher development levels

Teacher developments need to be undertaken sequentially to ensure better development of teachers. As illustrated on Figure: 2.2 the development needs begin with the entry level in which teacher pre-knowledge of computer usage is determined and consolidated. The frustration, insecurities and lack of confidence experienced in this level are addressed. This means that in this level a teacher achieves basic ICT knowledge and skills.

The entry level is followed by an adoption level. In this level the teacher is assumed to be able to use various ICTs (computers, to support traditional management; administration; teaching and learning) and can teach learners how to use ICTs. In other words, the teacher can integrate the ICT knowledge and skills into teaching and learning activities.

The next level is adaptation level in which teacher is assumed to be able to use ICTs to support everyday classroom activities. The teacher is expected to integrate the knowledge, skills and values of ICTs into the design and practice of teaching and learning.

Adaptation level is followed by an appropriation level in which a teacher is presumed has a holistic understanding of ways in which ICT contributes to the teaching and learning and also understands the developing nature of ICT and has an awareness that it is integral to the structure and purpose of the curriculum. This level also expects the teacher to be having experience and confidence required to reflect on how ICT can influence teaching and learning strategies and to use new strategies.

The last level is innovation. Innovation assumes that a teacher can develop entirely new learning environment that use ICT as a flexible tool in the teaching environment. It deals with specialised knowledge and skills used mostly in the higher education institutions like universities. According to the framework, specialised ICT knowledge and skills focus on the transformational use of ICTs to redefine the role of teachers in the classroom environment.

The sequential development of teacher through all the levels can consolidate knowledge and skills of ICTs to the teacher. However, it seems that teachers are not taken through all the levels, yet they are expected to implement ICTs in their teaching and learning. This is confirmed by Vandeyar (2015) when he revealed that district and provincial leaders superficially understood the e-Education policy, do not have the capacity, lack competence and ability to implement the policy as well as supporting schools.

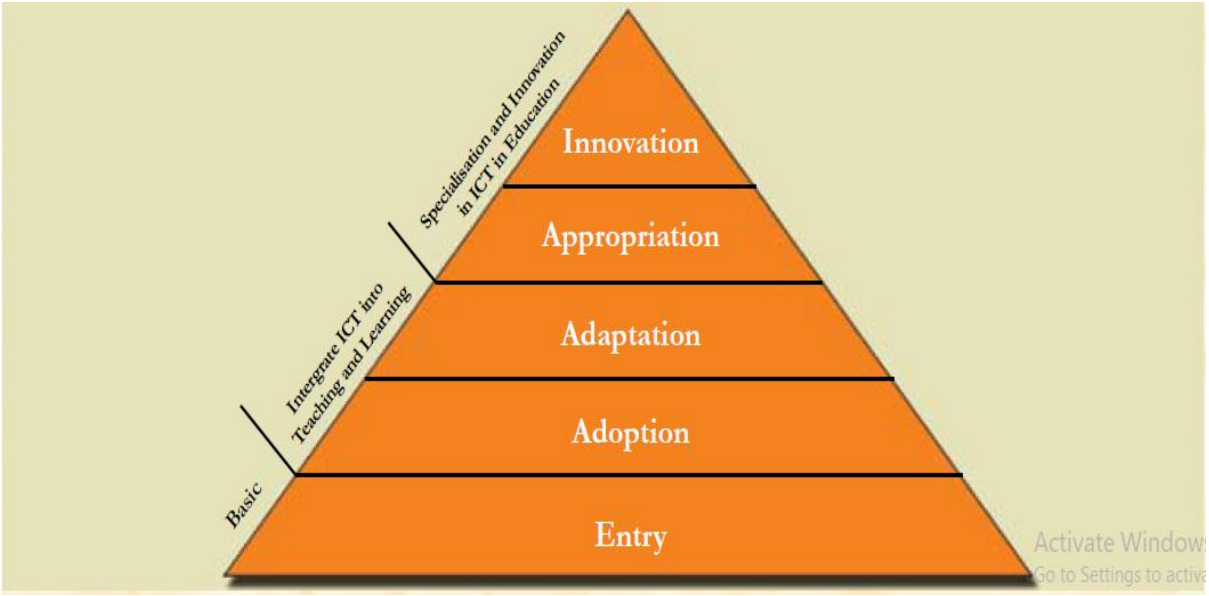


Figure: 2.2 The Teacher Developmental levels (Source: Guidelines for Teacher Training and Professional Development in ICT, DBE, 2007:7).

Figure 2.2 displays the guidelines on the training and development of teachers in ICT. The training programme starts with the entry level in which trainees are initiated into basic ICT skills. The levels are followed sequentially from entry level to adoption, adaptation, appropriation and innovation.

2.3.4.7 Targets for initial and continuing teacher development

The following targets are set by the guideline framework for ICT skills development for practising and prospective students. Firstly, all students leaving higher education for teaching profession should have reached at least the adoption level. Secondly, all practising teachers that have access to ICT should, as a minimum, be trained to the adoption level. Thirdly, the adaptation and appropriate levels focus on knowledge, skills and values to integrate ICT into teaching and learning. Lastly, the innovation level focuses on the transformational use of ICT to redefine the role of the teacher and the classroom.

The set targets are hardly evident in schools, Perhaps this might be because of barriers encountered by the education system such as technological constrains,

lack of infrastructure; hardware; software (Powel, Watson, Staley, Patrick, Horn, Fetzer, Hibbard, Oglesby and Verma, 2015:16). However, there seems to be light at the end of the tunnel as the DBE endeavours to resolve some of these challenges. For example, in its Annual Report 2018/2019 the DBE reported that an ICT school of the future was completed in KwaZulu-Natal (KZN) Province in partnership with Hewlett Packard (HP) in which learner devices, mobile trolleys, teacher laptops, interactive LED boards, LED screens, network infrastructure and ICT teacher training were provided (DBE,2019:17). Furthermore, in the same Annual Report 2018/2019 the DBE also pronounced that it has connected 320 schools and SA Connect Initiative connected a further 107 schools. (DBE, 2019:19). For professional purposes, the DBE reported that 1102 DBE and PED officials were trained on how to use the Moodle Learning Management System in all the provinces.

2.3.5 Professional development framework for digital learning

Another policy framework considered in the implementation of blended learning is the professional development framework for digital learning. The success of technology-based education depends on the professional competency of teachers in digital technologies. In terms of DEB (2007:7) the professional development of teachers is depicted by a high-quality professional learning and is personalised, job-related, ongoing and interactive.

The Learning Forward (learningforward.org) outlines 7 strands for professional learning that increases teacher effectiveness and learner attainment, namely:

- It occurs when learning communities are committed to continuous improvement, collective responsibility, and goal alignment which means that teachers need to be lifelong learners.
- It requires skilful leaders who develop capacity, advocate, and create support systems for professional learning. This clearly requires leaders of schools to be the developers of their subordinates in their respective institutions and therefore they need to have been developed themselves.

- It requires prioritising, monitoring and coordinating resource for teacher learning.
- It integrates theories, research, and models of human learning to achieve intended outcomes.
- It sustains support for the implementation of professional in learning for long-term change, and
- It aligns its outcomes with learning and teaching that is focused on curriculum goals and improved learner attainment.

Digital learning is defined differently according to different contexts. However, DBE (2018) broadly defines it as any learning or teaching activity that effectively uses digital tools and resources to strengthen a learner's learning experiences. It focuses on opportunities for personalised learning, opportunities for learning in and beyond the classroom, student-centred learning, digital content, assessment that are integrated into learning activities and project-based learning activities (DBE, 2018:6).

The professional development of teachers in digital learning adds to the aims and objectives of Action Plan to 2019 and ISPFTED of providing fresh approaches to the professional development of teachers and stakeholders using digital tools and content resources to support improved learning outcomes and higher learner attainment in the curriculum (2018:9). This aim is in keeping with the National policy framework for teacher education and development in South Africa (DBE, 2007) which aims to equip a teaching profession to meet the needs of a democratic South Africa in the 21st century, to provide an overall strategy for successful recruitment and supports and develop teachers in initial professional education and continuing professional development. Thus, the importance of all the institutions to ensure that all their subordinates are professionally developed.

2.3.5.1 Purpose of the Framework

The Framework provides guidelines for the professional development of teachers who use ICTs to enhance the teaching and learning and leaders as well as support staff. DBE (2018:9) submits that the main aim of the framework is to define professional development for digital learning in an education system that seeks to improve access, quality, redress and efficiency. DBE (2018) further submits that if this aim is achieved the following outcomes can be realised, namely, education leaders (nationally, provincially, at districts and institutions) that have a clear plan for professional development in terms of digital learning. Secondly, teachers in schools have a clear plan for their individual needs for professional development in terms of digital learning. Thirdly, learners achieve curriculum goals with support of appropriate teaching and learning approaches, and the use of digital tools and content resources. Fourthly, a wide variety of endorsed professional development activities aligned to the educator competencies and key considerations of the framework are available. Lastly, teachers entering the profession have a working knowledge of digital learning competencies.

2.3.5.2 Global and South African policy context

The Framework is related to some of the goals of the global and South African frameworks. Globally, this framework is related to the United Nation's Sustainable Development Goal (2015) Goal 4 which commits the international communities to "ensure inclusive and quality education to all and promote lifelong learning (UN, 2015). Nationally, the framework is related to Action Plan to 2019: Towards the realisation of schooling Goal 16 which is designed to "improve the professionalism, teaching skills, subject knowledge and computer literacy." This links to the ISPFTED's primary outcome designed to improve the quality of teacher education and development as well as the National Strategy for Learner Attainment (NSLA) Objective 1 which Sustained improvement of learner performance. Outcome 5 is also set to provide improved support for teaching and learning.

2.3.5.3 Socio-economic context

One of the serious challenges highlighted in the implementation of technology-based education is lack of enough resources. This relates to the socio-economic contextual realities of a country. However, Thierry, Harper-Merrett, Traore, Mbangwana and Touré (2009) and Ndlovu (2015) argue that if teachers' ability to teach using digital tools and resources is impeded by the scarcity of such digital tools and resources, then this does not have any significant incapacity factor. The lack of enough digital tools and resources is also addressed by adopting a range of pedagogical approaches. The implications are that the socio-economic context of a country is not a great hindrance in the development of teachers but the adoption of a range of pedagogical approaches with the limited available digital tools and resources.

2.3.5.4 Digital learning

As outlined above, digital learning uses digital tools and resources to strengthen the teacher's and learner's experiences. It is viewed as a modern expression of "ICT integration which is a broader concept than "IT skills" (DBE, 2018). Digital learning also deals with how teachers mediate learning, how learners and teachers use digital tools and content resources as well as how learners are assessed. However, to be successful in the usage of digital tools and resources, teachers need to be professionally developed.

2.3.5.5 Premise of the Framework

The Framework is based on the following premises:

- Mere access to or skills in the use of digital tools and resources does not translate into effective teaching and learning (OECD, 2015).
- As access to a greater range and quality of digital tools and resources increases, so do the range of opportunities that they offer to a learning experience.
- Mere transformative pedagogies (more learner-centred, with knowledge - building and higher order thinking skills) magnify the range of opportunities

offered by digital tools and resources to support and have an impact on learning (Ngảmbi, 2013).

- The effectiveness of digital tools and resources in supporting pedagogies depends on teachers and learners being aware of the opportunities that these tools and resources offer (Bower, 2008).
- An effective blend of pedagogies and interactions that are supported by digital tools and resources may lead to deep learning (Koehler; Mishra; Bouck, DeSchryver; Kereluik, 2011; Shin and Wolf, 2011).
- Change in digital learning competence can be achieved by context-rich exposure to pedagogy and/or potential use of resources in order to understand their value and impact when applied to learning (Ngảmbi, 2013).
- How digital tools and resources are used in the learning environment will depend on teachers' analysis of the accessible resources the learners and their various contexts.
- Teachers' individual evaluation of their digital learning competencies informs their professional development needs and learning pathways, and
- Developing digital learning competencies is the responsibility of role players at all levels of the system.

2.3.5 6 Digital learning competencies and digital literacy skills

In order to ensure the successful implementation of the framework, the digital competencies need to be aligned to the digital literacy that the teachers possess. The digital competencies are the full activities for learning supported by the digital tools and resources which include professional growth activities, curriculum activities and leadership in planning and implementation of digital learning as outlined.

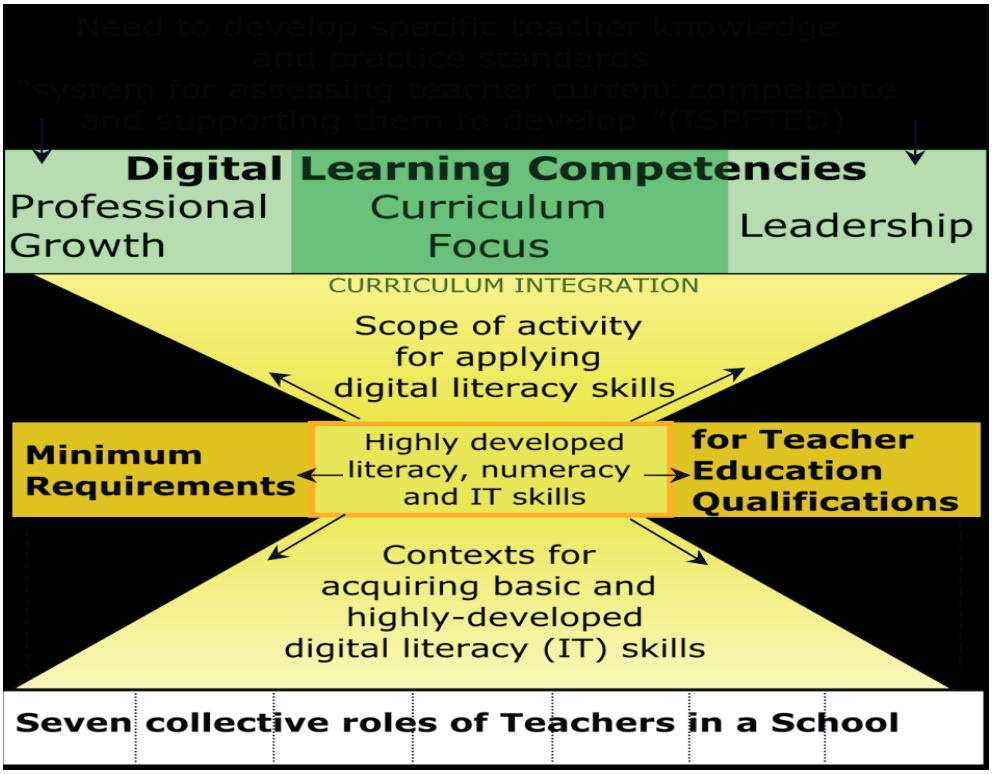


Figure 2.3: Digital Competencies (DBE, 2018:13)

Figure 2.3 depicts the digital competency structure. According to the Framework, a beginner teacher is supposed to acquire 10 basic competencies which are:

- Have sound subject knowledge.
- Know how to teach their subject(s) and how to select and determine the sequence and pace of the content in accordance with both subject and learner needs.
- Know how their learners are and how they learn - they must understand the learner's individual needs and tailor their teaching accordingly.
- Know how to communicate effectively in general, as well as in relation to their subject(s), in order to mediate learning.
- Have highly developed literacy, numeracy and Information Technology (IT) skills.
- Be knowledgeable about the school curriculum and be able to unpack its specialised content, as well as being able to use available resources appropriately, so as to plan and design suitable learning programmes.

- Understand diversity in the South African context in order to teach in a manner that includes all learners.
- Be able to manage learning effectively across diverse contexts in order to ensure a conducive learning environment.
- Be able to assess learners in reliable and varied ways, as well as being able to use the results of assessment to improve teaching and learning; and
- Be able to reflect critically on their own practice, in theoretically informed ways and in conjunction with their professional community of colleagues in order to constantly improve and adapt circumstances (DBE, 2018: 12-13).

On the other hand, the practising teachers need to possess seven competencies which include:

- Specialised in phase, subject discipline, or practice.
- Learning mediator.
- Interpreter and designer of learning programmes and materials.
- Leader, administrator, and manager.
- Scholar, researcher, and lifelong learner.
- Assessor, and
- Community, citizenship, and pastoral role

Apart from the seven competencies, teachers need to possess digital learning competencies. The digital learning competencies that teachers must have include professional growth and knowledge, curriculum focus and leadership. The competencies seek to provide a national reference point for the role players who support teacher professional development at all levels; represent objectives that teachers may want to aspire throughout their careers; set clear expectations of effective teaching using digital tools and resources; and clearly inform the design of professional development activities. Ultimately this enhances confidence in professional growth and knowledge; curriculum focus and leadership (DBE, 2018:14).

Professional growth and knowledge

In this area of focus, teachers acquire the skills of an enquiring mind regarding the educational value of using digital tools and resources. Furthermore:

- Teachers are equipped to be reflective about challenging current digital learning and teaching practice.
- They are trained to understand the role of the teacher, the learner and the digital resources during digital learning, and
- They are skilled to understand their value in participating in local and global professional communities (DBE, 2018).

Curriculum focus

Curriculum competencies which teachers need to acquire include:

- Integrating digital tools and resources in the teaching and learning to enhance learning objectives in various learning environments.
- Developing learner's global awareness and understanding using digital communication and collaboration tools.
- Transforming learning through the innovative use of digital tools and resources.
- Enhancing class management, assessment and feedback processes using digital resources, and
- Integrating learners' skills development in terms of digital literacy with curriculum-based learning.

Leadership

Regarding leadership, teachers are to acquire the digital skills which include:

- Demonstration of a commitment to the vision for digital learning in the province, district, and school.
- Accepting responsibility for planning and implementing digital learning at the school.
- Initiating peer support; and awareness raising campaign about the Framework.

- Partner with all relevant stakeholders in adopting the Framework DBE will work with partners to align their professional development programmes and activities to the Framework.
- Work with DBE partners, Provincial Education Departments, and their partners to develop processes to assist teachers to identify their development needs and to enable expanded opportunities for access to quality CPD activities and programmes to meet these needs.
- Coordinates strategic partnerships for the advancement of the Framework outcomes.
- Lead and coordinate research and evaluation on the impact of applying the Framework to professional development in digital learning.
- Monitor and support Provincial Departments and their partners to implement the Framework

The Provincial Education Departments have duties and responsibilities in ensuring that teachers' digital skills are improved, and for implementation of Teachers' Digital Skills Framework. Their activities include:

- Developing a provincial advocacy and awareness raising campaign about the Framework.
- Building on existing capacity in PTDIs and DTDCs) to promote professional development for learning with technologies.
- Planning and implementing teacher development programmes for digital learning in the province.
- Integrating the Framework principles with professional development activities.
- Monitoring and supporting districts and schools in implementing the Framework.
- Reporting to the DBE on the implantation of professional development for digital learning.

Within the Provincial Education Departments, districts managers have responsibility to cascade information to districts, circuits, and schools. The responsibilities of District Managers include:

- Support the DTDC and district support staff to integrate the Framework in professional development activities for learning with technologies.
- District Teacher Development Centres.
- Develop awareness raising and advocacy activities on the Framework at the DTDC.
- Promote the Framework and its supporting resources.
- Advocate and support the establishment of PLCs and encouraging teachers to participate actively and meaningfully.

In support of the goal and objectives by DBE, the Provincial Education Departments e-Learning and District and Circuit Offices have the Curriculum Support Staff who are assigned the responsibility to:

- Provide support to teachers in the integration of digital tools and resources for effective learning.
- Integrate digital content resources when supporting teachers.
- Provide support to school management teams and teachers in developing and managing their Professional Development Portfolios

On the other hand, the DHET was assigned the responsibility to:

- Promote the development and offering of appropriate qualifications based CPD programmes aligned to the Framework by universities and support them to do so as funds become available.
- Promote integration of the Framework in the design and delivery of pre-service teacher education programmes and courses.
- Support the further development of teacher education at tertiary institutions to integrate digital technologies in their own teaching; and
- Support research on digital learning at tertiary institutions.

Apart from DHET, DBE has multiple partners, such as Education Faculties and Teacher Training Institutions; and South African Council for Educators (SACE). Each of the partner has a set of responsibilities to carry.

Education Faculties and Teacher Training Institutions activities include:

- Integrate digital learning competence in the teacher education programme.
- Model digital learning competence during teaching activities.
- Develop student digital learning competencies during teacher education activities.
- Conduct research, where the opportunity arises, related to implementation of
- The Framework and development of digital learning competencies.

On the other hand, South African Council for Educators (SACE) responsibility is to provide a Continuing collaborative, work-place learning.

2.3.5.7 Curriculum integration of digital tools and resources

Improved learner attainment can be enhanced through effective teaching and learning supported by digital tools and resources. According to DBE (2018:20) this can be done through developing teachers' technological knowledge, pedagogical knowledge and content knowledge as reflected in Figure 2.4.

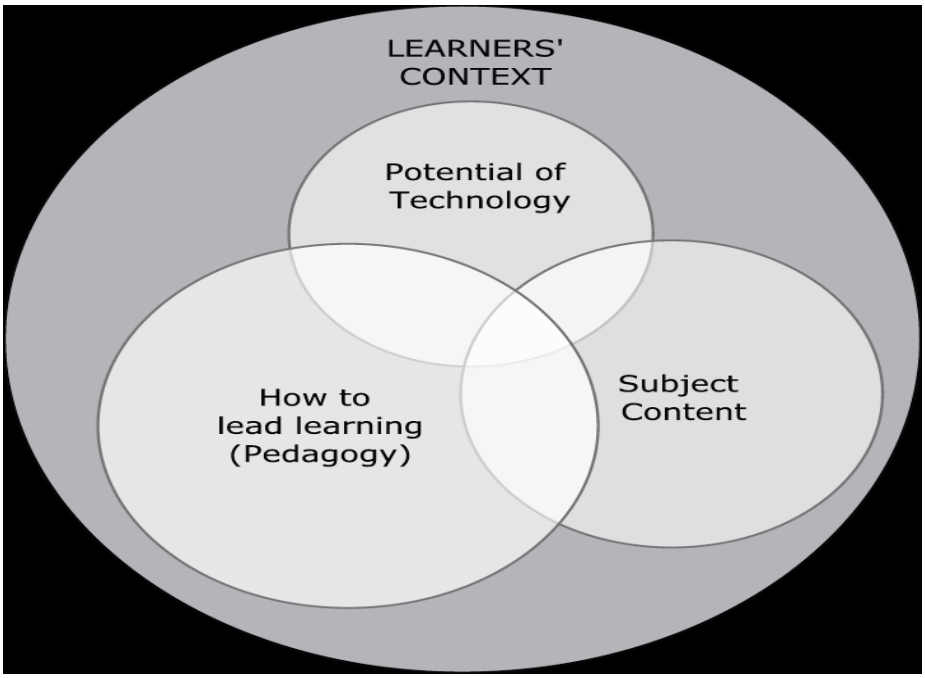


Figure 2.4. Knowledge framework for teacher development (DBE, 2018:20)

The figure above attaches great importance on how teachers should be competent in pedagogy and therefore succeed in their application of relevant

digital tools and resources to successful learning. As the focus of this study is on the implementation of a technology-based learning, the details on the potential of technology and subject content are undertaken do not form part of the study. The roles of the various stakeholders in the implementation of the framework are highlighted.

2.3.5.8 Implementation of the Framework

Various stakeholders are responsible for different activities in the implementation of the framework. These include activities led by DBE, provincial departments, DHET and activities undertaken by other role-players such as unions, schools and SACE. The activities led by DBE entail embarking on an advocacy Professional Teacher Development System that recognises professional development activities that are aligned to the Framework.

On the other hand, teacher unions are expected to advocate, support and encourage teachers to access opportunities to identify and address their development needs in terms of digital learning. Similarly, SACE is mandated to spearhead plans and implementation and endorsement of teacher professional activities in digital learning.

In addition, school leaders' responsibility is to promote the use of the Framework and its supporting resources; build on existing capacity to support professional development in digital learning at the school; and encourage teachers to plan continuing professional development and to record activities on the SACE CPTD system. Teachers also, have their role to play, in ensuring that they are immersed with Teachers Digital Framework. Teachers need to aspire to the competencies outlined in the Framework, and plan for effective use of digital tools and resources by learners. Furthermore, teacher librarians and school ICT coordinators should support teachers in the development of support materials that integrate digital tools and content resources.

2.3.5.9 Action Plan for Achievement of the Framework

According to DBE (2018) the support and alignment, strategists, monitoring and evaluation and building of competencies and existing capacity building of the Framework were undertaken during around April-July 2017. The implementation of the Framework in the provincial level was due in 2018 according to the plan (DBE, 2018:31-36). The analysis of the implementation plan suggests that presently (2020) most teachers might have been professionally developed and being practising digital learning in schools. However, little evidence of digital learning if any is witnessed, particularly in rural area schools. The Table 2.2 below displays the Action Plan for the Achievement of the Framework Outcomes.

Table: 2.2 Action Plan for the Achievement of the Framework Outcomes

	Activities Key	**Lead agencies**	**Tasks**	**Time frame**
1. Support and alignment				
1.1	Develop support materials for users to understand and apply the competencies	DBE	Identify and develop diagnostic self-assessment tools for teachers, SMT and curriculum support staff.	May-June 2017
1.2	Align CPD activities with educator competencies and the key ideas of the Framework	DBE, SACE	Meet with SACE to explain the key ideas of the Framework and educator competencies. Seek ways of aligning the SACE evaluation tool for professional development activities with the Framework. Meet with SACE evaluators of digital learning activities; Identify existing endorsed PD activities. Analyse the alignment of existing activities with Framework. Publish information on activity alignment to the framework.	April-June 2017

			Identify gaps in the provision of activities in relation to specific competencies.	
1.3	Develop support resources for provincial implementation.	DBE, PDE	Develop one-page information sheets, apps and diagnostic self-assessment tools. Conduct provincial workshops to introduce support materials.	July – Dec 2017
1.4	Evaluate and endorse professional development activities in alignment with the key ideas of the Framework.	SACE	Evaluate and endorse PD activities using the revised evaluation tools.	Ongoing
1.5	Adopt the key ideas of the Framework and train evaluators.	SACE, DBE	Run a workshop with SACE evaluators to introduce the key ideas of the Framework. Adoption of the key ideas of the Framework. Revision of evaluation tools for evaluating activities for digital learning.	April 2017
1.6	Approve providers of teacher professional development for digital learning.	SACE	Evaluate and approve providers.	Ongoing
1.7	Maintain and publish an updated list of endorsed professional development activities including information on their alignment to the framework.	SACE, DBE	Update and publish the list of endorsed activities. Publish information about the alignment of activities to the framework.	April 2017-Dec 2020
2.Strategize				
2.1	Plan a strategy for promoting digital learning.	DBE	Conduct strategy planning meeting	April-June 2017
2.2	Implement the strategy for promoting digital learning.	DBE	Develop workshop/seminar materials for Implementing Digital Learning Conduct workshops / seminars.	June 2017-Dec 2018
3. Monitoring and evaluation				
3.1	Plan and coordinate an evaluation of the impact of	DBE	Identify evaluation consultants; Identify key projects for evaluation	July 2017 – Dec

	digital learning		Analyse evaluation results; Identify strategies for harnessing best practice Revise the Framework.	2020
3.2	Develop parameters for monitoring implementation of the Framework	DBE, PDE, NICPD, ETDP SETA	Conduct a consultation process with the IT Steering Committee, NICPD and ETDP SETA Negotiate parameters for measuring implementation progress in provinces, districts and schools Develop rubrics to measure transition in digital learning.	July 2017 – Dec 2020
3.3	Monitor implementation of the Framework	DBE, PDE	Receive and analyse quarterly reports from PDEs.	July 2017 – Dec 2020
4. Build competence and build on existing capacity building				
4.1	Identify key role-players in terms of professional development for digital learning	DBE, PDE	Create online learning community for provincial role- players Create a communication forum for key role players;	April 2017 – Dec 2020
4.2	Build the competence of key role-players to plan, develop and implement PD activities for digital learning	DBE, PDE, PTDI, DTDC, Partners	Design a course for building the competence of provincial role players Develop online collaborative learning materials for provincial role-players Develop evaluation tools for transition and implementation Conduct online courses for key role-players.	April 2017 – Dec 2020
PROVINCIAL LEVEL IMPLEMENTATION				
5. Prepare				
5.1	Plan teacher development programmes for digital learning.	PDE, PTDI, DTDC,	Conduct planning meetings using the guidelines acquired from capacity building workshops	By January annually

		Teacher Unions	Set annual targets for the number of teachers and principals engaged in workshops/ seminars and PLCs.	
5.2	Implement teacher development programmes for digital learning.	DTDC, Teacher Unions, Partners	Plan, fund and implement a programme of activities for digital learning.	Ongoing starting Jan 2017
5.3	Monitor and support DTDC and district support staff with the implementation of the Framework in professional development activities for digital learning.	District Managers, DTDC	Coordinate reporting and feedback mechanisms Identify indicators of success; Seek support from PDE where the needs.	Jan – Dec 2020
5.4	Evaluate the implementation of teacher development programmes for digital learning.	PDE, DTDC, Teacher Unions, Partners	Use the evaluation tools developed by DBE to evaluate the effectiveness of PD activities.	Ongoing post workshop
5.5	Report to the Department of Basic Education on the implementation of professional development for digital learning.	PDE	Complete an evaluation form and an implementation report template Submit the documents to the coordinating officer at DBE	Quarterly
6. Promote the Framework and its supporting resources.				
6.1	Develop and implement a strategy for digital learning	PDE, PTDI, DTDC, Teacher Unions,	Identify the key objectives for a digital learning plan Develop a provincial strategy for enhancing digital learning and learner attainment Implement the strategy action items according	Jan 2018 – Dec 2020

		School Leadership	to a timeline.	
6.2	Integrate digital learning resources with teacher development activities that support the NCS.	PDE, DTDC, Curriculum support staff, Partners	Conduct curriculum workshops to explore the opportunities that digital tools and content offer to each subject Integrate appropriate digital tools and content resources during all teacher support and development activities.	Jan 2018-Dec 2020
7. Advocate and support the establishment of PLCs and encourage teachers to participate actively and meaningfully.				
7.1	Coordinate the establishment of PLCs for digital learning	DTDC, school leadership, teachers	Identify role players Build on the existing capacity of key role players to establish and grow PLCs.	Jan 2018-Dec 2020
7.2	Support PLCs.	DTDC	Coordinate meetings or online interaction spaces for PLCs for digital learning.	Jan 2018 - Dec 2020
8. Provide on-site support to teachers in terms of the integration of digital tools and resources for effective learning.				
8.1	Support teachers with integration of digital tools and resources according to the TPACK knowledge framework	School and district e-learning and curriculum subject specialists, Teachers	Visit and engage in dialogue with teachers about digital learning Participate in PLCs as collaborative learners; Establish and participate in online PLCs Host workshops/seminars for teachers.	Jan 2018 – Dec
9. Provide support to school management teams and teachers in developing and managing their Professional				

Development Portfolios.				
9.1	Promote the diagnostic self-assessment of individual professional development needs for digital learning	DTDC, Curriculum support staff, school leaders	Promote the use of the diagnostic self-assessment tools that are based on educator competencies Identify gaps in competence based on the diagnostic self-assessment Discuss options for professional growth.	Jan 2018 – Dec 2020
9.2	Plan professional development pathways and update portfolios.	Principals, Vice principals, Heads of Department, Teachers	Prioritise professional growth requirements; Complete the PDP Participate in professional development activities for digital learning.	Jan 2018 – Dec 2020
9.3	Support change leadership in schools.	DTDC, School leadership	Identify facilitators of change leadership workshops Conduct workshops on change leadership for digital learning.	Jan 2018 - Dec 2020
10. Through higher education institutions, implement qualification based CPD programmes and accredited short learning programmes that are aligned to the Framework for all types of teachers who work in the schooling system.				
10.1	Evaluate existing programmes' alignment to the key ideas of the Framework	DHET, HEI, Partners	Conduct a Framework introduction workshop for HEI staff responsible for curriculum development and technology integration skill Develop/refine tools for evaluating existing programmes' alignment to Framework.	May – Dec 2017
10.2	Adapt existing programmes	HEI	Develop/adapt courses; Submit courses for	Jan 2018

	or develop new programmes for digital learning as needed.		approval (if necessary) Include a course on digital learning in teacher education programmes for all pre-service teachers.	– Dec 2020
10.3	Integrate the educator competencies in the delivery of pre-service teacher education programmes and courses.	HEI	Analyse existing programmes and identify how educator competencies in digital learning could be included where appropriate Model digital learning during course delivery.	Jan 2018 – Dec 2020
11. Plan for the effective use of digital tools and resources by learners while enhancing curriculum aims.				
11.1	Aspire to the competencies outlined in the Framework.	Teachers	Attend workshops/seminars on digital learning that focus on learner-centred approaches Reflect on the effectiveness of lessons and evaluate options for new learner-centred approaches including digital tools and content resources Conduct diagnostic self-assessment of competencies and plan professional growth according to individual needs.	Jan 2018 – Dec 2020
11.2		District curriculum support staff Teacher librarian School-based curricu	Support teachers with development of teacher learner support materials that promote learner centred use of digital tools and content resources Conduct workshops/seminars/ meetings and support PLCs that focus on conversations about learners' access to digital tools and resources Conduct professional development activities that focus on learner-centred use of digital tools and resources	Jan 2018 – Dec 2020

		lum suppor t staff Teach ers	Teachers afford learners opportunities to use digital tools and resources whenever appropriate.	
12. Analyse progress in the transition to digital learning.				
12.1	Apply diagnostic self-assessment tools when evaluating progress.	DTDC, school s	Conduct a workshop to determine progress in adopting digital learning Apply the Digital Learning Progress Rubric Determine the next action steps.	Jan 2018 – Dec 2020
12.2	Apply diagnostic self-assessment tools to determine individual learning needs	Princip als, SMT, teache rs	Complete the professional development analysis tools Identify gaps in learning; Set priorities for professional development in digital learning Complete the PDP; Participate in PD activities.	Jan 2018 – Dec 2020

Source: Professional Development Framework for Digital Learning (DBE, 2018:33 – 36)

Table 2.2 shows a framework for the achievement of development of teachers in digital learning. The framework indicates the alignment of key activities, the responsible personal and structures, the tasks and time frame of completions of the key activities. The key activities which the DBE and PDE are responsible to include support and alignment, strategies, monitoring, and evaluation, building of competencies and capacity building. In terms of the national framework the timeframe for the implementation of the professional framework is 2017- 2020 and for the provinces is 2018 - 2020. According to this framework if things would have gone well, almost all the teachers would have been professionally developed in digital learning presently (2020).

2.3.6 National Strategy for Learner Attainment (NSLA)

The aim of education is effective teaching and learning. One of the indicators of the achievement of the aim is satisfactory learner performance. Contrary to this expectation, our education department is faced with poor learner performance. This is confirmed by international studies such as Southern and East Africa Consortium for Monitoring Education Quality (SACMEQ), Trends in International Mathematics and Science Studies (TIMSS) and Progress in International Reading Literacy Study (PIRLS) (DBE, 2015).

To address the situation, the DBE developed a strategy for improving learner attainment in schools. This was established because the department felt there were barriers which contribute to the poor performance of learners. This attainment strategy is called the National Strategy for Learner Attainment Framework (NSLA). The framework sought to achieve Action Plan 2014/19: Towards schooling 2025/2030 goals which are about the improvement of teaching and learning in the schooling system. According to the DBE (2015:2) the objectives of the framework is to:

- Sustain improvement in learner outcomes/performance.
- Enhance accountability at all levels of the system.
- Focus greatly on basic functionality of schools.
- Protect time for teaching and learning.
- Improve support for teaching and learning.
- Increase efforts on time on task, and
- Provisioning of resources.

2.3.6.1 Division of the Framework

The framework is divided into nine sections which are:

Section 1: Management and leadership.

Section 2: Early childhood development.

Section 3: Multi-grade; Primary/Get Schools: Foundation Phase; Intermediate Phase, Senior phase; Rural Education; Reading and Career Guidance.

Section 4: High/FET Schools.

Section 5: Mathematics, Science and Technology.

Section 6: Comprehensive Teacher Development Programme.

Section 7: Resource provisioning.

Section 8: Inclusive Education, Special Schools, Full-service Schools; Home Education; and

Section 9: ICT Support to Curriculum.

For the purpose of this study the management and leadership, resource provisioning and ICT support to curriculum sections are discussed.

2.3.6.1.1 Management and Leadership

The significance of having a sound management and leadership for delivering quality education in schools cannot be overemphasised. This can only be realised if schools have School Management Teams (SMTs) who are able to fulfil their roles as leaders in the implementation of curriculum. Furthermore, the schools need to have Districts which provide targeted support to improve practices within schools (DBE, 2015). In order to achieve the objectives of the Framework the various stakeholders such as the Provincial officers, District officers, EMGDs, Coordinators on school governance; Coordinators on school management and leadership are allocated activities to be undertaken. The various allocated activities to the stakeholders are shown in a table below:

Table 2.3: Responsibilities of various stakeholders

EDUCATION, MANAGEMENT AND GOVERNANCE DEVELOPMENT				
Item	**Strategy**	**Performance indicator**	**Responsibility**	**Time Frames**
1.	Monitor the functionality of the SGB	Monitoring plan of SGB functionality using the relevant tool Populated SGB Functionality Tool per visited school	Provincial and District EMGD Coordinators on School Governance	Quarterly
2.	Improve parent and community participation in the governance of schools	Report with the Database of newly elected SGB members per school	Provincial and District EMGD Coordinators on School Governance	May 2015
3.	Capacity building and Orientation of all newly elected SGBs	Management plan for SGB orientation and capacity building	Provincial and District	Quarterly
4.	Training of Principals (Grade R to 12) in School Leadership and Management	training of principals in management and School Leadership Report that indicates the following: • Number of Principals trained • Areas of training per session • Impact of training	Provincial and District EMGD Coordinators on School Leadership and Management	Quarterly
5.	Competency assessment of School Principals	Report indicating the number of School Principals who have gone through competency assessments before being appointed and the impact.	Provincial and District EMGD Coordinators on School Leadership and Management	Quarterly
6.	Induction of newly appointed SMTs	Report indicating the number of inducted SMTs and impact of the	Provincial and District EMGD Coordinators on	Quarterly

		sessions.	School Leadership and Management	
DISTRICT COORDINATION AND DEVELOPMENT				
1.	Provinces to refine their calendars by September and submit to districts to finalise plans before end of October and submit to schools. A refined provincial calendar free of clashes to be developed and approved.	A refined provincial calendar	Director Communication	Dec 2014
2.	Completing district and circuit/Area Office (AO) plans considering the provincial plan - to set district targets with specific emphasis on the exit classes	Learner Attainment Implementation Plans developed addressing shortcomings and catering for uniqueness of the district.	District Director Area Managers / Circuit Managers	End Feb 2015
3.	A coordinated circuit/AO plan with dates of planned principals meeting (for clusters/EMGD/Management) - To determine the number of days principals/ stay away from schools	District plan indicating all Area Offices interactions with school managers by Area office Officials (EMGD, Circuit managers and Curriculum)	District Directors Area Managers Circuit managers	Feb 2015
4.	Holding the curriculum Bosberaad in Districts and Circuits/AOs to address all district officials on the district plan and agree on the implementation. Identify specific challenges and strategies for intervention by multidisciplinary teams.	Meetings held in Districts cluster and Circuits / AOs.	District Director Area Manager, EMGD, AO Curriculum Coordinators and Circuit Managers	Feb 2015
5.	Adopting the underperforming schools for mentorship 5.1 All FET underperforming schools and first time Grade 12 schools by members of the Senior and Middle Management Team. 5.2 GET schools feeding	Reports of continuous mentorship of school principals by senior and once per month per manager per school. Reports should be submitted to the Area Managers/ District CES	SG Provincial and District Directors	

	underperforming High Schools by Deputy Chief Education Specialists	/School Improvement Plan (SIP) coordinator.		
6.	One meeting of mentors with districts to discuss findings and concerns from school visits.	Reports of problems identified, and interventions submitted during the meeting.	District Directors	End June 2015
7.	Updating profiles of all schools on a provided template for informed intervention and support. - Profile to include audit of teacher qualification and specialization	Updated profiles of schools existing in Districts / Circuits / Area Offices. Data base of teachers' qualification and areas of specialization and • relevant placement of teachers • regularly updated and monitored completing the HR CV project	Area Managers EMIS	End Feb 2015 and ongoing
8.	Monthly meetings of Circuit Managers, Curriculum Coordinators, Subject Specialists, EMGD and IQMS officials in Circuits/AOs to discuss problems experienced at schools regarding monitoring, support and review of targets.	Minutes of such meetings made available to district directors by Circuit /Area Managers.	District Director Circuit/Area Managers.	Monthly
9.	Support Forums for SMTs to share good practices on institutional management.	Reports on the Quarterly meetings of all high school principals in the area office.	District Directors/Circuit/Area Managers	Beginning of each term
10.	Monitoring; support and guidance to schools on: • Curriculum coverage • Correct timetables • In-school monitoring • Management meetings • Analysis of performance	Reports on the visits made available to the District / Circuit/Area Manager for interventions with the relevant officials.	District Director/ Circuit Managers	Monthly

	• Staffing			
11.	Issuing written notices to all schools identified as underperforming (Section 58B (1)) for them to prepare a plan setting out how academic performance at the school will be improved. Education Laws Amendment Act 2007 Section 16A (1) (b)	Reports on the letters issued to underperforming schools by Superintendent-General (SG) indicating number and kind of issues to be addressed.	SG	End Jan 2015

Source: National Strategy for Learner Attainment (DBE, 2015:5)

Table 2.3 presented the roles the various stakeholders need to play in the management and leadership pertaining attainment of learners in schools. The various stakeholders which include the Provincial officials, District officials, Circuit officials, Principals, SMTs and SGBs are responsible are responsible for the coordination of monitoring of the functionality of SGBs, improvement of parent and community involvement in the governance of schools, capacity building, orientation and training of SGB, training of principals in management and leadership, competency assessment of principals, coordination and development of teachers by the district officials. According to the development framework the plan was supposed to have been completed during 2015, but unfortunately to date little evidence is seen if any.

Regardless of the perfect outlines set, the management and leadership in schools is still problematic. Studies undertaken by Thaba-Nkadimene (2016); Nkadimeng (2017) revealed that the School Management Teams (SMTs) lack competencies in the management and leadership of the curriculum. It is therefore necessary that those assigned responsibilities in managing and leading the curriculum execute these responsibilities adequately.

2.3.6.1.2. Resource provisioning

Resource provisioning in schools appear to be problematic regardless of Action Plan Goal 19 which articulates that all learners in schools should have access

to resources according to the national policy. The procuring, delivery and maintenance of resources by DBE, provinces and schools are not adequately done so that quality education can be ensured. Various studies revealed challenges such as unequal allocation of resources to institutions, insufficient technologies, lack of project management and leadership as factors which are the results of poor resource provisioning (Sedibe, 2011; Louw, 1991; Education Foundation, 2000; du Plessis and Webb, 2012; Kwinda, 2013; Mojapelo, 2014). The availability of resources in schools is extremely vital for good quality education provisioning in schools (Czerniewics, Murray and Probyn, 2000). Thus, the lack or insufficient thereof is detrimental to the successful implementation of curriculum.

Lack of adequate resources leads to a poor provision of quality education resulting in learners who cannot read, write and compute (Spaull, 2013). In a study by Murtin (2013) lack of investment in school infrastructure and learning materials in disadvantaged areas was also observed. It is therefore suggested in this study that the DBE need to first ensure that sufficient budget for the technological resources and human resources is available.

2.3.6.1.3 ICT support to curriculum

The aim of using ICTs in institutions is to support curriculum implementation. It is therefore vital that all the stakeholders involved execute their management and leadership responsibilities fully. A successful ICT usage in curriculum pivots around a sound teacher professionalism; skills; subject knowledge and computer literacy, availability and accessibility of the technologies and quality monitoring and support as well as the connectivity of the institutions.

To address ICT support to the curriculum implementation, Action Plan 2019 developed Goal 16, 20, 22, 24 and 27. These goals are outlined as:
Goal 16: Improve the professionalism, teaching skills, subject knowledge, and computer literacy of teachers throughout their entire careers.

Goal 20: Increase access amongst learners to a wide range of media, including computers, which enrich their education.

Goal 22: Improve parent and community participation in the governance of schools, partly by improving access to important information via the e-Education strategy.

Goal 24: Ensure that the physical infrastructure and environment of every school inspire learners to want to come to school and learn, and teachers to teach; and

Goal 27: Improve the frequency and quality of the monitoring and support services provided to schools by district offices, partly through better use of e-Education.

The achievement of the goals necessitates formulated strategies which to be applied effectively and efficiently. DBE (2015:92) outlines strategies to be undertaken to ensure effective ICT usage to support curriculum implementation in institutions. Table: 2.4 clarifies the strategies.

Table 2.4: Strategies to support curriculum though ICTs

Item	Strategic Activity	Performance Indicator	Responsibility	Time Frames
1.	ICT professional development for management, teaching and Learning	Report with the following information: Number of teachers with the following ICT skills: • Basic Skills • Intermediate Skills • Advance Skills	PED	Quarterly
2.	Electronic content resource development and distribution	Report with the following information: Number of: • Electronic content resources available to schools • Schools with access to electronic content (Online/Offline) • Schools using electronic content (Online/Offline)	PED & DBE	Quarterly

3.	Access to ICT infrastructure	Report with the following information: Number of schools with: • Computers for administration • Computers for teaching and learning • Other technologies for teaching and learning • Access to an educational broadcasting	PED	Quarterly
4. .	School connectivity	Report with the following information: Number of schools with: • Email addresses • Connectivity for administration • Connectivity for Teaching and Learning	PED	Quarterly

Source: NSLA, DBE (2015:92)

Table 2.4 displays the strategies to support curriculum implementation through ICTs in schools. It highlights the strategies to be undertaken by the DBE and PED. These activities include ICT professional development in management and teaching and learning, development of electronic content resources, accessibility of ICT infrastructure and school connectivity. The time frame of curriculum implementation is also indicated on the table.

2.3.7 Connectivity school policy

Connectivity of schools is a directing factor to the implementation of ICT education. However, this seem to be one of the challenges experienced by the DBE, provinces, districts and schools. Mhlongwa (2012) submits that connectivity in schools is a preceding factor of ICT implementation in the teaching and learning environment. It is therefore imperative that all schools be connected before the implementation of technology education is introduced.

Contrary to the abovementioned, the Provincial and District offices of DBE seem to be experiencing problems regarding connectivity. According to Mweli's

report, only two schools in Limpopo Province during 2011/12 financial year had access to internet and 33% of 3 965 schools connected in 2012/2013 financial year. Fisher, Bushko and White, 2017 also cite connectivity as one of the greatest challenges of implementing technology education in schools.

Regarding connectivity, South Africa seems to be steadily improving. Although the DBE identified the general challenges which include connectivity, in its 2013 status report on education to the Portfolio Committee it reported that the total number of Districts offices connected were 86 and in 2011/2012 77District offices were connected, and 24 453 schools and 10 065 administration offices as well as 4 195 schools for teaching and learning purposes were connected (DBE, 2013).

Furthermore, it was also reported that organisations such as 2010 FIFA COP Legacy project, Vodacom Foundation project, Telkom Foundation and CSIR-Meraka Institute project assisted in connecting some schools (DBE, 2013). It can be assumed that presently (2020) connectivity in schools is not a serious challenge and therefore implementation of technological education might not be hampered.

2.4 SOUTH AFRICAN EDUCATION SYSTEM

The South African education system is faced by many challenges. These include curriculum changes which needs enough educational infrastructure, teaching and learning equipment relevant for the 21st century. Among these challenges, the professional development of teachers is crucial in order to ensure quality teachers for digital learning and teaching for today's world such as blended learning.

2.4.1 Professional development

Quality provision of education is guaranteed by quality teachers. Faced with the poor performance of learners in schools necessitates us to have answers for many questions. These include: Are we having quality teachers? Or Are we

faced by the situation as revealed by Prensky (2001:1) in which we have “digital immigrant instructors, who speaks an outdated language and struggling to teach a population that speaks an entirely new language? It is worth noting that the poor performance is for the learners who are often referred as Millennium Learners (Pedro, 2006), Digital Natives; IM Generation; The Net Generation or even Homo Zappiens (Prensky, 2001).

To address the quality provisioning of quality education issue, the Department Basic Education (DBE) and Higher Education and Training (DHET) established some legislation frameworks which include Action Plan to 2019 and Professional development framework for digital learning. One of the goals of Action Plan to 2019, Goal 16 states “to improve the professionalism, teaching skills, subject knowledge and computer literacy of teachers throughout their entire career” (DBE and DHET, 2011). However, it is questionable whether these goals are achieved as expected. With reference to Grade 12 results in Limpopo Province which are always not satisfactory (DBE,2018:11), this suggests the department experiences problems in the achievement of Goal 16. This therefore necessitates that drastic measures need to be undertaken to address the situation.

Perhaps it is for this reason that South Africa Education Department emphasises that ICTs must be used to ensure quality education. However, the introduction of educational technologies in schools requires qualified and skilled teachers in ICT which happens to be one of the challenges encountered by the DBE. It is imperative that before any idea of ICT implementation, teachers must have been developed and skilled. Like the connectivity of the school, development of teachers is key in the success of technology-based education. Ito, Gutiérrez, Livingstone, Penuel, Rhodes, Saba, Schor, Sefton-Green & Watkins (2013:54) attribute that teachers need cognitive competencies such as critical thinking, problem-solving, analysis, reasoning, interpretation, decision-making, adaptive learning, executive function, information literacy, information, and communication technology literacy to be relevant for the 21st century

technology education. Ito, *et al.* (2013:55) concur that the 21st century teachers must be intellectually open which means that they must be flexible, adaptable, artistic and culturally appreciative, continuous learners, intellectually interested and curious, initiative, self-directed, professional, responsible citizens, productive, self-regulated, self-reinforcement and career-orientated.

2.4.2 Status of e-Education

Regardless of South African e-Education policy which stipulates that every learner must be able to use ICTs confidentially and creatively by 2013 (Mweli, 2013), this seems to be little visible. This is clearly highlighted by Mhlongwa (2012:2) when she indicates that 10% of the 28 000 schools in South Africa have access to one or more computers and that these computers are mostly used for administration purposes with little emphasis on teaching and learning purposes.

Mweli (2013) posits that by achieving the objective of DBE to implement ICT education, schools are enabled to use ICT as a tool and platform for improving accessibility, inclusivity, quality, and efficiency. To date, little evidence of accessibility and efficiency in the use of ICTs in schools is witnessed, with rural areas mostly notable. Hlalele, (2012 & 2014), Gardiner (2008), Nelson Mandela Foundation (2005), Ministerial Committee on Rural Education [MCRE] (2005) confer that education in rural areas is not at an acceptable level with ICT integration in schools. Many schools in South Africa struggle to integrate ICT education in pedagogical practices due to several challenges (Dlodlo, 2010; Dzansi and Amedzo, 2014; Hlalele, 2014; Mathebula and Uwizeyimana, 2014).

The problems and challenges which are met in the implementation of ICT education are according to Mhlongwa (2012:2) financial constraints and lack of the government to prioritise ICT implementation in schools. Mweli (2013) in her report on the status of e-Education in South Africa highlights the challenges which impedes e-Education implementation such as: lack of a dedicated ICT implementation budget; lack of provincial ICT implementation plans; insufficient

alignment of provincial plans and targets to Action Plan to 2014 (goals 16 to 20); lack of competent and dedicated human resources; limited connectivity; high cost of connectivity; and reluctance of network operators to implement the e-rate. The challenges are more prevalent in the rural areas and have impacts on the performances of teachers and learners as is evidenced by the results the rural schools obtain compared to their counterpart urban areas. For example, according to the report, 10% of Limpopo Province and Eastern Province have access to internet as compared to 63% and 79% Gauteng and Western Province respectively (Mweli, 2013). It is therefore not surprising that Gauteng and Western Provinces achieve better results regularly.

2.5 EDUCATION PROVISIONING IN SEKHUKHUNE DISTRICT

Sekhukhune District is one of the five Limpopo Province districts making 11% of the Limpopo Province. The District is subdivided into Ephraim Mogale, Elias Motsoaledi, Tetakgomo-Greater Tubatse and Makhuduthamaga municipalities. According to Limpopo DC47 (2018: v) the District falls under Category C and is 13 645 hectares with a population of 1169 762. The district provides community services and mining (15-20%), trade (17%), financial and business (10-12%) and agricultural (9,7%) services (Limpopo DC47, 2018).

Education is provided through Early Childhood Development Centres (ECDs), schools and colleges in this district through the Department of Basic Education. The Head Offices of the district is located at Lebowakgomo and River Cross. Schools and Early Childhood Development Centres are under the supervision of several circuit offices in the district and the colleges are independent bodies controlled by the Provincial Department of Education.

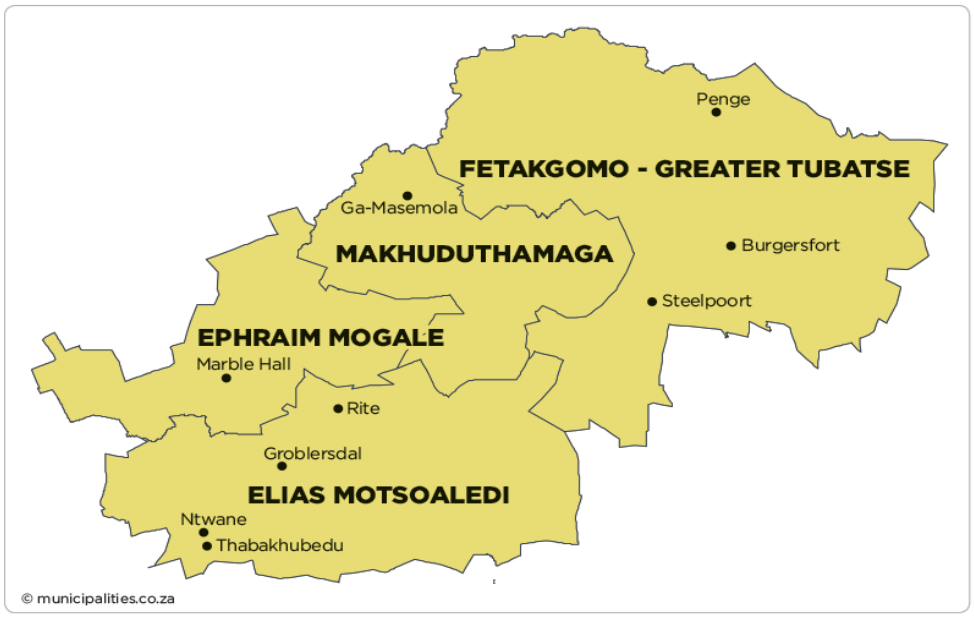


Figure 2.5: Sekhukhune District map (Source: Limpopop D47)

Figure 2.5 shows the Municipalities that share borders with Sekhukhune District. As indicated above, the area of the district is 13 645 hectares and has a population of 1169 762. This study was undertaken in the schools in Makhuduthamaga and Tetakgomo-Greater Tubatse Municipalities.

2.5.1 Access to education in Sekhukhune District

As outlined above, education in this district is obtained from ECDs, schools and Technical and Vocational Education and Training (TVET) Colleges. Tertiary students are registered at universities in and around the nearest districts such as University of Limpopo, University of Venda, University of Mpumalanga as well as in other provinces. The focus of this study is on the teachers who are teaching in schools in the Sekhukhune District. As is evidenced by Grade 12 results, Sekhukhune District is an underperforming site as compared to other Districts of Limpopo Province. For example: of the total 13 schools which achieved below 40% matric results for 5 consecutive years, that is from 2013 to 2017, there are 4 schools from Capricorn, only 1 school from Vhembe and 8 schools were from Greater Sekhukhune (DBE, 2017:14-15). This is indicative

that there are severe problems with the way education is offered in this District and such paucity calls for immediate attention.

It can be argued further that the performance of Sekhukhune District contributes negatively to the overall matric results of both Limpopo Province and South Africa. As indicated from the results of all the provinces, Limpopo Province together with Eastern Cape are the lowest on 65.6% and 65.0% pass rate respectively. In contrast to the parlous results in these two, there is a lot of good performance in Mpumalanga got 74.8%, Gauteng 85.1%, North West 79.4%, KwaZulu-Natal 72.9%, Free State 86.1%, Northern Cape 75.6% and Western Cape 82.8% (DBE, 2017:16). This might suggest that education is offered differently in the Limpopo Province. This again serves as a clear indicator that something needs to be done in the way education is provided in Sekhukhune District.

2.5.2 Access of ICT in Sekhukhune District

Access to electricity is critical to the success of quality education provisioning, particularly ICT education. This is because electricity is a driving force for the usage of landlines, mobile phones and internet. It is therefore imperative that school communities need to be connected. Statistics South Africa 2016 indicates that the proportion of households with access to electricity in Limpopo Province ranges from 73% to 98,6% with Makhuduthamaga and Ephraim Mogale among municipalities with the highest proportion access to electricity (Statistics SA, 2018:51).

About the statistics outlined above, it would be expected that most of the Sekhukhune District schools would have been electrically connected and thus provisioning of technology education possible. Consequently, the challenge of connectivity will not be a problem in these areas. Contrarily, Limpopo DC47, 2018: xxxiii) report indicates that the district has 0,573% access to landline, 21,1% access to mobile phones and 4,667% access to internet. From these statistics it is observed that the district has a low access to internet regardless

of having enough electricity and as such contributing to challenges to technology education as revealed by Pholotho and Mtsweli (2016).

The report further indicates that about 267 779 people has no access to internet and only 12 950 people has access to internet (Limpopo DC47, 2018:59). As internet is one of the requisites of ICT integration, this suggest that the district would find it difficult to integrate educational technologies in its schools. Mhlongwa (2012) states the poor efficiency and productivity of both teaching and learning in schools can be overcome using ICT. About Sekhukhune District this golden opportunity cannot be realised due to the low internet connectivity which is a conduit through which technology education is achieved. It is perhaps due to this reason that a teachers' development training programme in e-Learning was arranged between Malegale Circuit in Sekhukhune District and Limpopo University.

2.6 MALEGALE CIRCUIT: ICT FOR EDUCATORS TRAINING

Malegale Circuit is one of the circuits in Sekhukhune East Districts. An e-learning project was to be undertaken in this circuit for the training and development of teachers and members of the SMTs in e-learning. Malegale Circuit schools were sampled for this research study.

2.6.1 Teachers' Digital Training and ICT Access in Malegale Circuit

Sekhukhune District distribution of schools is displayed below.

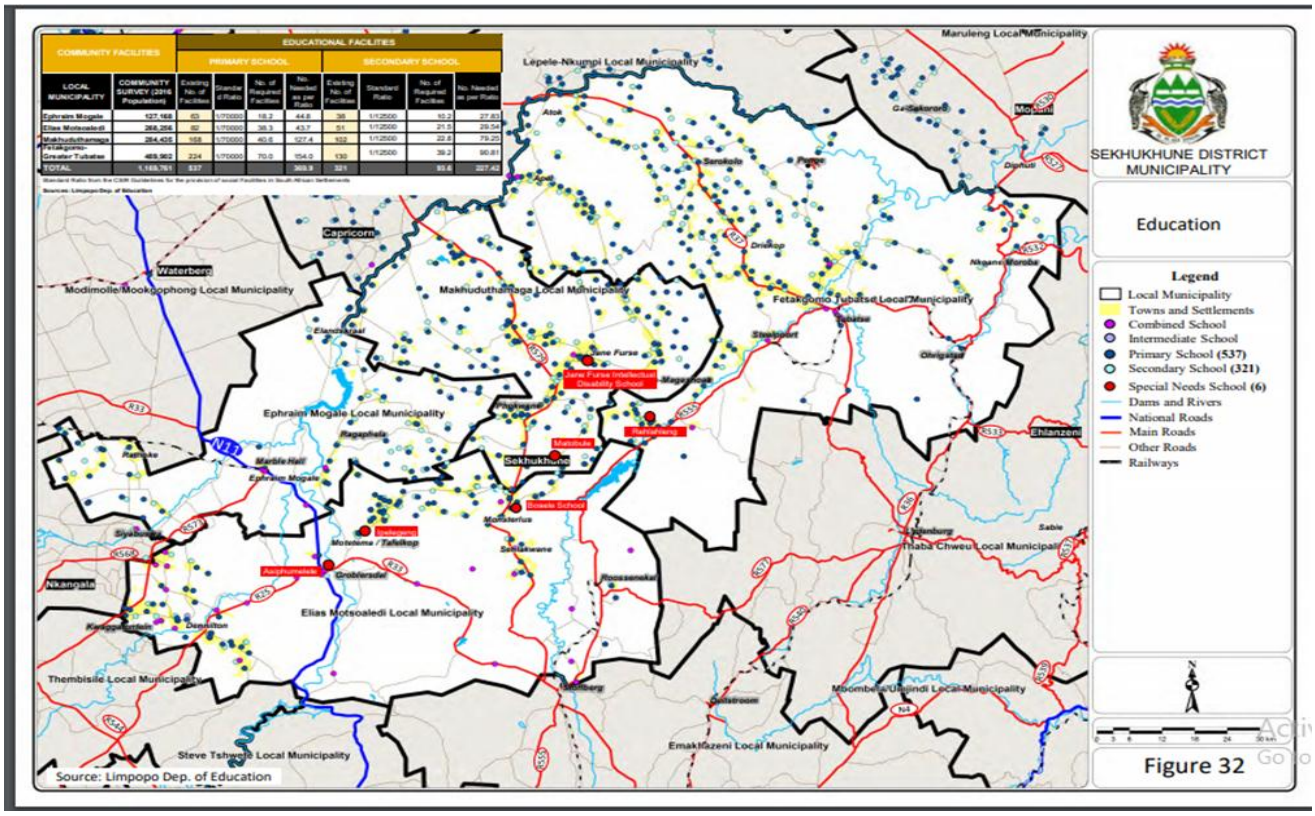


Figure: 2.6 Sekhukhune District schools (SDM-SDF, 2018:42)

Figure 2.6 above displays the Sekhukhune District and Malegale Local Municipal jurisdiction area in particular. Sekhukhune District is densely populated with schools. According to the Municipal report it has 537 primary schools and 321 secondary schools and 6 special needs schools (Sekhukhune Municipality, 2018:42). The huge number of schools means that a high capacity of internet needs is currently required. According to research, the District has challenges of electronic access and delivery of educational information resources (Matlala, 2015; Pholotho and Mtsweli, 2016; Mojapelo, 2018). This lack creates situations where teachers are not sufficiently developed in technology-based education. This happens regardless of a call from Basic Education Department that all schools should be implementing technology education (DBE, 2004).

It is against this background that Malegale Circuit forged hands with the University of Limpopo in collaboration with INTEL to develop teachers for the 21st century teaching approaches. The aim of the training was to empower teachers in promoting and developing a 21st century learning environment, fostering critical thinking and collaboration in the classroom, facilitating student-centred classroom that encourage student self-reflection and higher-order thinking, acquiring and applying basic technology skills to create teacher productivity tools and using technology effectively to create products relevant to the subject and grade levels (Intel Corporation, 2017:2). At the end of the programme, participating teachers are issued with certificates of attendance which serve as evidence of having undergone training in technological skills in using ICTs in curriculum implementation.

2.6.2 The Memorandum of Understanding (MOU) entered between the University and DBE

The Memorandum of Understanding (MOU) entered between the University of Limpopo and Department of Basic Education Limpopo represented by Sekhukhune District undertook the obligations as outlined below:

The University of Limpopo, through Limpopo Colaboratory (CoLab) shall:

- Provide as much of the hardware and as many communication links to schools in the Circuit as possible to enable teachers and learners in the Circuit to access educational technologies. Initially, Limpopo CoLab will equip Mofolo Primary School with 30 computers, a projector, and a screen on the understanding that this facility will be available to all schools in the circuit.
- Host, through its Learning Management Software (LMS), school-related courseware.
- Support the Circuit by providing the necessary training to educators in the use of ICT in education.
- Train all the educators in the circuit identified by the Circuit Manager in ICT for Educators, a course designed to empower educators to use technology

in teaching and learning, and the administration of teaching and learning with the objective of transforming the classroom and the teaching and learning experience of educators and learners.

- Support the Circuit to by providing access to an online computer literacy training tool which is supported by the University of Limpopo.
- Continues its support to the schools within the Circuit until such time as the schools can stand on their own, and
- Conducts research on the impact of the project on the school.

In pursuit of the noble interventions, the Circuit undertook the following resolutions:

- Represent the interests of all the schools within the borders of the Circuit.
- Nominate an individual to take responsibility for coordinating the digital literacy project with the schools within the Circuit.
- Influence participation in the ICT for Educators Training course of all the educators within the Circuit.
- Identify educators who should participate in the ICT for Educators Training offered by the Limpopo CoLab, with input from the Limpopo CoLab.
- Draw up a suitable timetable, in conjunction with the Limpopo Collab's Training Coordinator, to ensure that all educators participating in the ICT for Educators training can devote the full 60 hours required to complete the training. The 60 hours is made up of 40 hours of face-to-face training and 20 hours working on the Action Plan, the submission of which is a requirement for successful completion of the ICT for Educators programme.
- Ensure that the facilities – both the required classroom(s) and the required computers are available as per timetable.
- Ensure that any information and communications technologies made available by the Limpopo CoLab within the Circuit for the purposes of promoting the use of ICTs in teaching and learning are available to all schools and learners within the Circuit.
- Assist the University of Limpopo, through the Limpopo CoLab, to organise seminars, workshops, and any other training that the Parties agree will be

beneficial to the educators and learners within the borders of the Circuit; and

- Participate in research undertaken by the Limpopo CoLab

2.6.2.1 Schools' responsibilities within MoU

Undertakings by schools include:

- Appointing a champion/champions at the school to assist with the promotion of the use of ICTs in the curriculum by both educators and learners.
- Creating a supportive environment conducive to teaching and learning using ICTs; and
- Promoting a culture of using ICTs to enhance teaching and learning practices in their schools.

2.6.3 Composition of the training programme

The ICT for educators' training course is composed of twelve modules, namely: Module 1: Developing 21st century skills, Module 2: e-Content and the Internet, Module 3: Discovering word processing, module 4: Applying word processing, Module 5: Discovering multimedia, Module 6: Applying multimedia. Module 7: Discovering spreadsheets, Module 8: Applying spreadsheets, Module 9: Fostering critical thinking and collaboration, Module 10: Developing 21st century approaches, Module 11: Planning and doing Action Plan and Module 12: Reviewing and sharing of Action Plan. The contents of the modules are summarised in Table: 2.5 below.

Table: 2. 5 Teachers Digital Training's Course content

Module	**Contents**
1: Developing 21st century skills	Identifying essential skills, comparing classroom of today and classroom of tomorrow, 21st century student-centred instruction
2: e-Content and the Internet	Main features of e-content; integrating e-content into teaching; using internet to find resources

3: Discovering word processing	Exploring word processing software; assessment hand-outs
4: Applying word processing	Creating classroom resources using word processing productivity tools; weekly lesson planner, newsletter; diagram; certificate; being a critical friend
5: Discovering multimedia	Exploring multimedia software; discussing multimedia skills; curriculum review
6: Applying multimedia	Creating multimedia productivity tools; student of the week; instructional lesson; classroom rules and expectations; yearbook
7: Discovering spreadsheets	Exploring spreadsheet software; identifying spreadsheet software; Gradebook
8: Applying spreadsheets	Creating spreadsheet productivity tools; classroom inventory; seating chart; pictograph; register book
9: Fostering critical thinking and collaboration	Engaging in higher-order thinking; top discoveries and inventions; promoting collaboration, forming collaboration groups or pairs; facilitating collaboration
10: Developing 21st century approaches	Facilitating learning: Listening and speaking skills; observing and monitoring skills; questioning skills; encouraging skills; intervening skills
11: Planning and doing Action Plan	Definition of action plan, importance of action plan, components of action plan (goals; instructional strategies and tasks; challenges and solutions; timeline; resources, budget
12: Reviewing and sharing of Action Plan.	Reviewing action plan; sharing action plan; development of collaborative work groups

Source: Intel, 2017

Table 2.5 depicts the teacher digital course for 21st century. The course consists of 11 modules which are 21st Century skills, e-Content and Internet, developing word processing, applying word processing, developing multimedia, discovering spreadsheets, applying spreadsheets, fostering critical thinking and collaboration, developing 21st Century approaches, planning and doing action

plan modules. The modules address the 21st century skills ranging from critical thinking, communication, collaboration, creativity, information, media to technology skills (Urban, Roshandel, Michaels and Truesdell, 2017; Nelson, Low and Hammett, 2017; Kaufman, 2019).

Ownership of equipment:

- Information and communication technology equipment purchased by the University of Limpopo at the request of Limpopo CoLab will remain the property of the University of Limpopo.
- Should the Circuit cease to support the project or be actively involved in the project, the Limpopo CoLab reserves the right to remove said information and communication technology equipment and utilise it elsewhere in Limpopo Province.

2.6.4 Developing 21st century skills

The days of teaching learners to memorise for examinations are over in this technological era. This is informed by the advent of technology that has had a dramatic impact in transforming our lives. Teachers are therefore compelled to use innovative learner-centred approaches relevant to the 21st century. Various authors submit skills that need to be facilitated to develop people for the 21st century according to relevant fields (Pape, 2010; Thrilling and Fadel, 2009; Urbani, Roshandel, Michaels and Truesdell, 2017; Alismail and McGuire, 2015; Bernhardt, 2015; Nelson, Low and Hammett, 2017). These various authors perceive critical thinking, creativity, communication, collaboration and information media and technology as the main skills which people should possess to succeed in the 21st century. Suto (2013) categorises the 21st century skills into ways of thinking (creativity and innovation; critical thinking; problem solving; decision-making; learning to learn and metacognition), ways of working (communication; collaboration) tools for working (Information literacy; media literacy; ITC literacy) and living in the world (citizenship – local & global; life and career; personal and social responsibility).

2.6.5 Partnership for 21st Century Skills

Partnership for 21st Century Skills explains the following skills which teachers need to focus upon when teaching learners within the 21st century classroom.

Table 2.6: 21st Century skills

Skill	Explication
Accountability and Adaptability	Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for oneself and others; tolerating ambiguity
Communication Skills	Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts
Creativity and Intellectual Curiosity	Developing, implementing, and communicating new ideas to others; staying open and responsive to new and diverse perspectives
Critical Thinking and Systems thinking	Exercising sound reasoning in understanding and making complex choices; understanding the interconnections among systems
Information and Media literacy	Analysing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media
Interpersonal and Collaboration skills	Demonstrating teamwork and leadership, adapting to varied roles and responsibilities; working productively with others; exercising empathy; respecting diverse perspectives
Problem Identification, Formulation and Solution	Ability to frame, analyse, and solve problems
Self-Direction	Monitoring one's own understanding and learning needs; locating appropriate resources; transferring learning from one domain to another
Social Responsibility	Acting responsibly with the interests of the larger community in mind; demonstrating

	ethical behaviour in personal, workplace, and community contexts

Source: Partnership for 21st Century Skills (www.21stcenturyskills.org)

Table 2.6 outlines the 21st century skills. It is important that every person is conversant with these the 21st century skills, teachers in particular, because they are expected to facilitate students and learners brought upon a diet of these technologies and their diverse use. There is therefore a dire need to train and develop teachers in these diverse technologies.

Partnership for the 21st Century Skills (2009) further emphasises that for the abovementioned skills to be achieved, there ought to be conducive environment that enables creative learning practices, human support and conducive physical environment supporting facilitators to collaborate and share best practices in the classroom.

The questions which emanate from this submission are: Do we have conducive environments for 21st Century Skills in our schools? Are our teachers sufficiently trained for the implementation of the 21st century skills? Are technological resources relevant for e-learning readily available for the diversity of users?

There is significant consensus in the literature pertaining 21st century skills that today's teachers need to develop learners for today, tomorrow and the future life. It is therefore pertinent that teachers use innovative approaches that incorporate the old face-to-face methods and today's technology-based approaches such as blended learning. However, Kivunja (2025) in his study alerts us that the 21st century skills are not explicitly taught as part of the curriculum in many institutions. This omission makes points to the reality that teachers are not ready to impart these skills learners. In the next section the concept blended learning is discussed in detail.

2.6.6 The 21st Century skills models

Several models for the 21st century skills have been developed. One such model that has specific relevance to this study is developed by Michaels,

Roshandel, Truesdell & Urbani (2015). According to this model teachers need to be developed in personal development (capacity to understand and apply 21st century skills in multiple contexts), applied development (continued building of teacher's capacity to facilitate and supervise students the 21st century skills), and professional development (continued development of 21st century skills with students, colleagues, parents and administrators) to facilitate the 21st century skills (creativity, critical thinking, communication, collaboration and information media & technology skills). Michaels, Roshandel, Truesdell and Urbani (2017:29 -30) define the skills as outlined in the Table 2.8 below:

Table 2.7: Michaels, et al. (2017) 21st century skills

Skill	Definition
Critical thinking	Critical thinking is the ability to effectively use high order thinking skills to plan, teach, and reflect on instructional practice while integrating and applying theories of teaching, learning and development.
Communication	Communication is the ability to successfully use interpersonal skills and components of literacy (reading, writing, speaking, and listening) to contribute to teaching, learning and development.
Collaboration	Collaboration is the ability to work productively and equitably while valuing others in diverse educational settings.
Information, Media and Technology Skills (IMTS)	IMTS is the ability to access, manage, apply, analyse and evaluate digital information and instructional technological tools.

Source: Partnership for 21st Century Skills (www.21stcenturyskills.org)

Table 2.7 above displays and explains the critical skills needed for the 21st century and beyond. As alluded in the previous sections, these skills include creativity, critical thinking, communication, collaboration, Information, Media and technology skills (IMTS).

It is important to learn, develop and apply all the 21st century skills simultaneously. Unlike other researchers who found that one or two 21st century skills can be supported (Dong; Chai; Sang; Koh & Tsai, 2015, Hagevik; Aydemiz and Rowell, 2012, Jones and Jones, 2013; Pamuk, 2011), Michaels, *et al.* (2017) in their research study verify that various 21st century skills can be simultaneously integrated in teaching and learning. This means that for the successful implementation of 21st century skills teachers need to be well developed in the application of technologies in the development of learners for the 21st century life.

2.7 THE CONCEPT OF BLENDED LEARNING (BL)

Much has been said about blended learning in sections 2.2 and section 2.3. It is revealed that the concept blended learning is defined differently by a range of authors. This section presents the range of definitions offered for blended learning.

2.7.1 Definition of Blended Learning

Various definitions of blended learning can be established (Charbonneau-Gowdy, 2018; Banditvilai, 2016; Soeiro, de Figueiredo and Ferreira, 2012; Onguko, 2014; Tshabalala, Ndeya-Ndereya and van der Merwe, 2014; Gynther, 2016; Nakayama, Mutsuura and Yamamoto, 2016; Kintu and Zhu, 2016; Nortvig, Petersen and Hattesen Balle, 2018). Kanuka and Rourke (2013) perceive blended learning as learning in which technological tools are used with the aim of facilitating interactive and engaged learning environment. Dangwal (2017:131) states that blended learning "is the concept that includes framing teaching learning process that incorporates both face to face teaching and teaching supported by ICT and it includes face to face teaching and teaching supported by ICT, student interaction with course content, peer group interaction, group discussion and exchange of ideas, accessing e-library, online assessment, accessing and maintaining educational blogs, online learning videos and audios as well as virtual laboratories." In a complementary version, Harvey and Chris (2001) conclude that blended learning involves e-learning,

and it combines online and offline learning environments, collaborative and individual learning environments, structured and no-structured learning environments and combining pedagogical approaches.

An analysis of the definitions above establishes that some are concerned with the teaching and learning environment while the remainder are concerned with learning and pedagogies. There is little consensus on a universal definition of the term blended learning (Nortvig, *et al.*, 2018). The ambiguity and fluidity attached to the very concept and practice of blended learning compels Cronje (2020) to propose a new understanding of this facet. Cronje (2020:114) argues that blended learning "should be built around learning theory and should refer to a blend of direct instruction and learning-by-doing." He further submits that a definition of blended leaning definition that is based on the "dimensions of face-to-face and technology-mediated instruction does not provide an adequate theoretical underpinning for such decisions" (Cronje, 2020:120). Cronje (2020) believes that the definition of blended learning should include context, theory, method and technology. He proposes the new definition of blended learning as "the appropriate use of a mix of theories, methods and technologies to optimise learning in a given context." The present study aligns itself with the definition of blended learning by Cronje (2020) in that it combines technologies, context, theories, and methods in his definition. However, in terms of this study focus is put on the technology used, context (the stakeholders and their responsibilities), the theories applied, and the methods applied in blended learning implementation in schools. Blended learning can be relevant to the rural areas because with or without instructional technologies teaching and learning can take place (Driscoll, 2002:54). The blended learning decision matrix developed by Cronje as demonstrated in Table 2.7 can be modified to suite for implementation in rural areas like Sekhukhune District. Informed by the findings of the study, a proposed model which might be suitable for implementation of blended learning in Sekhukhune District and similar areas in Limpopo Province will be developed.

Table 2.7: Blended learning decision matrix

Context (Kurtz & Snowden)	**Theory (Cronje)**	**Method**	**Technologies**
Known	Injection	Tutorial Drill	Lecture, Book & Video
Complex	Construction	Construction Exploration	Open-ended learning environments Construction kits and tools Spreadsheets
Knowable	Integration	Puzzle Discussion Debate	Games Discussion tools
Chaos	Immersion	Experience Fieldtrip Apprenticeship	Blogs Logbooks Assessment tools

Source: Towards a New Definition of Blended Learning, Cronje (2020:120)

The table above explains a new definition of blended learning by Prof Cronje. The new definition defines blended learning in terms of theory, methods, and technologies. The new definition also clarifies confusions caused by various different definitions by different authors.

It is worth noting that many studies have been undertaken in the practices and configurations of blended learning in South Africa. However, most of these studies concentrate disproportionately on higher education institutions (Paterson, 2005; Tshabalala, Ndeya-Ndereya and Van der Merwe, 2014; Balfour, van der Walt, Spanner, Azwinndini and Tshivhase, 2015; Bagarukayo and Kalema, 2015; Vaughan, Reali, Stenbom, Van Vuuran and Macdonald, 2017). Recent studies done by Beyers and Hlala (2015) and Pholotho and Mtsweli (2016) in South African secondary schools amplify the fact that the success of BL is hampered challenges such as lack of equipment, network coverage, lack of teachers' skills, lack of electronic educational information and services.

However, the studies above seem to capture less if any about how teachers in the deep rural schools such as Sekhukhune District areas accept and use of

new technological learning approaches. In addition, the studies seem not exhaustively explicating how teachers are supported or support each other in the application of technology tools in their teaching contexts and on how they are developed as well as on how they network through technologies throughout their teaching and learning activities.

2.7.2 Benefits of blended learning

Numerous benefits of blended learning have been identified in previous studies. Osguthorpe and Graham, (2003) inform us that blended learning benefits teachers by ensuring richness of pedagogy, efficiency of learning, accessing knowledge, reduced cost of the approaches and the easiness of innovation.

Subsequently, Kim (2007:5) asserts that blended learning allows for increased learning effectiveness, increased convenience for the students, enhanced image for the school, cost savings for the school and classroom space savings as well as reduced congestion in the school. Dangwal (2017:131) also highlights that blended learning has the accoutrements of offering students' choice between traditional approaches and ICT supported teaching and learning; teachers are well versed in both traditional and ICT supported pedagogical approaches; students get face-to-face interaction as well as interaction with virtual space; peer group interaction is active, and students get full experience in using new technology. There is also recognition that students are developed in totality; it provides multicultural and multidimensional approach in teaching and learning; it makes teaching learner-centred; and students construct knowledge rather than just consuming it.

Consequently, Graham (2006) portrays blended learning as inherently imbued with a robustness that boosts effectiveness of education, increased access and convenience as well as its greater cost effectiveness, Subsequently, Eryilmaz (2015:253) indicates that the advantages of blended learning outweigh the historically traditional approaches in that students have control of the coverage of videos: they can stop and watch the lesson at any time they want, they can

watch the lesson repeatedly and they essentially have enough time to interact with their teachers. Research further acknowledges that the advantages of blended learning include increased flexibility (Pratt & Trewen, 2011; Parkes, Zaka and Davis, 2011), student engagement and motivation (Barbour and Reeves, 2009; Wang and Reeves, 2006), development of independent learning (Bolstad and Lin, 2009; Parkes, Zaka and Davis, 2011) and new ICT skills (O'Dwyer, Carey and Kleiman, 2007; Tunison and Noonan, 2001).

According to Hepp, Hinostroza, Laval & Rehbein (2004:1) ICT education provides opportunities in almost all life activities such as work, learning, leisure and health, increases production and provides quality education. Subsequently, Kundishora (2014: 3) highlights that the goals of ICT in Africa are designed "to establish an environment that encourages networking of services and applications; promoting e-commerce and trade promotion programmes for goods and services; promoting Internet access to exchange and access digital content; establishing e-government; promoting e-education and on-line services; strengthening network security; building and developing e-society and ICT human resources". World Bank (1998:1) posits that ICT can fast track acquisition and absorption of knowledge while the Department of Basic Education (2004:8) asserts that ICT have the "the potential to improve quality education and training."

Furthermore, Mikre (2011) confirms that ICT has the advantage to facilitate active, collaborative, creative, integrative and evaluative learning. The benefits of blended learning are numerous. However, some shortcomings and challenges that could impede successful implementation of blended learning exist. The next section deals with these challenges which can be encountered in the full deployment and use of blended learning modalities.

2.7.3 Challenges to blended learning

Blended learning requires a fully developed and 'wired' environment to succeed. It needs competent managers and leaders, skilled teachers, and

technological resources such as ICT and infrastructure among others. It is therefore necessary that measures must first be put in place before blended learning is implemented. To level the implementation ground, the Government of South Africa introduced e-Learning with specific aims designed to:

- Improve the quality of learning and teaching across the education and training systems.
- Enhance the quality and reach of teachers' reduction of time spent on administrative work.
- Support learners to achieve the nationally stated curriculum goals which include learner-centred learning, active, exploratory, inquiry-based learning, collaborative work among teachers and learners and creativity; analytical skills; critical thinking and informed decision making; and
- Change teaching and learning methodology in which teachers and learners have access to high quality, relevant and diverse resources; means of communication and collaborative with other learners and teachers and opportunities to create and present knowledge (Department of Basic Education, 2004:19).

The government initiatives for technology education implementation are most welcome. However, the practical implementation of the set goals seems to be beset by challenges, particularly in rural areas such as those characterising the Limpopo Province. Amongst the challenges encountered are the teachers' readiness to move from the old traditional teaching to new technological approaches, their readiness to transform, their self-developmental status and the support given by the Department (Pholotho and Mtsweli, 2016; Mlitwa and Van Belle, 2011; Isabirye and Dlodlo, 2014).

Hofmann (2014) submits that one big challenge faced in the implementation of blended learning is how users successfully adapt to the technology, their commitments, and the contextual circumstances on the ground. Gahala, 2001) identifies challenges in the assessment and utilisation of computers due to incompetence of implementers and confusion of teachers by the approach. Brody (1995) adds to the challenges the perpetual need for technical support of

teachers. Furthermore, Henriques and Riconscente, 1996; Kozma & Schank, (1998) highlight abrupt shift from instructors to facilitation without professionally developed personnel as a sore threat. Anderson (1996). On the other hand, emphasises on the availability of enough funds that comes with blended learning becomes a challenge.

Subsequently, Sayed and Baker (2014) submit that factors that can serve as barriers to successful blended learning implementation include a lack of infrastructure that could, however, be resolved by making enough funds available for buying required materials. There is also the implementers' fear of technology and shortage of engagement. As a serious challenge, this could be averted by developing and training implementers such that assessment difficulties for the huge number of learners could be overcome. In addition, Khan, Huda & Mulani (2015) also posit the barriers of BL as accessibility to computers in impoverished areas, lack of technical support for the teachers and blurred distinction of goals for BL by teachers.

Based on this literature review on blended learning, it appears the successful implementation depends entirely upon a well-established ICT infrastructure in a country. As Dangwal (2017:136) puts it, the successful implementation of blended learning needs "rigorous efforts, right attitude, handsome budget and highly motivated teachers and learners." Kundishora (2014:6) summarises the challenges faced in the implementation and utilisation of ICT for blended learning as the facilities, inadequate communications and power infrastructure, shortage of ICTs facilities, ICTs skills, inadequate institutional arrangement, limited financial resources, inadequate public and private partnership, as well as limited data management capacity, inadequate horizontal and vertical communication. It is therefore critical that before any attempts to implement blended learning are envisaged, there must be enabling measures in place to subvert the obstacles. The next section discusses blended learning models.

2.7.4 BLENDED LEARNING MODELS

This study found it necessary to give full details of the established models and legislative frameworks in to ensure a clear insight of the factors which make implementation succeed or fail. Various blended learning models can be found. For example, Graham blended learning model, alternative blended learning models, blended learning system models, skill-driven learning model, attitude-driven learning model, competency-driven learning model and Tshuma blended learning models (Graham, Woodfield, and Harrison, 2013; Machumu, Almasi, and Zhu, 2018; Valiathan, 2002; Tshuma, 2012). The aim of the blended learning models includes: the guiding of a successful planning, development of policies, implementation, monitoring, and evaluation of blended learning. With regard to this study, Tshuma's (2012) Blended Learning Model was adopted.

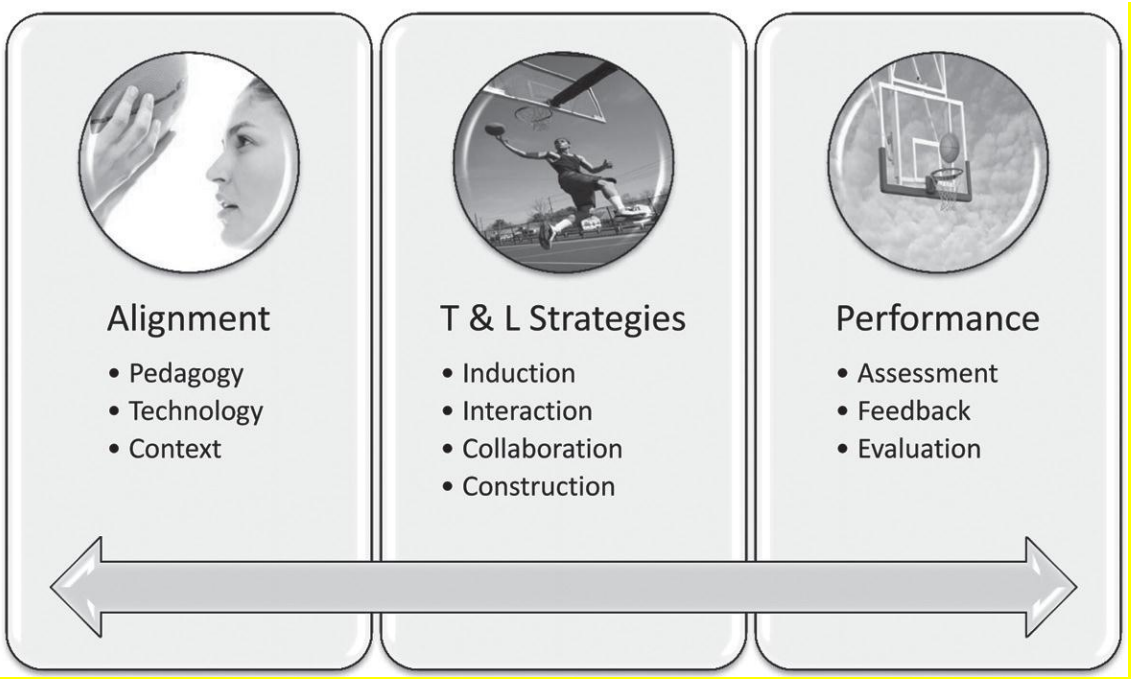


Figure 2:7 Blended Learning Model (Tshuma, 2012:29)

The BLM aligns instructional design principles (pedagogic, technology, context), teaching and learning strategies and evaluates performance through assessment tasks, feedback to learners.

Alignment

Pedagogy, technology, and context are aligned to teaching and learning strategies to ensure good use of instructional design principles (Tshuma (2012). The model emphasises that the selected technology should be ease-of-use, online and allows collaboration problem solving activities.

Teaching and learning strategies

Table 2.8 shows the 4 stages of blended learning, the general Blended Learning activities and some selected learning activities aligned with the general activities. The alignment, teaching and learning strategies and performance are clearly articulated in the given table. However, the researcher is of the opinion that if the roles and responsibilities of stakeholders in the national, provincial, districts and school are clearly spelt out and moderated, the model maybe improved. This is relevant because the national and provincial officials are responsible for making funds and resources available for the successful implementation of blended learning.

Table 2.: 8 Teaching and learning strategies in BLM

T and L Strategy	General activities (Blended Learning)	Selected learning activities
Stage 1: Induction	Using online and face-to-face communication: • Introduction to the course • Introduction of students to each other • Introduction to the online learning environment	• Building high course expectations by showing them skills to be acquired (e.g. website design) and how these relate to their other courses • Student introductions using symbols (animals, cartoon characters or Hollywood stars) • Logging on to the online learning system and using Moodle forum to discuss a few selected symbols. • Training on accessing basic resources and uploading assignments (written and oral instructions).
Stage 2: Interaction	Develops in stages: • Individual work • Communicating with lecturer and tutors • Communicating with other students • Feedback to	• Individual work • Communicating with lecturer and tutors • Communicating with other students • Feedback to lecturer

	lecturer	• Problem-solving of mini-case studies individually • Online quizzes for reinforcement • Giving feedback to lecturer about the different aspects of the course (e.g. using Minute paper) • Communicating with the lecturer and tutors (online or face-to-face) when having difficulties • Using online forum to communicate with other students on difficult aspects of assigned work or for social interactions
Stage 3: Collaboration	Using interaction to learn, not just for communication	• Debates and discussions of relevant topics prominent in the news (both online and face-to-face) • Analysis of websites (as a precursor to developing their own) and recommendations on how to improve these websites
Stage 4: Construction	Using higher-order learning skills to learn;	• Group projects (about 2 months long) developing a website for an existing small company • Peer and self-evaluation of individual participation in groups • Presentations of group work • Peer-assessment of web sites during the group presentations

Source: Blended learning model (Tshuma, 2012:31)

2.8 THEORETICAL FRAMEWORK

This study was framed within Connected Learning Theory (CLT) coupled with Technology Acceptance Model (TAM) and Connectivism (CT) theories. CLT is the overarching theory that frames the study. The reason behind coupling these theories is that their principles are interrelated and can reinforce each other. The researcher perceives an overarching connectedness of the theories that should be explored to the full for the actual realisation of the modalities and practices of BL. Detailed discussion of the theories is provided in the following segments.

2.8.1 Connected Learning Theory

The main theory which guided the study was CLT. To clarify and contextualise this theory, a review of previous research done on educational technologies was undertaken. CLT is defined by Ito, Gutie′rrez, Livingstone, Penuel, Rhodes, Salen, Schor, Sefton-Green and Watkins, (2013:4) as a "socially embedded, interest-driven and orientation that focuses on the educational, economic, or political opportunities." Connected learning is realised when a person pursues a personal interest or passion with the support of friends and caring parents. They see CLT as a framework for understanding and supporting learning, as well as a theory of intervention that grows out of our analysis of today's changing social, economic, technological, and cultural context (Ito, *et al.*, 2013:7). In addition, Ito, *et al.*, (2013) further indicate that connected learning environments are generally characterised by a sense of shared purpose, a focus on production, and openly networked infrastructures. Kitto, Cross, Waters and Lupton (2015) view connected learning as a modern pedagogical approach in which people forge, negotiate and nurture their connections to distribute and sustain learning across social and conceptual networks. Although CLT is still developing, this approach was deemed useful to examine the implementation of blended learning in this study.

Sahin, (2009) indicates that the successful implementation of connected learning requires 21st century skills such as accountability and adaptability, communication skills, creativity and intellectual curiosity, critical thinking and systems thinking, information and media literacy skills, interpersonal and collaborative skills, problem solving skills, self-direction and social responsibility skills. It can therefore be concluded that, like connectivism, connected learning is the theory for the 21st century (Kop and Hill, 2008).

This study employed CLT because of its capability to tap into the opportunities provided by technologies such as addressing gaps between in-school and out-school learning, intergenerational disconnections, supportive relationship builder and intergenerational connections based on shared interests among

learners (Ito, *et al.*, 2013). Furthermore, the researcher adopted connected learning theory because it addresses 21st century skills in a very direct fashion.

2.8.2 Connected Learning and context of learning (CLCL)

According to Ito, *et al.* (2013) achievement of outcomes in the teaching and learning situation is informed by three crucial learning contexts namely: the peer-support, interest-powered and academically oriented. The summary of each of the contexts is given in the following subsections.

2.8.2.1 Peer supported

Peer supported outcomes refer to the support provided by peers, friends, family members, community members, mentors with similar interest in the learner's pursuit for learning (Ito, *et al.*, 2013). A learner achieves better when supported by peers, friends and people who care for the success of the student. In this supporting process learners contribute, share, and interact with each other and supporters, culminating in maximum engagement and certain good outcomes.

2.8.3 Interest-powered outcomes

Interest-powered outcomes point to the learner's interest towards learning (Bayeck, 2016: 107). When learners are engaged with the content, when they have interest in what is relevant to their dreams and ambitions, then they achieve better. It is therefore, imperative that teachers should consider learners' interest to activate them as they engage with relevant content.

2.8.4 Academically oriented outcomes

The saying that "together we can do more" is apparently applicable in connected learning. This is because when people relate or establish connections, interact and share their ideas then their academic performance is set to improve (Bayeck, 2016: 109). Connected learning has the tendency to connect learners' interests and their social engagement to academic studies and therefore enables learners to flourish and realise their full potential (Ito, et al. 2013:12).

2.8.3 Properties of connected learning

Ito, et al. (2013:12) identify three important properties of connected learning. The three properties are production-centred, shared purpose and openly networked. These properties serve as driving indicators of the present research study.

Production-centred

When learners “create, experiment, circulate, remix and use media” in their learning they tend to be more productive (Ito, *et al.*, 2013). Teachers therefore need to give instructional tasks that are learner-centred and production-centred. The usage of digital tools in connected learning improves learners’ opportunities and their knowledge and hence learners become product centred.

Shared purpose

The usage of social media and web-based communities creates opportunities to incites learners’ interests, unfold, and thrive around common goals and activities when they share their experiences (Ito, et al. 2013). It is therefore important that teachers connect the teaching and learning environment, participants, and peers’ interests for mutual benefits (Bayeck, 2016).

Open networked

Open networked points network people through media and web communities to share their learning experiences (Ito, et al. 2013). This means that if educational environments are networked expected achievement of knowledge might be improved because people will share experiences and hence achieve more. Online platforms and digital tools in connected learning are examples of such environments. It is therefore important that people should network with each other, with the communities and globally with social media and web-based communities to improve their achievements in the teaching and learning situations.

2.8.4 Principles of CLCL

This study draws on the principles of connected learning as discussed above to answer the research questions. Ito, *et al. (*2013) highlight the principles of CLT which can be applicable in the learning situations as: in the teaching and learning environment everyone can participates, learning happens by doing, challenge is constant, and that everything is interconnected. In applying the principles, Ito, *et al.* (2013) draw our attention that connected learning employs digital tools which can make learners to connect their interests and social engagements with their studies and thus flourishing and realising their potentials.

Holstein

The principles of CLT namely: peer-supported, interest-powered, academic oriented, share purpose, production centred and openly networked assisted the researcher to formulate the research questions. The research questions for the interviews composed of: How do you support your peers in the usage of educational technologies in your teaching? What is your perception on your interest to implement blended learning in your subject? What technology strategies would you employ to improve learner's academic performance for the 21st century? How would you use social media and web-based community in the teaching and learning environment? What are your thoughts about sustaining learner's achievement through technology appliances? What is your opinion about using online platforms and digital tools in the teaching and learning situation? Answers to these questions let to the attainment of the research aim and objectives.

2.8.5 Technology Acceptance Model

TAM was first created by Davis (1989) based on the Theory of Reasoned Action (Fishbein and Ajzen, 1975) which posits that individual behaviour is driven by behavioural intention where behavioural intention is a function of an individual's attitude toward the behaviour and subjective norms surrounding the performance of the behaviour (Masrom, 2007). This means that the behaviour and intent of a person to innovate and accept that innovation is informed by the

person's attitude and perceptions toward and about the innovation. This Theory of Reasoned Action and Technology Acceptance Model are depicted in Figure: 2.8 and 2.9 below.

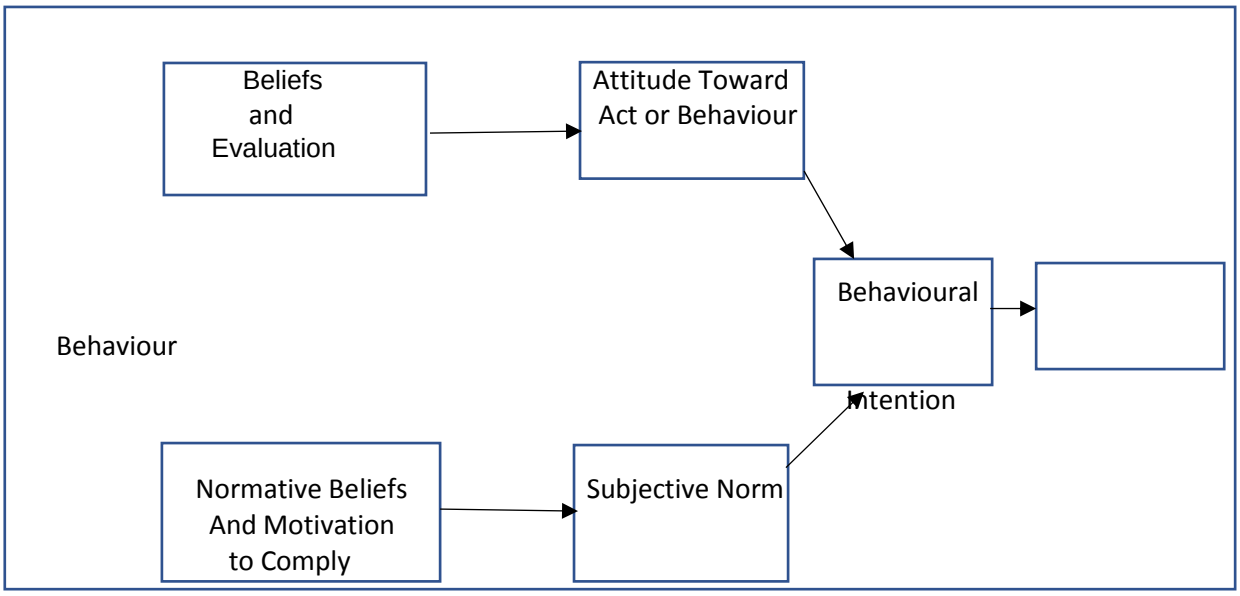


Figure 2.8: Theory of Reasoned Action (Masrom, 2007:3)

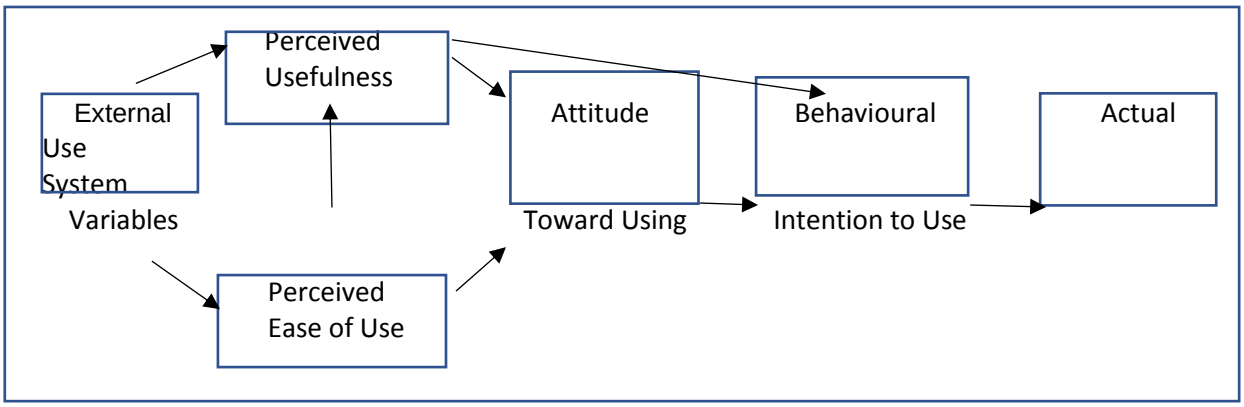


Figure 2.9: Technology Acceptable Model (Masrom, 2007:3)

The researcher found TAM theory relevant to this study since it addresses acceptance and usefulness aspects which are the driving force for the successful implementation of an innovation (Tselio, Daskalakis and Papadopoulou, 2010:224). The knowledge of the usefulness of an innovation

instils positive attitudes and motivation to use the innovation and hence it becomes easy users to implement. According to Davis (1989:320), perceived usefulness of a system is the belief that using a system will improve performance and that perceived ease of use of an innovation indicates the degree to which a person believes that there is a need to learn the system while the level of usage indicates the success of the usage. Tselio, Daskalakis and Papadopoulou (2011:224) further posit that "usefulness and ease to use proved to be key determinants of acceptance and usage of e-learning."

2.8.6 Connectivism Theory

Modern learning emphasizes the implementation of modern theories of learning. Bell (2011:102); and Cormier, (2008) concur that in this digital era learning must be distributed across networks of people, things and non-human appliances. This study adopted CT because of its relevance and robustness to the digital age (Tschofen & Mackness, 2012:124). Furthermore, Kropf (2013:15) alerts us that in this technology era individuals acquire information through various modern-day information sources such as online classrooms (online libraries, LMS), social networks (Twitter, Facebook, WhatsApp's, blogs, video casts) and virtual reality platforms (video games, web conferences, virtual open houses). Based on the assertions above it is imperative that teaching and learning activities need to be technologically inclined. The question arises "Are the existing teachers developed in the usage of the technology appliances? This theory assisted the study to answer the question.

Furthermore, Tschofen & Mackness (2012:124) add that CT entails the principles of autonomy, connectedness, diversity, and openness. Siemens (2004), indicates that CT is characterised by eight principles which include:

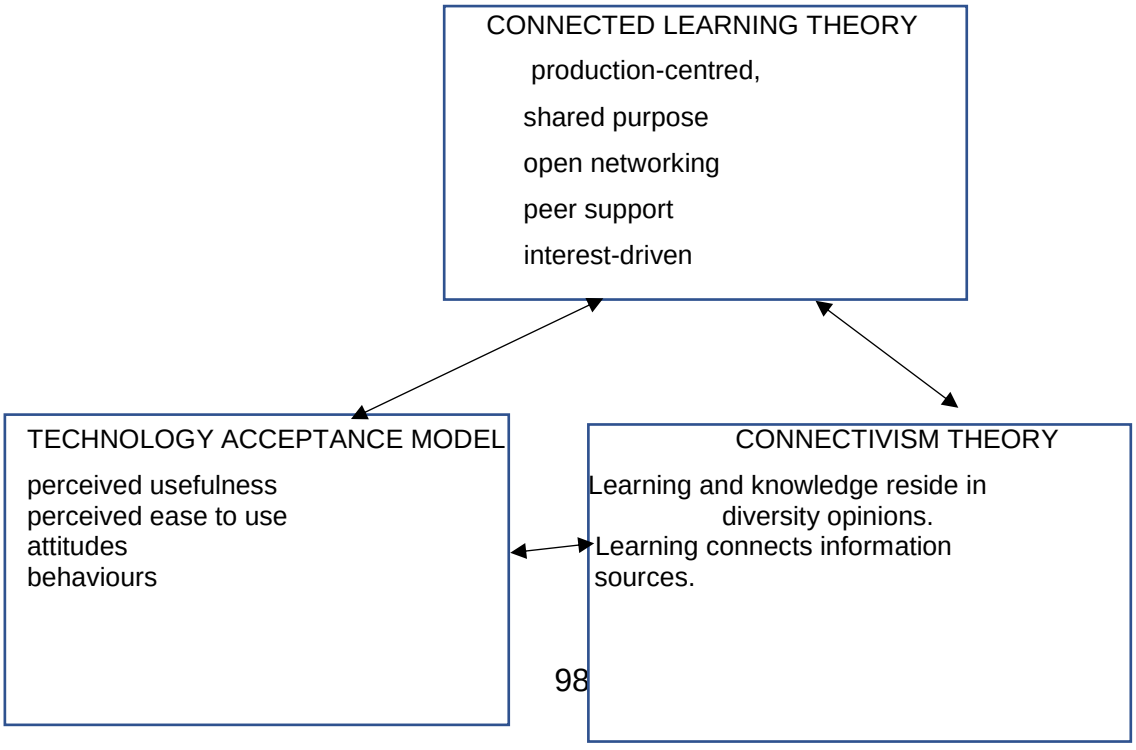
- Learning and knowledge rests in diversity of opinion.
- Learning is a process of connecting specialised nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.

- Nurturing and maintaining connections facilitate continual learning.
- Ability to see connections between fields, ideas and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivists learning activities; and
- Decision-making is itself a learning process.

Although all the principles are relevant to the study, the researcher focused on two principles of CT, namely: learning as a process of connecting information sources (connectedness) and learning may reside in non-human appliances. The two principles assisted the researcher to address the research questions and gather relevant data.

2.8.7 Integration of the study theories

Based on the outlined aim and objectives of the study, the three theories, namely CLT, TAM and CT, interview and questionnaire questions were formulated as indicated on APENDIX I, J, K, L & M. Although all the principles of the three theories are essential to blended learning, this study focused on specific principles of the theories to address implementation of blended learning in rural schools. Figure 2.10 depicts the proposed integration of CLT, TAM and CT principles which can be practised in implementing blended learning in rural areas.



intentions Learning resides in non-human appliances

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Figure 2.10 Integration of the theories that frame the study

Figure 2.10 above shows the integration of the theories that framed the study. CLT focuses on production-centres, shared purpose, open networking, peer support and interest driven principles to perform a task. However, the researcher argues that the successful application of CLT principles might not be easily achieved if those involved do not perceive the usefulness of the task, the easiness of the task, their attitudes; behaviours and intentions on performing the task. It is therefore necessary that the CLT principles be coupled with TAM principles for a better achievement. Consequently, in the performance of the task learning and acquiring of knowledge happens and this happens in various ways. To accommodate good performance CLT and TAM principles need to be supplemented by various modes and approaches, hence a necessity of coupling of CLT, TAM and CT principles together.

2.9 CHAPTER SUMMARY

The literature review undertaken in this chapter provided important insights into the provision of blended learning in the South African education system, with specific reference to Limpopo Province. This literature review helped the researcher to integrate library searching skills to fully appreciate the subject area and understanding of the problem at hand. These skills facilitated the academic justification of the research topic; design and methodology on the implementation of blended learning in schools (Hart, 2018:13). Relevant literature on ICT education, blended learning and theories on technology guided the formulation of research questions which enabled addressing of the research problem. CLT, TAM and CT theories which framed this study were fully discussed. The next chapter discusses the research design and methodology employed in the study.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 INTROUCTION

The previous chapter presented a review of relevant literature on the implementation of ICT technologies in teaching and learning. The critical review helped to contextualise the research problem and the purpose of this study (O'Neil, 2010). This chapter deals with the research paradigm, research design and methodology. Rajasekar, Philominaathan & Chinnathambi (2013) describe research methodology as the procedure by which researchers go about their work to describe, explain and predict the phenomenon of the study. Bailey (1994) suggests that research methodology provides the philosophy, values and assumptions which drive the investigation, interpretation of data and the drawing of conclusions from of the study. This study follows the advice by Dawson (2002) and considered the ethics, potential risks, the problems and limitations encountered in the application of the specific MMR methodology. Kaplan (1973) further advises that appropriate methods and processes must be applied in research studies.

The methodology used in this study dealt with instruments which the researcher developed in the investigation (Walliman, 2011). Various tools are available for use by research. However, Tashakkori and Teddlie (2010); Buchanan and Bryman (2009); Wilkinson and Birmingham (2003) warn that the method(s) selected must be appropriate and commensurate with the skills, each ensuring more strengths and less weaknesses. Jonker and Pennink (2010) concur that the instruments used must complement each other to generate pertinent data for the study and should follow logical progression.

The design and methodology chapter begin with a discussion of the research paradigm. This is followed by an interrogation of mixed methods research approach, research design, population and sampling, data collection and data analysis, ultimately terminating this with quality assurance and ethical issues.

3.2 RESEARCH PARADIGM

It is important to identify and justify a research paradigm that guides a research enquiry because a paradigm influences the choice of a research method, instruments used, participants and interpretation of data (Gringeri, Barusch & Cambron, 2013). Research paradigm is described as a researcher's worldview, meaning their perspectives and their school of thought or their beliefs that inform the interpretation of data (Mackenzie and Knipe, 2006). Lather (1986) indicates that research paradigm refers to the researcher's beliefs about the world that s/he lives in and wants to live in. Makombe (2017:3363) advises us that to obtain a properly structured and clearly articulated research enquiry, there are ontological, epistemological and methodological questions that need to be clarified, in that order. The ontological question: What is there to be known about the form and the nature of reality? The epistemological question: What is the relationship between the researcher and that which can be known about the reality? And the methodological question: How can the researcher go about attempting to know that which can be known about the reality? All three questions need to be answered in any plausible research study of this nature.

Various research paradigms are identified in the literature (Candy, 1989; Tashakkon and Teddie, 2003a; 2003b). Which one to use depends on the specific contours of the research problem and the researcher's choice. Literature identifies the empirical paradigm (positivism/post-positivism) and the normative paradigm (interpretivism, social constructivism, critical theory and pragmatism) as the two main research paradigms which researchers use to inform their studies (Makombe, 2017:3368). This study employed the pragmatic paradigm as a guiding tool for the investigation of blended learning implementation in Sekhukhune District schools.

3.2.1 Pragmatic paradigm

As outlined in the previous section any research study is guided by paradigm. This present study adopted a pragmatic paradigm because of its connection to mixed methods research, allowing for the collaboration between knowledge

creation and production (Evans, Coon and Ume, 2022:267-269). Trahan and Steward, (2013); Creswell and Plano Clark, (2007) concur that pragmatism provides a solid foundation for mixed methods research with its focus on the problem in its social and historical context. The researcher also found pragmatism relevant to this study because the investigation involves human knowledge and human actions (Goldkuhl, 2012:7). Goldkuhl informs us that the essence of pragmatism is "action and change, human acting in a world which is in a constant state of becoming."

With regard to this study, the enquiry is about human actions as they link to the practical usage of technologies in teaching and learning. This means that a pragmatic stance aims for "constructive knowledge that is appreciated for being useful in action" (Goldkuhl, 2012:15). The pragmatic principles relevant in this study entail:

- Placing high regard on the reality of and influence of the inner world of human experience in action.
- Viewing of knowledge as constructed and based on the reality of the world we experience and live in, and
- Organisms are constantly adapting to new situations and environments (improvement of the past understanding in a way that fits and works in the world in which we operate) (Johnson and Onwuegbuzie, 2004:18).

Firstly, guided by pragmatism paradigm the study employed a quantitative approach through using a questionnaire to evaluate the social world objectively and to predict human behaviour about the usage of technologies. In this phase the researcher inquired into how blended learning was implemented in Limpopo Province schools. The questionnaire enabled the researcher to obtain answers to the proposed research questions from the data collected (Creswell in Fouche and Delport, 2002).

Secondly, a qualitative research based on pragmatism was used to understand how individuals construct meanings and interpret events occurring in their world

(Wimmer and Dominick, 2000). This enabled the researcher to interact closely with the participants, enquiring into their perceptions, attitudes, experiences and insights on the implementation of blended learning in their teaching and learning situations (Terre Blanche and Kelly, 2002). In this regard, interviews were conducted with the sampled participants.

It is important for researchers to be knowledgeable about the characteristics of the adopted research paradigm so that they apply the approaches appropriately in their studies. This knowledge of the characteristics enabled the researcher to explore the research context, interact with participants and think critically around the research study (Klein and Myers, 1999). Through pragmatism, the researcher was able to use an appropriate research design, identify the relevant participants and deploy appropriate data collection and analysis methods.

3.3 MIXED METHODS RESEARCH APPROACH

This study adopted a mixed methods research approach to collect and analyse data. This means that the research combines qualitative and quantitative research approaches to address the research questions, data collection and analysis. The rationale behind employing this approach was that the study elicited information to address the research problem where one data resource would not be enough to resolve the intricate questions. This justifies the second method to enhance a full understanding of the research problem (Creswell & Plano Clark (2011).

The justifications provided by Green, Caracelli & Graham (1989) for the usage of mixed methods research approach were upheld in this study. These entail triangulation (which provided possibilities for convergence and corroboration of results from the different methods) and complementarity (which enabled elaboration, enhancement, illustration and clarification of the results). Creswell (2011; 2012) defines mixed methods approach as a procedure for collecting, analysing, and combining both quantitative and qualitative research and methods in a single study to understand a research problem. Whereas Burke

Johnson, Onwuegbuizie, and Turner (2007) explain mixed methods research approach “as the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.

The central premise of mixed methods research is that the use of quantitative and qualitative approaches in combination provides a better understanding of research the research problem than either approach alone. The researcher collected and analysed both qualitative and quantitative data and prioritised both forms of data (Creswell and Plano Clark, 2011).

3.4 RESEARCH DESIGN

In any study, a procedure on how the aim(s), uses, purposes, intentions and plans are to be accomplished need to be stated (Hakim, 2000). Akhtar (2016:71) alerts us that research design is necessary because it makes possible the integration of various research procedures to yield maximum data with minimum expenditure, effort and time. Tashakkori and Teddlie (1998); Creswell, (2003); Onwuegbuzie and Dickson, (2007) submit that in MMR, a mixed-methods design is determined by two factors which are (1) the priority of weight, where equal weight can be allocated to both quantitative data (QUAN) and qualitative (QUAL) data or alternatively different weights allocated, (2) the order of data collection (order in which QUAN and QUAL data is collected).

The study used convergent parallel design. The QUAN data was collected through questionnaires using open-ended and closed-ended questions to determine the perceptions of teachers in the implementation of technologies in blended learning (Creswell and Plano Clark, 2011). The QUAL data was collected using closed-ended questions through interviews and document study (Wium and Louw, 2018). The QUAN and QUAL strands were equally weighted in this study.

The integration of data was done at the analytic and interpretation levels and the results merged together. Guetterman, *et al.* (2015:555) tell us that by merging the data new insights emerge beyond the information gained from the separate quantitative and qualitative results. The merged data assisted the researcher to advance the integration and provided a visual means that allowed for the generation of new inferences (Guetterman, *et al.,* 2015:556). Accordingly, Creswell & Plano Clark (2011) alert us that by merging the data, a research problem is understood better. The researcher aimed at bringing the quantitative and qualitative elements concurrently, weighed the methods equally, analysed the two components independently, and interpreted the results together (Creswell & Plano-Clark, 2011). Table 3.1 summarises the research design of the study.

Table 3.1: Convergent parallel design process

PARADIGM: PRAGMATISM	**APPROACH: MIXED METHODS APPROACH**	
Research design: Convergent parallel design Quan & Qual data collected concurrently Data analysed separately Quan & Qual results are analysed and presented. Establish convergence, divergence, contradictions or relationships		
QUAN	**+**	**QUAL**
177 educators were sampled	**Sample & Sampling**	Four schools were purposively sampled for interviews and document study studied 12 participants: 4 Principals, 4 HODs and 4 teachers are purposively sampled per case school
Questionnaires	**Methods/ Instruments**	Interviews & resources analyses
IBM SPSS Version 28 Descriptive analysis	**Data analysis**	Thematic & content analyses of data from interviews and document study
	**Data Convergence/**	

	Synthesis	

Table 3.1 displays the convergent parallel design in mixed methods research. The study employed mixed methods approach and was guided by pragmatism paradigm. The QUAN employed questionnaires to collect data from 177 participants. IBM SPSS Version 28 was used to analyse the data collected. In the QUAL data was collected through interviews and document study. Thematic and content analysis were employed to analyse the collected data. The results of the questionnaires, interviews and document study were ultimately converged to obtain the final research findings.

3.4.1 Sampling for QUAL strand

Four schools were purposively sampled for the interviews. The QUAL strand sample consisted of two secondary schools and two primary schools. In each of the schools a Principal, HoD and a teacher were interviewed. The total sample of QUAL strand was therefore composed of 12 participants.

Table 3.2: QUAL strand sampling

Research design	Research methods	Sampling techniques	Sample frame
QUAL strand	Interviews	Purposive sampling	Principals, HoDs and teachers (12)
QUAL strand	Document study	Purposive sampling	Case schools (4)

Table 3.2 illustrates the research design, methods, and the samples of the study. The methods used for the QUAL strand included interviews and document study. Principals, Deputy Principals, HODs and teachers were interviewed, and documents were studied in each school. The rationale behind this approach was to establish whether the different components develop and support each other with regards to application and usage of technologies available in the rural schools. This approach enabled the researcher to obtain in-depth understanding of blended learning status from all the teaching stakeholders in the rural schools.

3.4.2 Sampling for QUAN Strand

For the QUAN strand 10 schools (5 secondary schools and 5 primary schools) were purposively sampled. In each school the principal, deputy principal, HoDs and a teacher constituted the sample. The total sample for the QUAN was made up of 177 participants (10 principals, 9 deputy principals, 35 HoDs and 123 teachers). The participants responded to closed and open-ended questions.

3.4.2.1 QUAN survey questionnaires

A survey questionnaire was adopted in this study. McMillan and Schumacher, (2001) and Crowther; Smit and Herbst, (1994) indicate that in survey research, a researcher selects a sample of respondents to collect information about their attitudes, values, habits, demographics, feelings, opinions, perceptions, plans and beliefs. McMillan and Schumacher (2001:602) define a survey research as "assessment of the current status, opinions, beliefs and attitudes by questionnaires or interviews from a known population." Cohen, *et al.* (2001:169) state that a survey gathers data to describe the nature of existing conditions or identifying standards against which existing conditions can be compared or determining the relationships that exist among specific events. In this study the researcher strove to describe and explain how and why teachers implement blended learning in their schools (McMillan and Schumacher, 2001; Crowther, et al. 1994).

Surveys are characterised by big samples and measuring of many variables and testing multiple hypotheses (Pietersen, 2007:155). However, in this study, a small scale sample survey was employed to capture the attitudes, opinions and experiences of teachers in the sampled school. Furthermore, Cohen*, et al.* (2001:171) argue that whether the survey is large scale or small scale and is undertaken by the lone researcher the data gathering techniques are the same. The survey design, through the usage of questionnaires assisted the researcher to understand the experiences, attitudes, perceptions, their acceptance and the usefulness of implementation of blended learning in their schools.

3.4.3 Population and sampling

Research studies aim to solve problems experienced in our lifetimes. It is therefore very important that researchers specify the population and the sample used in their studies. The discussion of population of the study is presented in the following segments.

3.4.3.1 Population

The concept population means all the participants taking part in an event (Nieuwenhuis, 2007:79). According to Thaba-Nkadimene (2017:80), population may refer to "knowledge bearers and holders of a particular phenomenon." This view is supported by Welman, Kruger & Mitchel (2005:52) when they declare that a population refers to the study object and consists of individuals, groups, organisations, human products and events. Furthermore, Strydom (2010:223) explains a population as individuals in a universe that possess specific characteristics. The target population of this study were Principals, head of departments (HoDs) and teachers in Sekhukhune District schools. The population in this study composed of 189 teachers from 14 schools in Sekhukhune District, Limpopo Province. The reason for selecting the different teacher classification levels was that the researcher sought to gather a holistic perception across all teacher levels regarding the implementation of blended learning.

3.4.3.2 Sample

It is often not possible to use the whole population to collect data for a research study. It is therefore necessary to select a representative sample which can tell more about the population (Maree and Pietersen, 2007:172). Strydom (2010:223) defines a sample as elements of the population which are considered in a research study. Cohen, *et al.* (2000:92) view a sample as a smaller group or subset of a population. This suggests that a sample is used to represent the whole population of the study. Pinch (1998:193) agrees that "we cannot study everyone, everywhere doing everything." However, Leedy and

Ormrod (2010:206) advise that “The sample should be carefully chosen such that, through it, the researcher is able to see the characteristics of the total population in the same proportions and relationships that they would be seen if the researcher were, in fact, to examine the total population.” In choosing a research sample, the researcher considered the sample size, the representativeness and parameters of the sample, the access to the sample and the sampling strategy (Cohen, *et al. (*2000:92).

As this study is MMR approach, the sample composed of two strands: one strand for the quantitative and the other for the qualitative research. For the QUAL strand two secondary schools and two primary schools were purposively sampled. In the two secondary schools 1 Principal, 1 HoD and 1 teacher from each school constituted a sample of the study while in the two primary schools, 1 Principal, 1 HoD and 1 teacher from each school constituted the sample. This makes a total sample of 12 participants for QUAL strand.

Furthermore, the QUAN strand composed of 177 participants that comprised of 10 Principals, 9 Deputy Principals, 35 HoDs and 123 teachers.

3.4.3.3 Sampling techniques

To select a convenient and representative sample, a researcher identifies sampling methods depending on the nature of research problem (Maree and Pietersen, 2007:172). Two sampling methods from which the researcher makes a selection are probability sampling methods (simple random sampling, systematic sampling, stratified sampling, cluster sampling) and non-probability sampling (convenient sampling, quota sampling, snowball sampling, purposive sampling) (Maree and Pietersen, 2007:172-178; Leedy and Ormrod, 2010:205-212).

For the purpose of this study, non-probability purposive sampling was used for both the QUAN and QUAL strands. Purposive sampling was used due to its potential to investigate, discover and understand the phenomenon under study

(Merriam, 2002). Babbie (2010:193) alerts us that in purposive sampling, a choice is made based on the knowledge of the population, its elements and the study purpose. The researcher's choice was based on the size of the school, the knowledge and experiences of the participants in education technologies as well as the costs incurred by the researcher. Data collection methods samples are as shown in Table 3.6 below:

Table 3.6: Summary of sample for this study

Data collection method	Schools	Participants	Sample size
Interviews	2 Secondary schools 2 Primary schools	2 Principal, 2 HoDs & 2 Teachers (6) 2 Principal, 2 HoDs & 2 Teachers (6)	12 participants
Document study	2 Secondary schools 2 Primary schools	2 Principals 2 Principals	4 schools
Survey questionnaires	Secondary & primary schools (10 schools)	10 Principals, 9 Deputy Principals, 35 HoDs & 123 Teachers	177 respondents

Table 3.4 above reflects on the summary of sample for this study. Interviews were conducted on 12 participants from 4 schools; document study done at 4 case schools; whereas, survey questionnaires were administered to 177 respondents composed of 10 principals, 35 deputy principals and 123 teachers.

3.5 DATA COLLECTION INSTRUMENTS

Research uses various methods to collect data. Researchers such as Johnson & Burke (2000) identify questionnaires, interviews, focus group, tests, observation, and secondary data as some of the major methods used to collection data. The collection of data can be done through reading, observation, and measurement, asking questions or a combination of these (Baxter, Hughes and Tight, 2001: 153). Data in this study were collected using

three research instruments: interviews, document study and questionnaires. The three data collection methods validated, strengthened and triangulated data provided by each instrument (Thaba-Nkadimene, 2017).

3.5.1 Interviews

The study employed face-to-face interviews to collect qualitative data for the QUAL strand. Kelly (2010); Merriam and Tisdell (2016); Thomas (2017) ascertains that talking to participants face-to-face alleviates misunderstandings and misconceptions because the researcher has an opportunity to clarify matters immediately on the spot. Kallio, Pietilä, Johnson, and Kangasniemi, (2016); Kelly, (2010) view interviews as a conversation initiated by the researcher to gain relevant information aligned to the research aim(s) and question(s). Nieuwenhuis (2007:87) explains an interview as "a two-way conversation in which the interviewer asks the participant questions to collect data and to learn about the ideas, beliefs, views, opinions and behaviours of the participant." Holstein & Gubrium (2003) defines an interview as a form of conversation which provides empirical data about the life experiences of participants. Folkestad (2008:1) emphasises that interviews give a new insight into a social phenomenon because they allow participants to reflect and reason on a variety of subjects in different ways. Nieuwenhuis (2007) highlights that interviews allow researchers to "see the world through the eyes of the participants." Additionally, Kvale (1996) sees an interview as the interchanging of views between two or more people on a topic of mutual interest for knowledge production

In this study the transaction of interview information, was applied. According to this conception, each participant in the interview has a different view of a specific situation and defines it differently. In this study the third conception, namely transaction of interview information, was applied. According to this conception, each participant in the interview has a different view of a specific situation and defines it differently. The researcher found this conception suitable

in obtaining the different views of the participants on the implementation of blended learning in schools.

3.5.1.1 Semi-structured interview

Different types of interviews include open-ended, semi-structured and structured versions (Nieuwenhuis, 2007:87). The present study used semi-structured interviews for the collection of QUAL strand data. The researcher used semi-structured interview because of its ability to marshal probing questions and clarification where possible (Nieuwenhuis (2007). The rationale behind using interviews is that they have the potential to obtain rich descriptive data from participants (Nieuwenhuis, 2007:87). The semi-structured interviews provided the researcher with opportunity to combine a list of issues and the freedom to follow-up where necessary (Thomas, 2017:206; Creswell, 2014; Kallio et al., 2016; Maree, 2007).

Semi-structured interviews have several advantages for researchers in data collection. Some notable advantages of semi-structured interviews are highlighted by various researchers (Cohen et al., 2011; Creswell, 2014; Kallio et al., 2016; Kelly, 1999; Maree, 2007; Merriam and Tisdell, 2016; Morrison, 1998; Stephenson, 2010). Some of the advantages which are highlighted in the literature include:

a) Researchers can address issues they have identified in advance and gain more information on. Regarding this study the researcher identified blended learning and drafted an interview schedule for an interview of participants.
b) An interview is arranged well in advance and the researcher has ample time to plan how the dialogic processes. For this study an interview schedule was drawn and issued to all the interview participants so that they knew of the date and time of the interview. The researcher also reminded the participants of the interviews a day before the interview.
c) Semi-structured interviews allow researchers to communicate with the interviewees and clarify and probe issues were necessary. The

researcher further probed the participants and clarified some misunderstandings and misconceptions to obtain the required information from the participants.

d) Semi-structured interviews have the potential to get into the psyche of the participants regarding their beliefs, perceptions, and attitudes towards a phenomenon. For this study, semi-structured interviews assisted the researcher to obtain relevant information about how teachers implement blended learning in their respective schools.
e) As reflected by Coleman, (2012); Denscombe, (2010); Javadi, (2014) semi-structured interviews in this study assisted the researcher to obtain in-depth answers.

Denscombe (2010:192) summarises the advantages of using semi-structured interviews in the following manner:

a) Depth of information: It gives good and detailed information.
b) Insights: The detailed information provides valuable insights.
c) Equipment. It requires simple and in-expensive equipment.
d) Informants' priorities: It enables informants' opportunities to broaden their ideas, views and the identification of critical information.
e) Flexibility: Interview programme can be adjusted according to the prevailing conditions.
f) High response rate: Interviews have a relatively high response because the researcher can make as many follow-ups as possible to ensure that participants are interviewed.
g) Validity: The researcher is capable to check the accuracy, the relevance and error elimination during data collection.

However, some dis-advantages in semi-structured interviews can be encountered in the process (Coleman, 2012; Creswell, 2014; De Vos et al., 2011; Denscombe, 2010; Maree, 2007; Merriam & Tisdell, 2016; Thomas, 2017) as:

a) Interviews are time consuming. The arrangement and the process of interviews as well as taking of notes takes a lot of time.
b) Workload during data analysis. Data transaction, analysis and coding for interviews poses challenges and time-consuming.
c) Effects on reliability. The different data-set collected and the consistency and the impact of the interviewer on the participants may affect the reliability of the interview negatively.
d) Interviewer effect on interviewees. The interviewer might misunderstand the identity and text of the interviewee and therefore reaching a different understanding. Furthermore, the interviewee might get tempted to impress the interviewer and give false statements which might affect the research results negatively.
e) Inhibitions from recording devices. The recording devices such as electronic devices might instil fear in the participants and leading them to withhold relevant information with the result that less information is obtained.
f) Use of resources. Resources used in interviews often incur huge costs on the researcher. Sometimes researchers are expected to travel long distances and they essentially incur expenses in purchasing of the recording devices.

With regard to this study, the researcher addressed the disadvantages by:

- Managing time sparingly at all cost,
- Minimising the workload during analysis by utilising external experts to transcribe the interviews,
- Ascertaining the reliability by cross-referencing the information all the times,
- Requesting the interviewees to give honest and reliable information to the best of their abilities; and
- Reducing the travelling costs by interviewing all the participants of one school on the same day.

3.5.1.2 Composition of the interviews and interviews schedules

A total of 4 Principals, 4 HODs and 4 CS1 teachers were interviewed in their respective schools as their natural settings. Participants answered the research questions as outlined in the research question section. The questions for the interviews composed of open-ended questions. This enabled the researcher to clarify and probe participants and in turn collect relevant and reliable data. Johnson & Burke (2000) concur that in interviews the researcher has opportunities to probe the interviewee when the need arises.

As indicated by Babbie (2010), in interviews the researcher had an opportunity to observe the participants, the surrounding and the technological devices used in the case schools. Aspects addressed included: the perceptions of teachers on ICT education, implementation of blended learning and the challenges encountered. The interviews gave the researcher new insights into the research study and allowed participants to reflect and reason on a variety of aspects in different ways (Folkestad, 2008:1). The data were then transcribed and analysed by thematic analysis.

3.5.2 Document study

Document study analysis information was derived from screened and studied newspapers articles, books and brochures, journals, minutes of meetings and other documents in order to make a robust investigation to arrive at some conclusions. The documents and resources which were studied included literature articles, books and journals about technology education, technological infrastructure, technological facilities, connectivity, internet facilities, administration documents, technology policies and developmental programmes.

The rationale behind utilising document study was for triangulating it with the questionnaire and interviews to get “a confluence of evidence that breeds credibility” for the research results (Eisner, 1991:110). Furthermore, document study was undertaken to obtain supplementary research data, providing critical means of tracking change, development, and the verification of the findings from the questionnaires and interviews (Bowen, 2009:30). Some of the advantages of document study which compelled the researcher to employ

included its efficiency, availability of documents, its cost-effectiveness, lack of obtrusiveness and reactivity, stability and exactness as highlighted by Bowen (2009).

In this study the document study attempted to establish the availability and non-availability of ICT Centre, Computers and laptops and other technologies, school internet connectivity, internet access by all teachers and learners, Pedagogical Digital software, Appropriate Edu-Tech policies, Electrification of all the school buildings, Reliable Electricity, Reliable Electricity, Technical support systems, Computer training for teachers and developmental programmes in the case schools. The information obtained from the document study consolidated the information from the questionnaires and interviews and assisted the researcher to get in-depth answers for the research questions.

According to Merriam (1988:118) documents help researchers to uncover the meaning, develop understanding and discover insights which are relevant to the research problem. Marshal and Rossman (2006:107) support that “knowledge of the history and context surrounding a specific setting comes, in part, from reviewing documents.” They further indicate that reviewing of documents is an “unobtrusive method, rich in portraying the values and beliefs of participants in the setting.” Bowen (2009:27) further defines document study as “a systematic procedure for reviewing or evaluating documents – both printed and electronic material.” Nieuwenhuis (2007) claim that documents used to collect data include advertisements, agendas, agendas, administrative documents, letters, and questionnaires.

3.5.3 Questionnaires

A questionnaire is one of the instruments that researchers use to gather data. Several questionnaire methods to collect data can be used in research studies. These include group administration questionnaires, postal survey, telephone survey and face-to-face survey (Maree, 2007). Which methods to use depends on the degree of control the researcher exerts over the survey environment

(McMillan and Schumacher, 2001; Crowther, Smit and Herbst, 1994). Wilson and McLean (1994) refer to a questionnaire as an instrument for collecting survey information while Hanan and Anderson (2007:2) perceive it as a device employed to gather information about people's opinions, often asking respondents to indicate how strongly they agree, how information is connected through resources as well as questions about how blended learning in the rural schools could be improved. To ensure a complete return of the questionnaire the researcher issued and collected the questionnaires personally.

In this study self-administered questionnaire was used. The reason was based on Welman, Kruger and Mitchel (2001) assertion that opinions, beliefs and convictions can best be obtained using a questionnaire and that the respondents have ample time and freedom to complete the questionnaires. Furthermore, the researcher adopted questionnaires because of its potential generating a higher response rate and enabling the researcher to clarify issues to the participants (Maree, 2007). The researcher did not opt, for example, for a face-to-face survey method because of its high cost and bias (Maree and Pietersen, 2007). The questionnaire consisted of closed and open-ended questions. Questionnaires were self-administered to 177 respondents in Sekhukhune E-Learning Project schools. The questionnaire comprised variables which included: biographical information, perceived usefulness of blended learning, perceived ease of use, school readiness in implementing blended learning as pedagogical strategy, learning as a process of connecting information resources and improving blended learning in rural schools as portrayed in Table 3.4.

Table 3.4: Extract of Questionnaire

A: BIOGRAPHIC INFORMATION			
1	What is your gender?	Male	
		Female	
2	What is your age band?	21-30	
		31-40	
		41-50	

		51-60	
3	What is your job designation?	Senior Teacher	
		Master Teacher	
		HOD	
		Deputy Principal	
		Principal	
4	What is your highest academic/professional qualification?		
5	What is your ICT qualification?		
6	What is your ICT training you received? Describe		

B. PERCEIVED USEFULNESS OF BLENDED LEARNING	**Agree**	**Disagree**
7. Schools are supplied with adequate useful educational technologies		
8. Blended learning provides effective teaching and learning situation		
9. Blended learning promotes self-regulated learning among learners		
10. Using blended learning improves my teaching skills		
11. Using blended learning improves learner performance in the school		
12.Using blended learning promotes collaborative learning		
13.Blended learning requires schools to have pedagogical technologies required to teach 21st Century skills		
C. PERCEIVED EASE OF USE	**Agree**	**Disagree**
14. It is easy for me to carry out teaching activities on educational technologies available in my school		
15 I use blended learning in many of my classroom instructions		
16. I find it easy to assess learners in using technologies		
17. The school is moving towards paperless education as prescribed by E-Education policy		
18. My school has policy that guides the implementation of technological policies		

Table 3.4 depicts a questionnaire which was administered to the participants. It was composed of open-ended and closed-ended questions. The questionnaire requested information about the teachers' biography, perceived usefulness of blended learning and how ease do teachers find the technology devices usage and the teachers' readiness to implement technologies. The participants were

expected to either agree or disagree with a statement to provided. Refer from Appendix I for the questionnaire

'The researcher designed a plan for the issuing and collection of the questionnaires to and from the sampled schools. The researcher self-administered the questionnaires. For the reason that the questionnaires were self-administered, all the issued questionnaires were returned. In all the processes of questionnaires administration the researcher ensured that Covid-19 protocols were strictly observed.

3.6 DATA ANALYSIS

Different forms of data analysis are used in this study. For the purpose of this study, thematic analysis, narrative analysis and content analysis were used for the QUAL strand and IBM SPSS version 28 software was used for the QUAN strand.

3.6.1 Data analysis for QUAL strand

As outlined above, analysis of qualitative strand was done by using thematic and narrative analysis. Narrative analysis enabled the respondents to speak for themselves (Schurink, Fouche and de Vos, 2011:405). This enabled the researcher to probe the respondents and obtain more useful information. Detailed discussion of thematic and narrative analysis follows next.

3.6.2 Thematic analysis

The collected data extracted from the interview were analysed by thematic analysis. Generally thematic analysis is used in qualitative research. The conceptual framework of this research study was built upon the theoretical positions of Braun and Clarke (2006). According to them, thematic analysis is a method used for "identifying, analysing, and reporting patterns (themes) within data" (Braun and Clarke, 2006:79). In tandem, Fereday and Muir-Cochrane (2006) see thematic analysis as a form of pattern recognition which categorises data analysis into some themes. The researcher used thematic analysis to

scrutinise data from written notes and voice-recorded narratives. The researcher was guided by the six phases developed by Braun and Clarke (2006) on how to analyse data collected from the interviews. The researcher adopted a deductive thematic analysis approach which meant that he employed preconceived themes based on the theoretical frameworks, the research questions and the aim of the study (Caulfield, 2019). Detailed discussion of the six steps follows:

Phase 1. Familiarising yourself with data

The researcher read and re-read the written notes and played and replayed the voice-recorder to search for essential meanings emerging out of the deliberations.

Phase 2: Generating initial codes

In this phase initial codes are generated. Since the research used the deductive thematic analysis approach, preconceived themes were used for the analysis of data.

Phase 3: Searching for themes

This phase categorised codes and generated the themes. The researcher categorised the preconceived themes in terms of the research questions.

Phase 4: Reviewing themes

The researcher reviewed the accuracy and relevance of the themes in accordance with the research questions, the theoretical frameworks and the aim of the study.

Phase 5: Defining and naming themes

This phase involved the naming and identification of the predominance of each theme. The researcher defined and explained how the themes were related to the data and came up with succinct and easily understandable name categories for each theme (Caulfield, 2019).

Phase 6: Producing the report

Finally, the researcher presented a detailed analysis of each of the themes (as outlined in Chapter 4).

The rationale was to help the researcher to produce an insightful analysis that responds adequately to the research questions (Braun and Clarke, 2006:79).

3.6.3 Narrative analysis

According to Riesman (2005) thematic analysis directs emphasis on the content of the text by posing the “What” more than “How”, the “told” rather than “telling. As the researcher wanted to hear the status of technologies from the research participants, narrative analysis was important to probe the “How” questions so that the respondents narrated their stories themselves. Schurink, Fouche and de Vos (2011) alert us that narrative approaches do not only focus on the content but also stress the collection and presentation of data from the participants speaking themselves. The aim of using narrative analysis in this study was to gather the thick descriptions on teacher’s perceptions of the usability and effects of technologies in their teaching and learning situations (Labor, 1997).

3.6.4 Document study

Analysis of documents in research is often done through critical content analysis (Marshal and Rossman, 2006: 108). Thus, the researcher adopted content analysis in this study. Krippendorff (1980) explains content analysis as a research method which makes replicable and valid inferences from data to their context with the aim of providing knowledge, new insights, a representation of facts and a practical guide to action. Marshal & Rossman (2006:108) view content analysis as a method for describing and interpreting the artefacts of a society or social group.

The reason for using content analysis in the study was to attain a condensed and broad description of the phenomenon as well as categories (themes) that

best described the phenomenon (Elo and Kyngàs, 2007:108). Marshal and Rossman (2006) highlights that content analysis is used because of its unobtrusive and nonreactive character. Content analysis was also used for describing trends in communication of the content, relating known characteristics of sources to messages they produce, auditing content against standards, analysing techniques of persuasion and relating attributes of participants to messages that they produced (Holsti, 1968). Technology management and administrative documents were requested from the principals of the four schools sampled for the interviews. The researcher then scrutinised all the technological documents, building infrastructure and facilities. The findings were then tallied with those from interviews and questionnaires for final results.

3.6.5 Analysis of QUAN data using IBM SPSS version 28 software

Data collected from the 177 participants was analysed by using Statistical Packages for Social Sciences (SPSS version 28) devices. From this analysis, frequency tables, pie charts and bar graphs were generated and developed. The outcomes of the questionnaires were then triangulated with those from the interviews and document study to obtain the overall results of the study.

3.7 QUALITY ASSURANCE ISSUES

The results of any research need to be trusted by the readers. It is for this reason that researchers should always ensure that the results of their r studies are trustworthy. Shenton (2004) identifies credibility, transferability, dependability and confirmability as the four criteria that need to be heeded in qualitative research. About credibility the researcher endeavoured to give a true picture of the state of blended learning by adopting familiarising himself with the participants and schools, purposively sampling the participants, triangulating the instruments and the methods of collection and tactically ensuring honesty in the participants (Shenton, 2004). For the fact that the sample of the study was small it was not possible to demonstrate that the findings and conclusion of the study can be transferred to other situations and populations (Shenton, 2004:69).

However, the researcher provided enough detail of the context of blended learning for trustworthiness purposes.

According to Lincoln and Guba (1989) credibility ensures dependable results. In this study this was demonstrated by triangulating the research data collection methods.

The study results must be as objective as possible. It is therefore imperative for the researcher to confirm the objectivity of the research findings. Shenton (2004:72) warns us that the findings of research study must be the results "of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher." Confirmability in this study was ensured by the triangulation of the research methods and findings. Furthermore, to ensure confirmability the researcher admitted his predispositions, recognised shortfalls in the methods deployed and fully described methodologies (Miles and Huberman, 1994). As this research was a mixed method research the validity and reliability as principles of quantitative research were also fully considered.

Sousa (2014) emphasises the authenticity and acceptability of the research results when he calls for a clear and rigorous description of all the methodological steps used in the research process, the adequacy of the research questions and the participants sample as well as the collection and analysis of data in the research study. The quality of the results of the study is attained by ensuring trustworthiness and rigor of the research process. In this study, Sousa (2014) research validation framework was employed. This framework is explained in the next chapter.

3.8 ETHICAL CONSIDERATIONS

The issue of ethics is very important in research, particularly when research deals with living things. Leedy and Ormrod (2010:101) emphasise this assertion when they say that "whenever human beings or other creatures with the potential to think, feel, and experience physical or psychological distress are the focus of investigation, we must look closely at the ethical implications of what

we are proposing to do." The researcher considered the following ethical issues in this study.

3.8.1 Ethical clearance from the University of Limpopo

The researcher abided by the ethical clearance stipulations provided by the University of Limpopo. See Appendix B. After having received a clearance certificate, the researcher obtained approval from the Department of Basic Education (Sekhukhune District) to conduct research in the case schools

3.8.2 Seeking permission from Participants

Researchers obtain information from living and/or non-living beings. In any case the researcher is obliged to seek permission from the people who participate in an investigation or permission to use the non-living objects involved in the investigation from the owners. To seek consent from the participants, researchers often make use of informed consent form. Diener and Crandall (1978) define an informed consent as "the procedure in which individuals choose whether to participate in an investigation after being informed of facts that should likely influence their decisions´ Cohen et al. (2000) alert us that the principle of informed consent arises from "the subject's right to freedom and self-determination"

In this study the researcher issued an informed consent form which contained a brief description of the nature of the study, description of what participants will be involved, a statement indicating that participation is voluntary and can be terminated at any time they wish, the guarantee of anonymity and confidentiality, provision for the researchers' signature and the participant (Leedy and Ormrod, 2010102).

3.8.3 Anonymity

Babbie (1998:112) defines anonymity as the situation where a researcher cannot identify a given response from a given respondent. In this study letters of the alphabet were used for coding instead of the names of the participants.

Furthermore, all participants in the study were assured of confidentiality and anonymity during and after the completion of the study.

3.8.4 Prevention of bodily harm

This study is not experimental in nature, so physical harm was not a potential risk during the research process. However, the researcher identified possible responses which might lead respondents to think that their lives, relationships, and jobs mighty be at risk, should they be honest and assured them protection from bodily harm (Babbie, 1998. 441). In which case the possible harm to the participants, either financially or emotionally was strictly considered. Even if respondents were sceptical of providing information, the researcher assured them that no one will know who responded to the questionnaire.

3.8.5 Thesis availability to the participants

On completion of the research study the researcher made the thesis available to any participant who required it. Furthermore, the thesis was made available on the University of Limpopo website where people might have access to information regarding implementation of blended learning in schools.

3.8.6 The principle of respect

Respect of individuals who participate in research is key to the success of any research study. It is for this reason that in this research study the researcher respected the inputs and all the information provided by all participants. This research respected the dignity, privacy, confidentiality, and rights of the participants at all times. As guided by (Bromley, Mikesell, Jones and Khdyakov, 2015) the researcher ensured that individual's confidentiality is maintained, the research process is culturally appropriate and does not temper with the individual's culture; religious and values, the researcher remained alert; sensitive and responsive during research process and created dialogue and ongoing communication with participants.

3.8.7 Respect for dignity

The Bill of Rights proclaims that everyone has an inherent dignity and right to have their dignity respected and protected (The Constitution of Republic of South Africa, 1996). Based on this directive, the researcher respected, protected and upheld the dignity of all participants in this study. The researcher also ensured that respect for dignity was dealt with by addressing problems uncovered during the research process and by striving towards achieving equitable benefits for all participants (Bromley, Mikesell, Jones and Khodyakov, 2015). During the interviews, which started on 29 June 2020 and ended on 03 July 2020, the researcher communicated questions to participants in a dignified manner, and cases where participants did not understand the questions, the researcher clarified them until they understood. Interviews were conducted from

3.8.8 Respect of privacy and confidentiality

This research dealt with individuals who might have had private personal information. It is for this reason that the researcher considered respect for their privacy and confidentiality at all time. Confidentiality emphases that all information obtained during the research practices should be kept secret apart from the research purposes or in cases that the interests of society are important (Fouka and Mantzoron, 2011:11). In this research study the researcher protected the identities of all participants and the case schools (Nieswiadomy, 2007). A breach of privacy and confidentiality has potential to violate “a person’s rights and poses a risk of dignitary harm to the research participant, ranging from social embarrassment and shame to stigmatisation, and even damage to social and economic status such as loss of employment and health insurance” (Columbia Education, 2020). To avoid the above-mentioned, the researcher was obliged to keep the participants’ privacy confidential at all costs.

As this study dealt with the beliefs, attitudes, opinions and records of people, the researcher always protected and safeguarded the privacy of the participants during the research process. To ensure that respect of privacy and

confidentiality research principles were adhered, the researcher gave the participants control of the research process and promoted the individual's autonomy (Columbia Education, 2020). The researcher further ensured that trust which maintained the participants' dignity was built so that to instil the feeling that they are respected (Columbia Education, 2020).

Research which deals with human beings should always consider ethical issues. Leedy & Ormrod (2010:101) warn that "whenever human beings or other creatures with the potential to think, feel, and experience physical or psychological distress are the focus of the investigation, we must look closely at the ethical implications." The ethical issues which the researcher considered included: ethical clearance from the University of Limpopo, seeking permission from the participants, anonymity, prevention from harm and making the thesis available ton the participants.

This study was undertaken during the difficult times of Covid-19. To ensure both the safety of the participants the researcher possessed a thermometer and a sanitise to use during the interviews and the issuing and collection of questionnaires. As all the participants and interviewees were conversant with Covid-19 protocols, they were all cooperative in the researcher's implementation of the rules.

3.9 CHAPTER SUMMARY

This chapter commenced with the introduction and this was followed by the discussion of the paradigm perspective which guided the study. Explication of mixed methods research approach and the rationale behind using it in the inquiry were outlined. The chapter further discussed the design and methods used to collect and analyse data. Data was collected using questionnaires, interviews and document study. Analysis of data was done by using SPSS version 28 for the quantitative questionnaires while the interviews and document study data were analysed using thematic analysis. Quality assurance aspects of qualitative and quantitative research approaches applied in the research study were also discussed. Lastly, the chapter outlined the ethical

issues considered in the study in accordance with University of Limpopo Research Ethics.

The next chapter presents the biographical information of the schools, participants and validation of the results and data.

CHAPTER 4: BIOGRAPHICAL AND DATA PRESENTATION

4.1 INTRODUCTION

The 19th and 20th century's ways of teaching and learning came and passed respectively. However, education continues to be facilitated by teachers who were trained in the traditional ways of teaching in those past centuries. The 21st century has arrived with emphasis on technologies, and this calls for serious development and re-training of the cohort amongst existing and practising teachers in the novel technologies that have become features of the current dispensation.

In an attempt to prepare teachers for the 21st century teaching and learning approaches, the Department of Basic Education (DBE) in South Africa developed policies in technology which include e-Education Policy, Integrated Strategic Planning Framework for Teacher Education Development in South Africa 2011-2025, Guidelines for Teacher and Professional Development in ICT and Professional Development Framework for Digital Learning. Despite the DBE initiatives, little is known about how teachers perceive the usefulness of technologies, how they use the technological resources and their skills in the deployment of such technologies in schools, particularly in Sekhukhune District. This study therefore examines the implementation of blended learning in Sekhukhune District schools. The study sought to obtain answers to the following questions:

- Determine teachers' perceptions on the usefulness of blended learning.
- Establish how easy teachers think they will find blended learning use.
- Ascertain how teachers will connect information using technological resources in their teaching and learning environment.
- Determine teachers' current skills in blended learning.
- Devise a list of recommendations on implementing blended learning in schools; and
- Suggesting the elements to be considered in designing blended learning model which can be implemented in schools.

The aim of the research study was to examine teachers' perceptions and technology skills in the implementation of blended learning in schools. The aim was achieved by determining the teachers′ perceptions on the usefulness of blended learning in the teaching and learning, establishing how technology resources are used by teachers in their practices and ascertaining the teachers′ technology skills in technologies, document study findings and the questionnaire findings. The next sections present the profiles and demographics of the schools and participants; the documents employed; the alignment of the study and validation of the results.

4.2 CODING AND PROFILE OF CASE SCHOOLS

It is critical for researchers to include profiles of participants in their research studies. This was important in this study because the profiles cast light on the population dynamics and changes that might have had influences on the responses offered by these participants (Thaba-Nkadimene, 2017:96). However, researchers need to consider aspects of the anonymity and confidentiality of the research participants. To address the issues of anonymity and confidentiality schools and participants were coded as reflected in the next sections.

The criteria for selecting the sample were that the school was big enough such that it had the post of a Principal, Deputy Principal and HoDs. Furthermore, the school needed to be easily accessible to cut on travelling costs. The sample consisted of fourteen quintiles 1 public schools which were purposively sampled. The sample was made up of seven secondary public schools and seven primary public schools. Table 4.1 depicts coding and the profile of the schools.

Table 4.1: Coding and profile of the case schools

Secondary schools				Primary Schools			
School	Type	Quintile	Code	School	Type	Quintile	Code
Secondary 1	Public	1	S1	Primary 1	Public	1	P1
Secondary 2	Public	1	S2	Primary 2	Public	1	P2
Secondary 3	Public	1	S3	Primary 3	Public	1	P3
Secondary 4	Public	1	S4	Primary 4	Public	1	P4
Secondary 5	Public	1	S5	Primary 5	Public	1	P5
Secondary 6	Public	1	S6	Primary 6	Public	1	P6
Secondary 7	Public	1	S7	Primary 7	Public	1	P7

Table 4.1 outlines the coding and profiles of all schools which formed the sample of the study. 10 schools formed QUAN strand sample while 4 schools used for QUAL strand. Almost all the sampled schools had good building infrastructure for teaching and learning and were electrified. For example, Figure 4.1 displays two of the schools employed for the QUAL strand interviews.

Figure 4.1: Selected pictures of the case schools

It was observed that almost all the sampled schools are well built, fenced, electrified and have sufficient water supply. The toilets of the staff and learners were assessed and found in good working order. Majority of the schools have beautiful administration buildings for the School Management Teams and their staff members. It was unfortunate that most of the schools do not have suitable ICT Centres except one primary school which had a dysfunctional centre.

4.3 PROFILE OF QUAL STRAND SCHOOLS

As stated above, four schools were sampled for the QUAL strand. The four schools were sampled for both the interviews and document study data collection. These included two secondary schools namely: S1, S2 and two primary school which were P1 and P2 schools as shown in Table 4.2.

Table 4.2: Profile of QUAL strand schools

School		Type	Quintile
Primary school 1	P1	Public school	1
Primary school 2	P2	Public school	1
Secondary school 1	S1	Public school	1
Secondary school 2	S2	Public school	1
		TOTAL	4

Table 4.2 reflects on the four sampled schools for the QUAL strand. These schools were all public and quintile 1 schools. According to Ogbonnaya and Awuah (2019) a quintile 1 school is categorised as falling within the "most economically and disadvantaged geographical areas" category. They are non-fee paying schools and receive more funding per learner from the government than schools in the higher quintile 4 and 5 (Ogbonnaya and Awuah (2019). As all the sampled schools were deemed big in terms of enrolment (+-600 learners). These schools therefore receive sufficient funds because schools are funded per enrolment. Consequently, it can be argued that the schools can afford to supplement the technologies provided by the Department of Basic Education and hence expected to be implementing technological learning.

4. 4 PROFILING OF RESPONDENTS AND PARTICIPANTS

Profiles of the QUAN and QUAL respondents and participants are presented below:

QUAN Strand

The sample of the QUAN strand composed of 177 respondents. This was constituted by 10 principals, 9 deputy principals, 35 head of departments and

123 teachers from 10 purposively sampled schools in Sekhukhune District, Limpopo Province. The schools were sampled because of their proximity and their rankings. Schools which were ranked at Post Level 3 and 4 were chosen for the fact that they all qualified for Principalship, Deputy Principalship and head of department's posts.

Table 4.3: Profile of schools and participants for QUAN strand

Secondary schools			Primary Schools			
School	Respondents	Code	School	Type	Respondents	Code
Secondary 1	Principal deputy principal HoDs teachers	S1	Primary 2	Public	Principal deputy principal HoDs teachers	P1
Secondary 2	Principal deputy principal HoDs teachers	S2	Primary 3	Public	Principal, deputy principal HoDs teachers	P2
Secondary 3	Principal deputy principal HoDs teachers	S3	Primary 5	Public	Principal deputy principal HoDs teachers	P3
Secondary 4	Principal deputy principal HoDs teachers	S4	Primary 6	Public	Principal deputy principal HoDs teachers	P4
Secondary 5	Principal deputy principal HoDs teachers	S5	Primary 7	Public	Principal deputy principal HoDs teachers	P5

Table 4.3 depicts the composition of the school and participants for the administration of a questionnaire in the QUAN strand. Questionnaires were administered to 5 secondary schools and 5 primary schools in Sekhukhune District, Limpopo Province. The principals, deputy principals, head of

departments and teachers responded to the questionnaires which the researcher self-administered.

QUAL Strand

The sample for QUAL strand composed of principals, HoDs and teachers from four purposively sampled schools in the district. The participants were chosen due to their functional roles of overseeing, managing and implementation of curriculum in schools. These participants formed part of the interviews because of their pivotal role on the management, supervision and implementers of curriculum activities in schools.

Table 4.4: Profile of interview participants

School	Participants	Total
P1	1 principal 1 HoD 1 teacher	3
P2	1 principal 1 HoD 1 teacher	3
S1	1 principal 1 HoD 1 teacher	3
S2	1 principal 1 HoD 1 teacher	3
Total	4 principals 4 HoDs 4 teachers	12

Table 4.4 displays profiles of schools and participants of the QUAL strand. In each of the sampled schools three participants were interviewed, namely the principal, head of department and a teacher. With the assistance of the school principal, the researcher arranged jointly with the interviewees regarding the interview programme in their respective schools. In total, twelve participants were interviewed. This means that a total of four principals, four HoDs and four teachers constituted the sample for QUAL strand.

4.5 DEMOGRAPHIC INFORMATION OF PARTICIPANTS

This section presents the demographic information for the QUAN and the QUAL strands. Merriam Webster Dictionary, (2002) defines demographic information as the population factors and dynamics within the population. This means the characteristics of human factors such as age, sex or qualifications as is the case in this study. Hammer (2011) argues that by not indicating the demographics of participants, a researcher risks taking the stance of “absolutism” which assumes that the phenomena of interest are the same

regardless of their characteristics. Hammer (2011) further submits that demographics of participants permits readers and researchers to determine to whom the research findings were generalised, and it also allows for comparisons to be made across replications of studies. It was for this reason that in this study the researcher included demographic profiles of the participants. In this study the demographic information is composed of participants' gender, age band, highest qualification, ICT qualification and ICT training.

The demographic information assisted the researcher to understand the participants' responses better. The factors relevant for this study were the gender, age band, the highest qualification of participants, ICT qualifications and ICT training in technologies.

4.5.1 Demographic Information of QUAN Strand

The collected data in the QUAN strand was analysed by employing SPSS Version 28.

QUAN strand on biographical information involved gender, age, job description, highest qualification, ICT qualification and ICT training of the respondents. The information on these aspects shed light on population dynamics that had an influence on the respondents′ responses to the research questions (Thaba-Nkadimene, 2017). Detailed discussion of the demographic aspects follows next.

4.5.1.1 Gender

It was important in this study to determine gender of the participants and respondents. This is because males and females have different perceptions toward technologies. The researcher asserts that the different perceptions of males and females can complement each other in the implementation of technologies. Yau and Cheng (2012) assert that males seem to be more confident in using technologies than females. This articulation is shared by Cai, Fan and Du (2017) who identified that males hold more favourable attitudes

toward technology use than females. It can be therefore argued that the working together of the males and females can contribute in the development of technology skills across the genders.

Table 4.5: Frequency table of gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	83	46.9	46.9	46.9
	Female	94	53.1	53.1	100.0
	Total	177	100.0	100.0	

Table 4.5 illustrates the sample of QUAN strand. A total of 177 respondents formed the QUAN strand sample. There were 83 male teachers and 94 female teachers. In terms of percentages females make 53.1% and males 46. 9%. The significance of gender in this study was to address the attitudes and confidence levels of the respondents toward technologies since gender has been identified as exerting an influence on the use of ICTs in the teaching and learning (Mustafina, 2016).

4.5.1.2 Participants' Age

The age of the respondents was important in this study. According to Mustafina (2016), age has the potential to change teachers′ attitudes toward technology. The frequency of the different age interval is shown on the table below.

Table 4.6: Frequency table of age group

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	14	7.9	7.9	7.9
	41-50	102	57.6	57.6	65.5
	51-60	61	34.5	34.5	100.0
	Total	177	100.0	100.0	

Table 4.6 shows the statistics of the respondents' ages. The ages of the participants stretch from 31 years to 60 years. The age interval was set at 10-year gaps from 31-40, 41-50 and 51-60 age groups. According to the analysis there were 14 respondents in the 31-40 group, 102 in 41-50 and 61 respondents in the 51-60 interval group. In terms of respondents 31-40 contributed 7.9%, 41-50 57.6% and 51-60 34,5%. As age is one of the characteristics which influence the usage of new media in schools, it emerged that the 31-40 age group constituted the majority for life span implementation of technology education in schools (Totter *et al.,* 2006). However, with regards to this study the 31-40 age band contributed 7.9%. This appears to be a worrying factor because the 31-40 age band is largely composed of the so called digital natives or the "Net" Generation who generally display an affinity to the new technologies and can ensure a lifelong engagement with technology education implementation Bennet, Maton and Kervin, 2008). This simply suggests that more training and development in technologies is needed for the 41-50 and 51-60 groups born before the onset and proliferation of novel technologies.

4.5.1.3 Job description

In any working situation employees are categorised according to their job ranks and responsibilities. In a school set up the organogram ranks from a teacher to head of department, deputy principal to the highest rank is the principal. With regards technological use in the teaching and learning situation, members of the management team (principal, deputy principal and head of department/s) need to be technologically and pedagogically skilled.

Table 4.7: Frequency table of job description

Job Description					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Teacher	123	69.5	69.5	69.5
	HoD	35	19.8	19.8	89.3
	Deputy Principal	9	5.1	5.1	94.4
	Principal	10	5.6	5.6	100.0
	Total	177	100.0	100.0	

Table 4.7 depicts the job descriptions of the different participants sampled for the study. It was composed of 10 Principals, 9 Deputy Principals, 35 HoDs and 123 teachers. Teachers constituted 69.5%, HoDs 19.8%, principals 5.6% and deputy principals 5.1%.

4.5.1.4 Participants' qualifications

It is important that teachers hold some academic and professional qualifications with regard to their subject/job specialisation. Despite of the DBE developmental programmes, individuals develop themselves to excel in their respective areas.

Table 4.8: Frequency table of highest qualification

Highest qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	50	28.2	28.2	28.2
	Degree	65	36.7	36.7	65.0
	Honours	60	33.9	33.9	98.9
	Master's	2	1.1	1.1	100.0
	Total	177	100.0	100.0	

The information shown in Table 4.8 indicates that majority of the respondents are well qualified. The table indicates that 50 (28.2%) respondents have diploma qualifications, 65 (36%) respondents obtained degrees, 60 (33.9%) respondents had Honours degrees whereas only 2 (1.1%) respondents had Master′s degrees. Based on the qualifications of the respondents, one can argue that the majority of the respondents are supposed to be computer literate the greater part of their higher education qualifications involves usage of computers. Although possession of qualifications in using ICT is not sufficient in enhancing the use of computers as found by Bakkabulindi, Sekabembe, Shopi and Kiyingi (2009), qualifications in this study were deemed important for the implementation of computers for the provision of technology education. ICT teacher qualifications is dealt with in Chapter 5.

4.5.2 Demographic Information of QUAL Strand

Like in the QUAN strand, the gender, age, highest qualification, ICT qualification and ICT training in the QUAL strand were addressed. of the following segment interrogates these specific aspects.

4.5.2.1 Gender Distribution

The study by Netshitangani and Msila (2014) established that women in managerial positions in the rural areas are still under-represented. Subsequently, Cook and Glass (2011) found that appointment of women in senior leadership positions have witnessed a dramatic rise, suggesting that gender has become an important consideration for positions in management and leadership.

Table 4.9: Gender distribution

Gender	Frequency	Percent	Valid Percent	Cumulative percent
Male	6	50	50	50
Female	6	50	50	100
Total	12	100	100	

Table 4.9 displays gender distribution of QUAL participants. With regard to this study the gender distribution shows a balanced gender distribution, that is 50% male and 50% female representation. This suggests that access to opportunities in the case schools was unaffected by gender. This was promising as opposed to the submission by Diko (2007) who identified that gender equality in South Africa was far from being achieved as there were skewed patterns in her study.

4.5.2.2 Age of participants

The other information of the participants which the researcher found to be important was the age band of participants. Schonwetter, Bond and Perry (1993) revealed that gender and age are related to an individual's work style and job satisfaction. They found that job satisfaction among the younger

participants was greater compared to either middle-aged or senior administrators and older men and younger and middle-aged women indicated a high stressful work style. The purpose of age profile in this study was intended to establish the relationship of participants' age regarding the usage of technologies in schools.

Table 4.10: Age band profile

Age band	Frequency	Percent	Valid percent	Cumulative percent
21-30	1	8.3	8.3	8.3
31-40	3	25	8.3	33.3
41-50	6	50	50	83.3
51-60	2	16.7	16.7	100
	12	100	100	

Table 4.10 shows that 50% of the participants were in 41-50 age band, 16.7% in 51-60 age band, 25% in 31-40 age band and 8.3% age band. Since majority of the participants were in the middle-aged band (41-50) it was expected that their job satisfaction with regard to implementation of technologies would be greater (Schonwetter, Bond and Perry, 1993).

4.5.2.3 Qualifications of the participants and respondents

Quality technology education can be implemented effectively and efficiently if those implementing it are well-qualified. Totter, Grote and Stü (2016) emphasize that ICT qualification is one of the important teacher characteristics which is identified as a factor influencing the use of a new media in schools. However, as reflected on the information obtained in this study most of the participants do not have the necessary ICT qualifications. This suggests that teachers in the case schools are not well-equipped for the implementation of technology education. The revealed information is inconsistent with Ghavifekr and Rosdy (2015) which revealed that teachers′ well-equipped in ICTs makes technology-based teaching and learning successful.

The ICT qualification factor was important because it helped the researcher to discover the status of the participants' readiness in using technologies. Aslam, Rehman, Imran and Muqadas (2016) revealed that the teacher's qualification is the strongest predictor of student satisfaction than experience. Lewis and Sappington (1993) concur that the high levels of education increase chances that the worker will have high productivity on the job. The next sections present the qualifications of the QUAN and QUAL participants.

4.5.2.4 ICT Qualifications of QUAN respondents

It is important that teachers possess specialised qualifications in their functional areas. This would ensure the provision of quality education to learners, particularly in technology education. This study investigated teachers' ICT qualifications and training in technologies.

Table 4:11 ICT qualifications of QUAN respondents

ICT qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	7.3	7.3	7.3
	No	164	92.7	92.7	100.0
	Total	177	100.0	100.0	

Table 4.11 above exhibits frequency table for respondents' ICT qualifications. Data reveal 13 (7.3%) respondents had ICT qualifications whereas a hooping 164 (92.7%) respondents did not have any ICT qualification. The table indicates a low percentage of teachers with ICT qualifications. This implies that most teachers do not technological knowledge and thus would find it difficult to use technologies in the teaching and learning spaces. The significance of this finding in this study is that it arises a clear picture of the need of training of teachers in technologies. This finding confirms Ramorola (2013) whose work found lack of qualified teachers in technologies for effective implementation of technology education in teaching and learning situation. The study also uncovered teachers' lack of qualifications in ICT in the teaching and learning in secondary schools.

4.5.2.5 ICT Training for QUAN respondents

The training and re-training of teachers in technologies is vital because technology keeps on changing with times. This is even more important given our school curriculum which constantly changing and living educators obsolete and redundant in their working environments. The next table presents information about ICT training of the participants. However, in this study lack of teachers training was observed.

Table 4.12: Frequency table of ICT training received

ICT training received					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	3.4	3.4	3.4
	No	171	96.6	96.6	100.0
	Total	177	100.0	100.0	

Table 4.12 displays ICT training of the respondents. They confirmed their ICT training by answering Yes or No. The table shows that only 6 (3,4%) respondents got training in ICT while 171 (96.6%) had no training in ICTs. Despite DBE's emphasis on e-education in schools, the finding of the study shows that insufficient training of teachers in technologies is undertaken in schools. The finding of the study suggests an intensive training of teachers in technologies to ensure a successful implementation of technology related teaching and learning in schools. The finding of this study concurs with a study by Umar and Hassan (2015) done in Malaysia which indicated a need to train teachers to integrate ICT in the classroom in order to guarantee quality teaching and learning in schools.

4.5.2.5 Highest Qualification for QUAL participants

The highest academic and ICT qualifications of the QUAL participants are shown below.

Table 4.13: Highest Qualification for QUAL participants

Qualification	Frequency	Percent	Valid percent	Cumulative percent
Diploma/ Degree	6	50	50	50
B Honours	6	50	50	100
Masters	0	0	0	0
Doctorate	0	0	0	0
Total	12	100	100	

Table 4.14: Highest ICT Qualifications for QUAL participants

ICT Qualification	7	58.3	58.3	58.3
ICT training	5	41.7	41.7	100
Total	12	100	100	

Tables 4.13 and 4.14 reflect on the highest teaching qualification and the highest ICT qualifications respectively. The qualifications of the participants indicate 50% of the participants having a Degree qualification and 50% with Bachelor Honours degrees. It was expected that due to the required level of qualification obtained by participants, they would find it easier to use technologies in their teaching practises. Furthermore, 58.3% of the participants have certificates in ICT whereas 41. 7% had no training in ICT. Although 58.3% had certificates it was revealed that they only had basic computer literacy and could not use this knowledge for teaching and learning in the classroom. This finding is in line with Mathevula and Uwizeyimana (2014) research study that revealed that though some of the teachers received some form of ICT training the training had minimal or no impact on their abilities and confidence to use ICTs in teaching and learning.

4.6 DOCUMENT STUDY

Document study was done on the four schools sampled for the interviews. The principal of the school was asked to furnish all the required technology documents and records of technology facilities and infrastructure. These included records of the availability or unavailability of ICT centre, teaching and learning computers and laptops, internet connectivity, internet accessibility, pedagogical digital software, Ed-Tech policies, school electrification, reliable

electricity, technical support, computer training of teachers, teacher development programmes, and alternative instructional strategies. Data gathered from the document study was analysed through content analysis. The results of the document study were then merged with the results of the interviews and questionnaires to obtain final research findings.

4.7 ALIGNMENT OF THE RESEARCH STUDY

Firstly, before the validation of the data and the results of the study is presented, an alignment of the research study is displayed next. The alignment was informed by Sousa (2014) validation framework shown in Table 4.15

.

Table 4.15: Alignment of the study

Aspect of the research process	Study alignment to Sousa (2014)
The research questions	How do teachers understand the usefulness of blended learning approach in teaching and learning? How do teachers connect information using technology resources in blended learning? To what extent do teachers have the necessary skills for successful implementation of blended learning? What are the teachers' recommendations on the introduction and implementation of blended learning in schools? What are the elements to be considered in designing blended learning model fof schools?
Aim and objectives the study	examine of implementation of blended learning in Sekhukhune District determine usefulness of blended learning establish usage of blended learning connecting information using technology teachers' skills in blended learning
Theoretical frameworks	Connected Learning Theory, Technology Acceptance Model (TAM) and Connectivism
Research sample	Four (4) case schools, 4 principals, 4 HoDs and 4 teachers in Sekhukhune District schools
Data collection methods	Semi-structured interviews & document study
Data analysis	Thematic, narrative and content analysis were used. The researcher made use of deductive thematic analysis in which preconceived themes based on the research questions, the

	theoretical frameworks and the aim and objectives of the study were used. The preconceived themes were after refinement finalised as the themes of the study. The researcher used rich, thick description of data analysis to produce the findings of the study.

Table 4.15 above explains the process of validation of the qualitative data collection and the findings. The process explains all the critical items of the study which informed the validity of the findings. These included the research questions, the aim and objectives of the study, the theoretical frameworks, the sample of the research, data collection methods and the methods used for data analysis. The alignment of the research questions, themes and sub-themes are presented next.

4.8 ALIGNMENT OF THE RESEARCH QUESTIONS, INTERVIEW QUESTIONS, THEMES AND SUB-THEMES

To ensure trustworthiness of the results, the researcher provided a true picture of the state of blended learning by familiarising himself with the participants and schools and triangulating the data collection methods as well as tactically ensuring honesty in the participants (Shenton, 2004). Furthermore, the researcher ensured that the research questions and interview questions are adequately aligned with the themes and sub-themes (Sousa, 2014). APPENDIX N and APPENDIX O outline the alignment between the research questions and sub-theme questions.

4.8.1 Alignment between the research questions, interview questions and sub-questions

The research questions were aligned to the questionnaire and the interview questions as outlined in Appendix N. The first research question: “How do teachers understand the usefulness of blended learning?” and the fourth question “What are teachers’ recommendations on the introduction and

implementation of blended learning in schools? were aligned to six interview questions which included: What is your understanding of blended learning? Do you think your level of technology knowledge is enough for administering and managing blended learning in your school? What do you perceive to be the benefits of using blended learning? What are your perceived difficulties of using blended learning? What are your views on the challenges that impede teachers from engaging or not engaging in blended learning?" and, "What are your recommendations for the introduction and improvement of blended learning?"

The second research question, "How do teachers connect information using technology resources?" was aligned to five interview questions, namely: How has the introduction and implementation of blended learning influenced your decision to engage or not engage in blended learning? Do you think your school has enabling structures for the implementation of blended learning? How to you find the usage of technology appliances in curriculum implementation? Is your school currently implementing blended learning? And "What are your views on the blending of technological approaches and traditional ways of teaching?"

The third question, "To what extent do teachers have the necessary skills for successful implementation of blended learning? was aligned to two research questions which were: "What skills do you think teachers need to implement blended learning? and, What support do you think is needed for teachers to implement blended learning?

The fifth question, "What are the elements to be considered for the designing of a blended learning model? This question was answered by consolidating the findings from the QUAN Strand, QUAL Strand, and the Document study findings.

4.8.2 Alignment of research questions, themes, and sub-themes

The research questions were further converted into three main themes respectively, namely,

- Teachers perceptions of blended learning in teaching and learning,
- Connection of technology resources in blended learning and
- Teachers skills for blended learning implementation.

The themes were further sub-divided according to sub-themes which emanated from the interview questions. The first theme, teachers perceptions of blended learning in teaching and learning was aligned to six sub-themes which are: understanding of blended learning, technological knowledge of administering and managing blended learning, benefits of using blended learning, difficulties of using blended learning, challenges that impede teachers to engage in blended learning and recommendations for the introduction and improvement of blended learning implementation.

The second theme, *connection of technology resources in blended learning* was also aligned to five sub-themes. These included: influence of blended learning implementation on teachers′ practices, enabling structures for implementation of blended learning, usage of technology appliances, current implementation of blended learning in schools and blending technological approaches and traditional approaches of teaching.
Subsequently, the third theme was aligned to two sub-themes comprising teachers′ ICT skills and teachers′ support on blended learning implementation.

4.9 RESULTS AND DATA VALIDITION

It is vital that all the threats which affect the trustworthiness of the study results are avoided at all cost. To ensure trustworthiness in the study, researchers need to validate the reliability and internal validity of the data collection and analysis methods. Reliability is the extent to which a variable or a set of variables is consistent in what is intended to measure (Ihantola and Kihn, 2011) whereas validity refers to the accuracy, meaningfulness and the credibility of the results (Leedy and Ormrod, 2010:97). Ihantola and Kihn (2011); Onwuegbuzie (2003) highlight that the threats to internal validity include insufficient knowledge

of a contradiction of logic, deficiencies during data collection, analysis or interpretation and bias.

In this study validity of the findings was ensured by:

- Using adequate data gathering resources for the research,
- Selecting appropriate methodology for answering the research questions,
- Selecting appropriate instrumentation for data gathering,
- Using appropriate sample,
- Demonstrating the internal and external validity fairly,
- Avoiding all forms of biasness in data collection and analysis (Cohen, Manion and Morrison, 2000: 115), and
- Avoiding contradiction in the logic between the research questions and analysis.

4.9.1 Validation of QUAN results and data

As alluded previously, the study employed a questionnaire to collect data. Likert-type scale questions were used in the questionnaire. Gleim and Gleim (2003) alert that “when using Likert-type scales it is imperative to calculate and report Cronbach′s Alpha coefficient also known as reliability test for internal consistency for any scales or subscales one may be using”. Gleim and Gleim (2003:87) further assert that the closer Cronbach′s alpha coefficient is to 1.0, the greater internal consistency of the item in the scale. George and Malley (2003:231) proclaim the following rule of thumb of internal consistency “≥ 0.9 – Excellent, ≥ 0.8 – Good, ≥ 0.7 – Acceptable, ≥0.6 – Questionable, ≥ 0.5 – Poor and ≤ 0.5 – Unacceptable”.

The purpose of conducting reliability testing is to ensure that the observed variables measure the true value and whether they are error free or had high error in the questionnaire. Cronbach alpha basically ensures the internal consistency of items in scale. Therefore, Cronbach alpha value determine whether the question is error free or not (Cronbach, 1951). In analysing Cronbach alpha Santos (1999), Brown, (2002) and Flanagan, (2007) shows that

Cronbach alpha ranges from 0-1, and this means that 0.00 means no variance is consistent in the test results. Similarly, 1.00 represents that all variances are consistent.

4.9.1.1 Reliability Tests Summary (Item Statistics)

The calculated summary of the reliability statistics follows next. This is tabulated in Table 4.16 below.

Table 4.16: Case Processing Summary

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.705	0.648	21

Table 4.16 indicates the calculated Cronbach′s alpha as 0,705 and Cronbach′s based on standardized items 0.648 on N-21 items. Since the Cronbach's Alpha is 0.705, then it implies that the internal consistency of the data and the results are acceptable. The next section illustrates the internal consistency reliability test results.

4.9.1.2 Internal consistency reliability test results using the Cronbach`s Alpha

Item analysis using Cronbach′s Alpha is presented on Table 4.17 next

Table 4.17: Item analysis using Cronbach's Alpha analysis

Item Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ICT training received	28.23	1.838	-.037	.723
Adequate E-Tech supply	28.22	1.820	.025	.713
Improving teaching skills using BL	29.16	1.456	.831	.636
Improving learners' performance using BL	29.16	1.452	.769	.639
BL promotes collaborative learning	29.16	1.486	.689	.648
Pedagogical technologies	29.16	1.558	.577	.663
I use BL in many of my classroom teaching	28.22	1.866	-.087	.722
Easy to assess learners in blended learning	28.22	1.843	-.031	.717
My school is moving towards paperless education	28.21	1.882	-.140	.718
My school has BL policy	28.22	1.843	-.031	.717
My school has good ICT policies	28.22	1.855	-.059	.720
Teachers are trained on the use of E-Tech	28.23	1.940	-.238	.740

BL spaces offer a better knowledge to learners	29.18	1.740	.281	.694
BL learning spaces offer a better knowledge to learners	29.16	1.645	.338	.687
Classroom Interaction is not limited by geographical spaces	29.17	1.744	.185	.702
BL spaces eases administration of learners' tasks	29.16	1.657	.314	.690
E-Tech facilitates student learning inside and outside the classroom	29.18	1.728	.316	.692
Digital technical support is required for BL implementation	29.18	1.774	.180	.701
Adequate E-Tech supply	28.22	1.820	.025	.713
BL for self-regulated learning	29.14	1.440	.646	.647
BL for effective teaching and learning	29.15	1.421	.729	.638

Table 4.17 basically supports the calculations in Table 4.16. Each variable has its own Cronbach alpha consistence value. Based on the table the internal consistence of both the data and questionnaire is significant. That means 70% (0.7) of the items on the questionnaire as well as the findings are consistent and reliable (George and (Malley, 2003:231; Rovai, Baker and Ponton, 2014:385). However, 30% (0.3) of the items were found not to be reliable and hence were not included in the Cronbach′s Alpha analysis. To improve the reliability of the items and the results, eleven items were deleted (Cho and Kim, 2015). These items included: gender, age, job description, highest qualifications, ICT qualifications, E-Tech eases teaching loads, teachers transited from traditional to digital pedagogies, classroom interaction is not limited by geographical spaces, I recommend BL to all rural schools, electrification of rural schools and connect school project for all rural schools.

4.10 CHAPTER SUMMARY

This chapter presented the profiles of the case schools. The demographics of the participants for the QUAN and QUAL strands were detailed. Fourteen schools participated in the research study. Ten schools were employed for QUAN strand and four schools for QUAL strand. The QUAN strand participants composed of 10 principals, 9 deputy principals, 35 HoDs and 123 teachers (177

in total) while the QUAL participants were 4 principals, 4 HoDs and 4 teachers (12 in total). The study also employed document study to capture and synthesise information about how schools manage, maintain and implement technology teaching and learning.

Furthermore, this chapter detailed the alignment of the study, the research questions; interview questions; themes and the sub-themes. The chapter also demonstrated the validation of data and the results of the study. In the next chapter presentation, analysis and results of QUAN is undertaken.

CHAPTER 5: ANALYSIS AND PRESENTATION OF QUAN RESULTS

5.1 INTRODUCTION

The previous Chapter 4 presented the biographical information of the case schools' participants as well as the validation of the research results. This chapter provides an analysis and presentation of the QUAN strand findings. A questionnaire was employed to gather data for the QUAN strand. This questionnaire was administered to 177 respondents (principals, deputy principals, HoDs and teachers) and it comprised closed-ended questions. The next section presents the presentation and analysis of QUAN data.

5.2 PRESENTATION AND ANALYSIS OF QUAN DATA

As indicated in Chapter 3, data for the QUAN Stand was collected through a questionnaire. The questionnaire is categorised into six themes which include, biographical information of respondents, perceived usefulness of blended learning, perceived ease of use, blended learning as pedagogical technology strategy, learning as a process of connecting information resources and improving blended learning in rural schools. The presentation and discussion of biographical information and ICT training of respondents were presented in Chapter 4. This section presents information pertaining the views of teachers′ understanding of blended learning in teaching and learning, perceived ease of use, blended learning as pedagogical technology strategy, learning as a process of connecting information resources and improving blended learning in rural schools are presented.

5.2.1 Teachers' understanding of blended learning in teaching and learning

The study sought to find out the status of teachers′ understanding of blended learning in teaching and learning. To gather as much relevant information as possible, this theme was split into divisions. The respondents provided different views on their understanding of blended learning in teaching and learning. Amongst these views, the following findings emerged: inadequacies of e-Tech

supply, acceptance of blended learning as effective teaching and learning approach, acceptance that using blended learning improves skills, acknowledgement that blended learning improves learners′ performance, that blended learning provides collaborative learning and use of pedagogical technologies in schools. Detailed discussion of the findings follows next.

5.2.1.1 Inadequacies in e-Tech Supply in the schools

The first finding related to inadequacies of e-Tech supply in public schools. As illustrated in Figure 5.2, the majority of the schools do not have sufficient e-tech resources. This suggests that both the teachers and the schools are not well equipped with ICT tools to implement successful technology-based teaching and learning (Ghavifekr and Rosdy, 2015). This finding is consistent with Lekgothoane and Thaba-Nkadimene (2019) who identified lack of pedagogical technologies in schools. A study by Tshabalala (2014) also observed inadequate technologies resources as the main factors impeding successful implementation of blended learning.

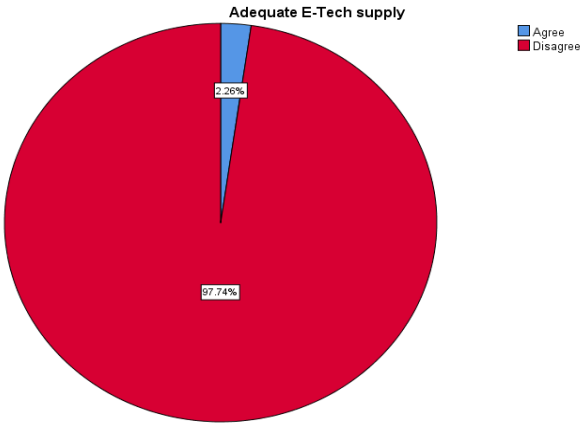

Figure 5.1: Inadequacies of e-Tech supply

Figure 5.1 shows the supply of e-Tech to respondents according to percentages, gender and age. From the figure, it is evident that only 4 (2.26%) respondents confirm adequate e-Tech supply whereas 173 (97.74%) respondents confirmed inadequate e-Tech supply.

5.2.1.2 Blended learning for effective teaching and learning

The next aspect on the perceived usefulness of blended learning was how blended learning exerts an impact on teaching and learning. The study established that the majority of the teachers agree that blended learning provides effective teaching and learning. This finding suggests that teachers are positive to the technologies. The finding of this study is in line with the study by Soomro, Soomro, Bhatti and Ali (2018) who showed that teachers have a positive perception of technologies in teaching and learning. Another study by McLaughlin, Gharkholonarehe, Khanova and Deyo (2015) verified that majority of students in a cardiovascular pharmacotherapy course agreed that blended learning enhances students' learning.

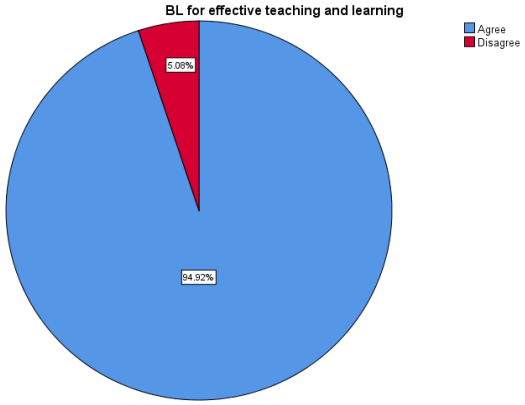

Figure 5.2: BL for effective teaching & learning

Figure 5.2 displays that the majority teachers agree that blended learning provides effective teaching and learning. According to Figure 5.2, there are 9 (5.08%) respondents who indicated that blended learning does not offer effective teaching and learning while 168 (94.92%) agreed that blended learning offers effective teaching and learning opportunities. The finding is consistent with the study by Masalela (2009) which confirmed that blended learning has the tentative potential of improving pedagogy, engagement in learning and flexibility in the teaching and learning.

5.2.1.3 Blended learning promotes self-regulated learning

The next aspect relates to the impact of blended learning on self-regulation. The study found that the majority of the teachers agree that blended learning improves self-regulated learning. A study by Lynch and Dembo (2004) confirmed that a high self-regulation has the potential to increase learners' performance in learning.

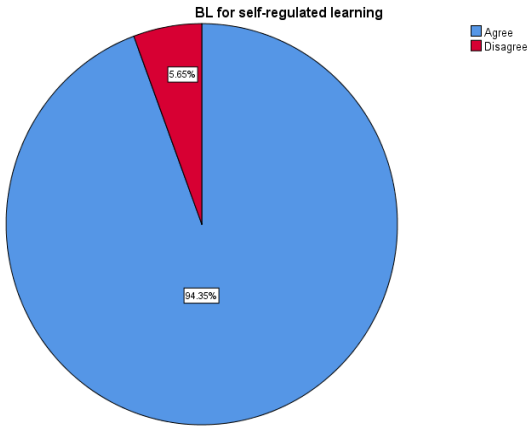

Figure 5.3: BL offers self-regulated learning

Figure 5.3 displays an overwhelming majority of 167 respondents (94.35%) who agree that blended learning provides self-regulated learning whereas 4 (5.65%) disagree that blended learning has this marked effect. This suggests that teachers find blended learning a comfortable and flexible approach of teaching and learning. This ratifies the observations made by Masalela (2009) that blended learning has the potential the benefit of improving pedagogy and engagement in teaching and learning that is flexible. The low percentage of participants disagreeing that blended learning provides self-regulated learning suggests that there might be lack of technology education advocacy in the schools and it is advised that the school management consider this as a stumbling block for the full implementation of blended learning.

5.2.1.4 Improvement of teaching skills using blended learning

Another aspect on the perceived usefulness of blended learning is the effect of blended learning on teaching skills. The study established that a huge number of teachers agree that blended learning improves teaching skills. The outcome was expected since the study confirmed that the majority of respondents were

not trained in technologies (Figure 5.8). The study's finding concurs with Banditvilai (2016) who found that blended learning enhances learning skills and motivates those to whom it is directed. Figure 5.4 shows the teachers' technology skills.

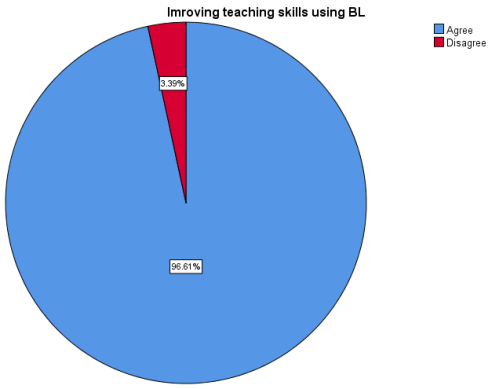

Figure 5.4: Improving teaching skills using blended learning

Figure 5.4 shows that only 6 (3.39%) respondents disagree that blended learning improves teaching skills whereas 171 (96.61%) respondents agree that blended learning improves teaching skills. This scenario suggests that the teachers have a positive outlook towards blended learning regardless of the challenges they indicated impede them from using the technologies. This further suggests that the teachers would embrace the opportunities availed in technological skills programmes and hence a recommendation for teachers to be developed.

5.2.1.5 Improvement of learners' performance using blended learning

The other item in the questionnaire administered was concerned with the improvement of learners' performance by using blended learning. Most of the respondents agreed that blended learning improves the learners' performance. The finding concurs with Kiviniemi's (2014) study on students' outcomes that confirmed that blended learning increases performance.

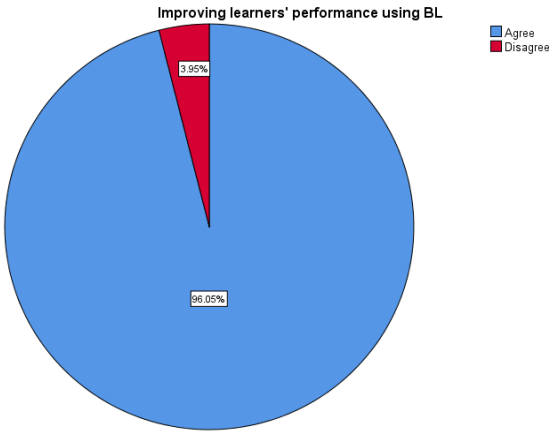

Figure 5.5: Improving learners' performance

In terms of Figure 5.5, there is evidence that only 7 (3.95%) respondents disagree that blended learning can improve the learners' performance, whereas 170 (96.05%) agreed that blended learning can improve learners' performance. The majority of the respondents in terms of gender and age groups agree that blended learning has the potential to improve learning. In a study undertaken by Ellis, Steed and Applebee (2006) teachers conceived that blended learners use information media as one way of achieving learning outcomes and generates critical investigation on the part of the learners.

5.2.1.6 Blended learning provides collaborative learning

The next aspect investigated was about providing collaborative learning through blended learning. The study established that the majority of the respondents agree that blended learning enhances collaborative learning. This finding supports Hilliard's (2015) study that verified that blended learning enhances students′ collaboration and engagement in the learning activities.

In another study by Wang (2010), the findings established that blended learning promotes social interaction and engagement among students. Figure 5.6 demonstrates this facet of collaborative learning.

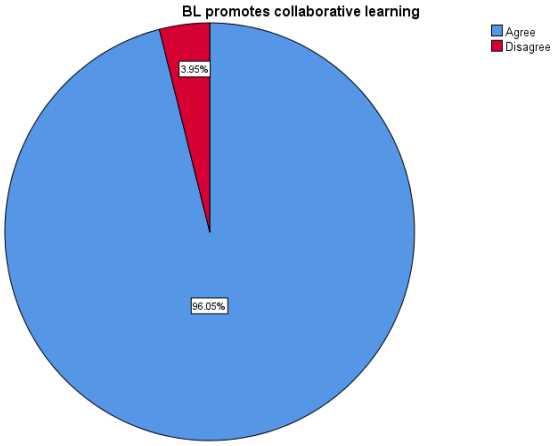

Figure 5.6: BL for collaborative learning

Figure 5.6 depicts that 7 (3.95%) respondents disagree that blended learning provides collaborative learning and 170 (96,05%) agree that blended learning could facilitate collaborative learning. A high percentage of the respondents agree that blended learning is a critical facet of the collaborative learning process. The results suggest that teachers appreciate the implementation of blended learning to ensure superior learner experiences and performance. This finding is in line with Akkoyunlu and Soylu (2004) who identified that teachers are impressed by and inclined towards blended learning environments.

5.2.1.7 Pedagogical technologies in schools

The next aspect related to pedagogical technologies in schools. The study found that a majority of the respondents agree about the usage technologies in their respective schools. This study also confirmed that some respondents had basic technological knowledge; however, it was found that they use the computers for administrative functions. The study by Mundy, Kupczynski and Kee (2012) verified that majority of teachers use computers for administrative functions at the expense for teaching and learning purposes.

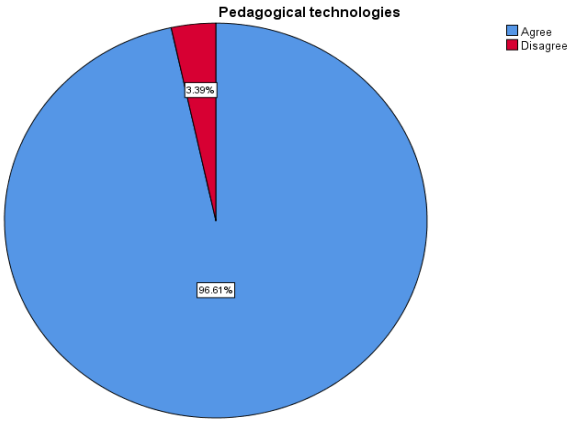

Figure 5.7: Pedagogical technologies in schools

Figure 5.7 above illustrates that 6 (3.39%) respondents disagree with usage of pedagogical technologies in schools while 171 (96.61%) agree with the usage of pedagogical technologies in schools. The majority of the respondents agree with pedagogical technologies usage in schools. This is a clear indication that teachers are willing to use technologies in their teaching practices should such apparatuses be made available for the purposes of teaching. The finding confirms Ford and Botha (2010) who established that teachers in rural areas are willing to use technology support in their teaching and learning environments.

5.2.2 Perceived ease of blended learning use

The next theme on the questionnaire is about how teachers' perceived ease of use of blended learning in their teaching situations. The theme is composed of sub-themes which include availability of e-Tech in schools, usage of blended learning for classroom teaching, assessment of learners using blended learning, e-Tech assessment loads and how technologies ease the burden, paperless education in schools.

5.2.2.1 Application of e-Tech in schools

The successful implementation of blended learning is underpinned by the usage of technologies in the teaching and learning spaces. However, this study found that most of the teachers were not using technologies in their practical teaching

sessions. Table 5.1 shows the usage of technologies in the schools. There is a clear inference that teachers might be encountering problems in the use of the technologies. For example, lack of knowledge and skills, lack of confidence, lack of technology resources and others militate against efficient deployment of these resources. Nkadimeng and Thaba-Nkadimene, (2019:59) found that teachers lacked confidence, and this was a serious drawback in the performance of HoDs .

The study by Makgato (2012) indicates that teachers do not use technologies in teaching and learning because they are afraid of new innovations and change. Such instances of technophobia militated against implementation of the modalities despite the availability of ICT resources. Mathipa and Mukhari (2014) also found the factors that impede teachers from using technologies in teaching and learning extended to lack of resources, inadequate teacher training, lack of skills, lack of confidence and lack of support. Table 5.1 depicts the results of the application of technologies in Limpopo schools.

Table 5.1: **E-Tech eases teaching loads**

E-Tech eases teaching loads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	16	9.0	9.0	9.0
	Disagree	161	91.0	91.0	100.0
	Total	177	100.0	100.0	

Table 5.1 displays the perceptions of the respondents on teaching loads when using e-Tech. Astonishingly, only 16 (9%) of the respondents agree that e-Tech eases teaching loads whereas161 (91%) disagree that e-tech eases teaching loads. This startling finding suggests that teachers do not use technologies for the teaching and learning purposes.

5.2.2.2 Usage of blended learning for classroom teaching

Implementation of blended learning is obviously dependent on the learners. The effectiveness of blended learning implementation is measured through the performance of the learners in the classroom, specifically how well they adapt

the affordances of blended learning to their unique learning and mastery styles. This study found that there is minimal usage of blended learning in the case schools in Limpopo. This finding concurs with those of a study by Thaba-Nkadimene and Mogatli (2020:137) which found that a “lack of modern educational technology in schools” culminates in the minimal usage levels of the technologies that could be available and ready for deployment in the case schools.

Table 5.2: Usage of blended learning for teaching in classrooms

I use BL in many of my classroom teaching					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	4	2.3	2.3	2.3
	Disagree	173	97.7	97.7	100.0
	Total	177	100.0	100.0	

As reflected on Table 5.2, the majority of the respondents disagree on the usage of blended learning for classroom teaching. 173 (97.7%) respondents disagreed and only 4 (2.3%) agreed that they use blended learning for classroom teaching. The fact that only 2.3% agree that they use blended learning for teaching in the classroom can be attributed to the finding from the document study that only one school (25%) of the interviewed schools use technologies for teaching and learning (Table 6.4). However, it is appreciated that 96.61% (Figure 5.1) agree with the usage of technologies in schools.

5.2.2.3 Assessment of learners using blended learning

It is vital that teachers have competencies in the assessment of learners through the blended learning utilities. This would enable them to do the necessary corrections of which seem not to be working as expected. However, the finding of this study shows that the majority of the respondents find it difficult to assess learners in blended learning classrooms. The finding suggests that the teachers do not exhibit the necessary skills in the technologies. Table 5.3 displays the status of the teachers with regards learner assessment in blended learning classrooms.

Table 5.3: Ease of assessment of learners in blended learning

Ease of assessment for learners in blended learning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	4	2.3	2.3	2.3
	Disagree	173	97.7	97.7	100.0
	Total	177	100.0	100.0	

Table 5.3 indicates that 173 (97.7%) respondents disagreed that it is easy to assess learners in blended learning while 4 (2.3%) respondents agreed. The finding indicates a need for the broad and full technological development of the teachers in the use and facilities of these novel technologies.

5.2.2.4 e-Tech eases assessment loads

The next aspect on which information was obtained was with regard to assessment loads in blended learning. Majority (98.3%) of the respondents disagreed that technologies ease assessment loads. The fact that teachers are not using technologies in their teaching practices culminates in their disagreement that technologies ease assessment loads. Again, these gaps in the teachers′ technological knowledge and skills call for serious attention from the HoDs and the entire administrative mechanisms in order to enforce the use of novel technologies in assessment.

Table 5.4: e-Tech eases assessment loads

e-Tech eases assessment loads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	3	1.7	1.7	1.7
	Disagree	174	98.3	98.3	100.0
	Total	177	100.0	100.0	

Table 5.4 shows the participants' perceptions about assessment load in e-Technologies. Most of the respondents disagree that e-Tech eases assessment

load. This is manifested by the fact that 174 (98.3%) respondents disagreed that e-Tech eases assessment loads, whereas 3(1.7%) respondents confirmed that e-Tech eases assessment loads

5.2.2.5 Paperless education in schools

Güzer and Caner (2014) emphasise that the present developments in technology anticipate that teachers use blended learning in their classroom practises. This therefore means schools will need to transform from traditional ways of teaching to a paperless environment that is offered by the technologies. However, majority of the respondents in this study disagreed that their schools were moving towards a paperless education.

Table 5.5 Paperless education in schools

My school is moving towards paperless education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	2	1.1	1.1	1.1
	Disagree	175	98.9	98.9	100.0
	Total	177	100.0	100.0	

It can be concluded as shown on Table 5.5 that respondents prefer other educational strategies of teaching than paperless education. It is for this reason that the majority of the teachers disagree that they are moving towards paperless classrooms: they are somewhat stuck in the 'traditional' modalities of a print-rich learning environment and this could certainly take some time to wash off. This is a clear indication of a need of technology development programmes for teachers in technologies. This is attested by the fact that an overwhelming majority of 175 (98.9%) respondents disagreed with paperless education in schools while only 2 (1.1%) agreed that a paperless environment could be feasible at all in schools.

5.2.3 Blended learning as pedagogical technology strategy

The next theme is school readiness in implementing blended learning as pedagogical technology strategy. This theme composed of items such as

availability of blended learning policy in schools, availability of ICTs policies in schools, teachers' transition from tradition to digital pedagogies and teachers' training on the use of e-Tech technologies.

5.2.3.1 Availability of blended learning policy in schools

Implementation of blended learning cannot succeed without the availability of policies which serve as guiding tools. It is therefore paramount that DBE, PED, Districts, Circuits and schools craft and develop the technological policies that could assuage the situation currently obtaining in schools. This study established that schools did not have blended leaning policies. Tondeur, Van Keer, Van Braak and Vakke (2008) also confirmed the fact that there is a plethora of underdeveloped and often underutilised policies in schools. There is therefore a need for urgent advocacy toward policy formulation and implementation of blended learning in schools (Tijjani and Ibrahim, 2019).

Table 5.6 Availability blended learning policy in schools

My school has BL policy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	4	2.3	2.3	2.3
	Disagree	173	97.7	97.7	100.0
	Total	177	100.0	100.0	

On the display in Table 5.6 shows that most of the schools did not have blended learning policies for technologies. 173 (97.7%) respondents disagreed that blended learning policy was available in their schools, while 4 (2.3%) respondents agreed that they had some version of a blended learning policy.

5.2.3.2 Availability of ICT policies in schools

There is an urgent need to develop policy on ICT for the proper technology education. It is the responsibility of the school management team (SMT) to develop and implement ICT policy in schools. Table 5.9 shows that the majority of the case schools do not possess ICT policies. Similar findings were established in a study by Albugami and Ahmed (2015) study where a lack of

clear ICT policy exerted negative impact in ICT implementation in schools. This is affirmed by the fact that the majority of the teachers disagree that their schools have good ICT policies. Table 5.9 displays the results derived from the teachers.

Table 5.7 Availability of good ICT policy in schools

My school has good ICT policies					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	4	2.3	2.3	2.3
	Disagree	173	97.7	97.7	100.0
	Total	177	100.0	100.0	

This scenario as displayed in Table 5.7 shows that 173 (97.7%) respondents disagreed that their schools had ICT policies available whereas, 4 (2.3%) proclaimed that their schools had ICT policies.

5.2.3.3 Teachers training in e-Teach

It is necessary that teachers are regularly trained to keep them up to date with the changing circumstances and the daily mutations in e-tech. This is even most important faced with the technologies which are continuously changing all the times. However, in this study lack of training of teachers in ICT was identified as a sore shortcoming. Studies by Mathipa and Mukhari, (2014); Buabeng-Ando, (2012); Herselman, (2003) also confirmed lack of teacher training as one of the factors that exerts a negative impact on the implementation of technology education negatively.

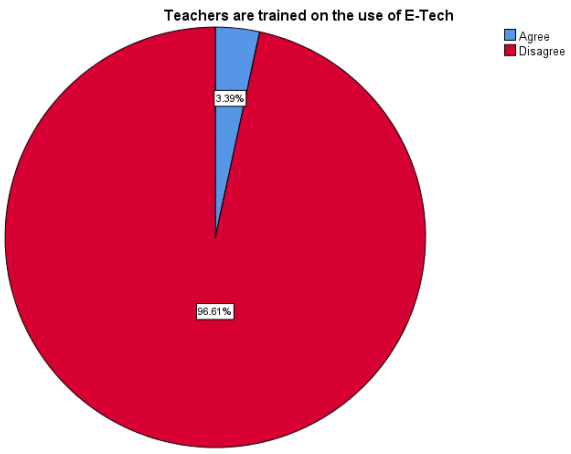

Figure 5.8: Teachers training in e-Tech

Figure 5.8 indicates that the majority of the respondents were not trained on the use of e-Tech. 171 (96.6%) indicated that they were not trained in e-Tech whereas 6 (3.4%) confirmed that they got some basic training in e-Tech.

5.2.3.4 Teachers transition from traditional to digital pedagogies

Due to the new transformations brought about by technology, schools and teachers need to transit from the old to the new dispensations. For the fact that today's learners are "friends" to technologies (Irina, 2012), it is obligatory that schools and teachers become friends to the technologies as well. Fortunately, in this study it is revealed that majority of the participants agree with the transition from traditional to digital technologies. This indicates the willingness and preparedness of the participants to adopt blended learning in schools as revealed by Ishmail, Azizan and Azman (2013).

However, teachers echoed lack of technology resources, knowledge and skill, relevant technology accommodation and connectivity as the factors that impede their transition from traditional approaches to digital pedagogies. Figure 9 depicts teachers' perceptions on the transition from tradition to digital pedagogies.

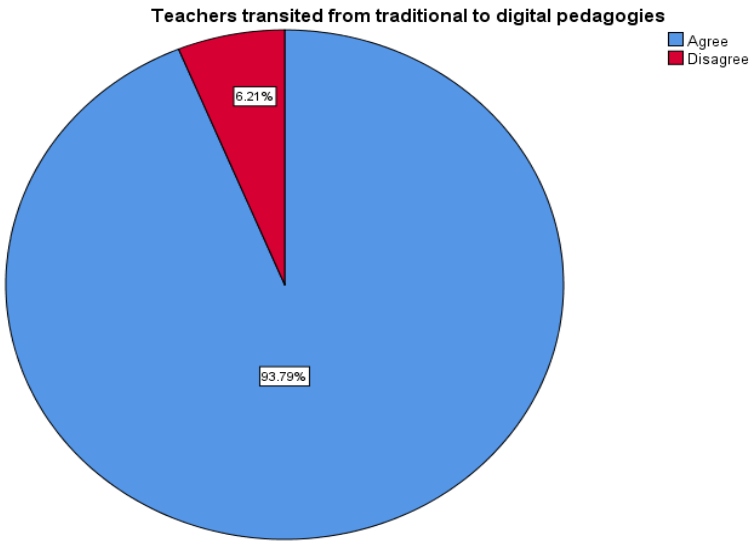

Figure 5.9: Teachers transitions from traditional to digital

Despite that the fact that 96.6% respondents highlighted that they were not trained on the use of e-Tech and that their schools did not have e-Tech policies, an overwhelming majority, 166 (93.8%) respondents agreed that they transited from traditional to digital pedagogies. However, there were 11 (6.2%) respondents who disagreed that they transited from traditional to digital pedagogies. The finding surfaces a need of development skills and support to the teachers to implement blended learning.

5.2.4 Learning is a process of connecting information resources

Another theme of the analysis is “learning is a process of connecting information resources”. This theme composed of items such as blended learning offers a better knowledge to learners, blended learning spaces offer better knowledge to learners, classroom interaction is not limited to geographical spaces, blended learning spaces eases administration of learners′ tasks. Detailed presentation of each item is illustrated below.

5.2.4.1 Blended learning offers a better knowledge to learners

The aim of this item was to find the perceptions of the teachers with regards to learners’ acquisition through blended learning. Majority of the respondents agreed that blended learning increases learners′ knowledge. This finding is in keeping with Kiviniemi (2014) that blended learning increases the performance of learners.

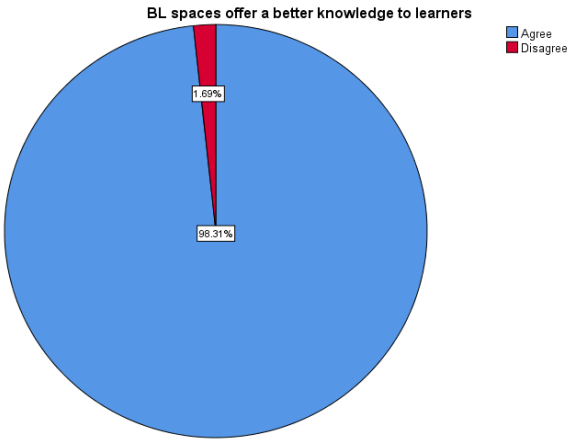

Figure 5.10: BL offers better knowledge of learners

Figure 5.10 demonstrates that the majority of respondents, 174 (98.3%) agree that blended learning offers a better knowledge to learners as against 3 (1.69%) respondents who disagree that blended learning offers a better knowledge to learners.

5.2.4.2 BL spaces offer better knowledge for learners

A learning space is crucial to a smooth application of blended learning. Learners ought to be facilitated in an environment conducive enough for teaching and learners. This simply means teaching and learning situation in which all the requisites of blended learning implementation are available. Blended learning needs spaces in which teachers and learners are able to engage, interact and collaborate (Vaughan, Cleveland-Innes and Garrison, 2013). Majority of the participants in this study agreed that conducive learning spaces offer better knowledge acquisition to learners. The finding conforms to Evmenova (2018) who revealed that participants were eager and appreciative of a new technology model of learning. The finding suggests that it is necessary to encourage teachers to implement blended learning in their practices.

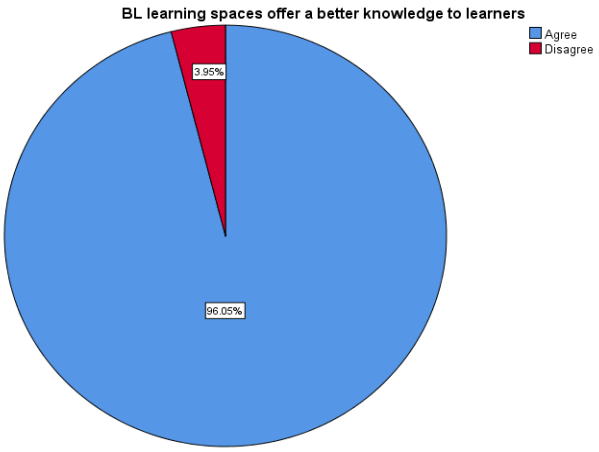

Figure 5.11: BL spaces offer better knowledge for learners

Figure 5.11 indicates that 170 (96.05%) respondents agree that blended learning spaces offer better knowledge to learners while 7 (3.95%) respondents disagree. The finding suggests a need of advocacy to the minority respondents who disagree that blended learning spaces offer better knowledge to learners.

5.2.4.3 Classroom interaction is not limited to geographical spaces

Blended learning is not clued to the four walls of a classroom only. Through blended learning learners and teachers have the opportunities to interact and communicate together anytime and anywhere. The finding of the study regarding the interaction in blended learning revealed that majority of the participants agree that interaction among teachers and learners is not limited to geographical spaces. Teachers and learners have opportunities to communicate anytime even while at home or during the weekends through the technologies. Table 5.8 shows limitations of blended learning with regard to geographical spaces.

Table 5:8 Limitations of BL regarding geographical spaces

E-Tech facilitates student learning inside and outside the classroom					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	174	98.3	98.3	98.3

	Disagree	3	1.7	1.7	100.0
	Total	177	100.0	100.0	

Table 5.8 shows a whopping 174 (98.3%) of respondents agree that learning in e-Tech is not limited to geographical space while 3 (1.7%) respondents disagree. This implies that teachers need to be trained and developed in technologies so that they be able to interact and communicate with learners anytime anywhere.

5.2.4.4 Blended learning spaces eases administration of learners' tasks.

Administration and management of blended learning is key to the success of implementation. It is for this reason that the officials and teachers should possess the necessary technological competencies. In this study majority of the respondents agree that the usage of blended eases administration tasks. This finding indicates that most of the participants' value blended learning.

Table 5.9: The ease of blended learning on administration of learners.

BL spaces eases administration of learners' tasks					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	170	96.0	96.0	96.0
	Disagree	7	4.0	4.0	100.0
	Total	177	100.0	100.0	

Table 5.9 depicts the responses of the respondents. 170 (96%) of the participants agree that blended learning spaces ease the administration of the learners′ tasks while 7 (4%) of the respondents disagree with the notion. It can be argued that for the fact that the respondents acknowledge the importance of blended learning with regard to their administration tasks, then they would accept to be trained and developed in blended learning. Thus, the suggestion of training and development of officials and teachers in technologies.

5.2.5 Improvement of blended learning in rural schools

The last theme is improving blended learning in rural schools. It includes the following items which the participants were supposed to agree or disagree with: supply of e-Tech will improve BL implementation in rural schools, recommendation of BL in rural schools, suitable technological infrastructure will improve provision of BL in rural schools, digital training will improve BL implementation in rural schools, digital technical support is required for BL implementation, electrification of rural schools, connect school project for all rural schools.

5.2.5.1 Supply of e-Tech will improve BL implementation in rural schools

Availability of technologies is key to the implementation of blended learning. It is therefore critical that DBE and schools ensure that all the necessary technological requisite are available. Almost all the participants in this study agree that e-Tech can improve blended learning implementation in rural schools. This scenario is displayed on Table 5.10.

Table 5.10: Importance of e-Technology in rural schools

Supply of E-Tech will improve BL implementation in rural schools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.10 shows that 100% of the respondents agree that the supply of e-Techs improves implementation of blended learning. However, the study found that there is lack of supply of technologies. It is therefore recommended that supply of technological resources be prioritised by the authorities.

5.2.5.2 Recommendation of blended learning to all rural schools

This item sought to find out the perceptions of the respondents regarding blended learning in rural schools. All participants' welcome introduction and implementation of blended learning in rural schools.

Table 5.11: Recommendation of blended learning to all rural schools

I recommend BL to all rural schools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.11 shows that 177 (100%) of the respondents recommend that rural schools implement blended learning. This suggests that teachers need to be developed in technologies so that they would be able to implement technologies in their teaching.

5.2.5.3 Suitable technological infrastructure will improve provision of BL in rural schools

The success of blended learning implementation requires suitable technological infrastructure. All the participants agree that suitable technological infrastructure can improve the provision of blended learning in rural schools.

Table 5.12: Choice of technological infrastructure to be used in rural schools

Suitable technological infrastructure will improve provision of BL in rural schools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.12 displays that 100% of the respondents agree that suitable technological infrastructure improve blended learning implementation in rural schools. It is therefore suggested that the authorities provide the necessary infrastructure to all rural schools.

5.2.5.4 Digital training will improve BL implementation in rural schools

To be able to use the digital devices in the teaching and learning situation, teachers need to possess all the necessary technological knowledge and skills. To have technology knowledge and skills means that teachers should undergo some training and development, and this involve finances. All the participants in this study agree that there should be the provision of digital training because it improves blended learning implementation in rural schools.

Table 5.13 Provision of digital training to improve blended learning in rural schools

Digital training will improve BL implementation in rural schools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.13 depicts that 177 (100%) of the respondents agree that digital training is needed so that to improve blended learning practices in schools.

5.2.5.5 Digital technical support is required for BL implementation

It is necessary that regular support is provided to all blended learning stakeholders to ensure successful implementation. Majority of the participants agree that digital support is required for the implementation of blended learning.

Table 5 14: Digital technical supports in of blended learning

Digital technical support is required for BL implementation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	174	98.3	98.3	98.3
	Disagree	3	1.7	1.7	100.0
	Total	177	100.0	100.0	

Table 5.14 illustrates that 174 (98.3%) respondents agree that digital technical support is required for the implementation of blended learning implementation, whereas 3 (1.7%) disagreed. The findings suggest a need to find out why 1.7%

of respondents disagree with the fact that digital technical support is required for the implementation of blended learning.

5.2.5.6 Electrification of rural schools

Application of technologies relies much on the availability of electricity. However, studies revealed that availability of electricity and connectivity is a serious problem in rural schools (Beyers and Hlala, 2015; Pholotho and Mtsweni, 2016; Ndlovu, 2018). All the respondents in this study agree that rural schools should be electrified. This study therefore suggests that all schools which plan to implement technologies need to be adequately electrified.

Table 5.15: Electrification of rural area school

Electrification of rural schools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.15 displays that all 177 (100%) respondents agree that rural schools need to be electrified for a successful implementation of blended learning. The implication of this finding is that respondents are ready to use the technologies and they are facing some obstacles which fail them.

5.5.7 Connect school project for all rural schools

One of the requisites of blended learning is connectivity. The success of blended learning is informed by the connectivity for networking purposes. All the participants in this study agree that rural schools need to be connected. The implication of this finding is that the DBE should make funding available for connecting all rural schools.

Table 5.16: Connect school project for all rural schools

Connect school project for all rural schools

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	177	100.0	100.0	100.0

Table 5.16 above illustrates that 177 (100%) respondents agree that all rural schools need to be connected technologically. The result suggests lack of technological connectivity in rural schools, which might could impact implementation of technologies negatively. The study undertaken by Aguinaldo (2013) observed unavailability of internet connection as one of the crucial obstacles which implementation of blended learning negatively.

5.3 DISCUSSION OF FINDINGS

In this section the discussion of the findings is presented with regard to perceived usefulness of blended learning, perceived ease of blended learning use, blended learning as pedagogical technology strategy, learning is a process of connecting information resources.

5.3.1 Perceived usefulness of blended learning

Inadequate e-Tech supply is a significant and a serious problem in almost all the case schools. This is evidenced by the fact that majority (97.74%) of the respondents indicated that lack of e-Tech supply prevailed in their schools (Figure 5.1). Regardless of lack of e-Tech supply, 94.92% of the respondents still agreed that blended learning provides effective teaching and learning environment as reflected in Figure 5.2. The finding verifies what Mwapwele, *et al.* (2019:159) found that 90% of the teachers in rural areas were ready to use technology despite the financial, technical and digital literacy challenges that are faced.

Figure 5.3 and Figure 5.4 depict that 94. 35% and 96.61 % respondents agree that blended learning promote self-regulated learning and promotion of teaching skills respectively. As illustrated in Figure 5.5, majority (96.05%) of the respondents agree that blended learning improves learners′ performance. The

finding concurs with Kiviniem (2014) that found a significant increase in student performance under blended learning in public health course. Figure 5.6 displays that 96.05% participants agree that blended learning promotes collaborative learning.

Based on these findings, it can be inferred that respondents are positive to pedagogical technologies in their teaching practices. This is attested by the fact that 96.61% (Figure 5.7) respondents agreed with the application of pedagogical technologies in their schools. The finding agrees with Soomro, Soomro, Bhatti and Ali (2018) that showed that teachers had a positive perception for technology usage in the teaching processes.

5.3.2 Perceived ease of blended learning use

Apart from the usefulness of blended learning as discussed above, availability of e-Tech devices needs to be considered as an aspect that is key to the success of technology education implementation. Surprisingly, in this present technological era, Table 5.3 illustrates that 91% respondents disagree that e-Tech eases teaching loads and 97.7% respondents (Table 5.4) also disagreed that they use blended learning to assess learners′ tasks (Table 5.3) as well as deploying it in their classroom practices (Table 5.2). The fact that 97.7% of the respondents are not using BL in their classroom (Table 5.2) and 98% use technologies for administration purposes suggests that respondents need development in the use of technologies for teaching and learning purposes. As a result, 98.9% respondents (Figure 5.5) indicated that their schools have not as yet begun moving towards paperless education. This situation calls for the urgency of teacher development in the use of technologies in teaching and learning. The finding compares favourably with Ndlovu (2018) study on technology teachers′ challenges which established inadequate training, lack of technology skills and insufficient support as barriers to implementation of technologies in teaching and learning.

5.3.3 Blended learning as pedagogical technology strategy

It is critical that plans and policies that guide the implementation of blended learning be established before the implementation. In this study it is reflected that 97.7% respondents Table 5.6 and Table 5.7 indicated that their schools did not have Blended Policy and good ICT policies. Furthermore, Figure 5.8 shows that 96.6% respondents confirmed that they did not receive training in e-Techs. It is not clear that 96.6% respondents indicated that they did not receive any training in e-Techs and yet 93.8% (Fig 5.9) respondents claimed that they transited from traditional to digital teaching approaches. Investigation needs to be done on this discrepancy. Tondeur, van Keer, van Braak and Vakke (2008:212) study inform us that school policies on ICT are often underdeveloped and underutilised. Another study by Tshabalala, Ndeya-Ndereya and van der Merwe (2014) observed lack of policy as one of the obstacles for blended learning implementation.

5.3.4 Learning is a process of connecting information resources

It is important for a learning environment to be conducive enough for quality teaching and learning to take place. Figure 5.10 and Figure 5.11 display that 98.3% and 96.05% respondents confirm that blended learning and blended learning spaces offer better knowledge to learners respectively. As depicted in Table 5.8, 98.3% respondents agree that when using blended learning classroom interaction is not limited to geographical spaces. In addition, 96% respondents agree that blended learning spaces eases administration of learners′ tasks (Table 5.9). The finding denotes that the respondents embrace the implementation of blended learning in their schools.

5.3.5 Improvement of blended learning in rural schools

Majority of the respondents are positive to the introduction and implementation of blended learning in the rural schools. The fact that almost all the respondents agree that supply of e-Tech improves BL implementation and that they recommend BL in schools, suitable technological infrastructure improves BL provision, digital training improves BL implementation, and electrification of

school presumes the willingness and readiness of participants to practice blended learning in schools. This finding agrees with Ishmail, Azizan and Azman (2013) that found that teachers were willing and prepared to adopt ICTs in their teaching practices.

Furthermore, Table 5.14 shows that 98.3% respondents agree that digital technical support is required for blended learning implementation. The fact that a large number of respondents agree with the need for technical support is an indicative of positive attitudes towards blended learning implementation in rural schools. This finding aligns with the study undertaken by Bytheway, Cox, Dumas and Van Zyl (2012) which revealed that teachers in rural areas are willing to use technologies to support teaching and learning, but they unfortunately lacked pedagogical and technological knowledge towards integrating it into teaching activities.

5.4 SUMMARY OF QUAN FINDINGS

An extensive number of findings were established in the QUAN strand. These include: inadequate e-tech supply in schools, teachers agree that blended learning provides effective teaching and learning, teachers agree that blended learning improves self-regulated learning, teachers agree that blended learning improves learners′ performance, teachers agree that blended learning provides collaborative learning, blended learning is not practiced in schools, minimal use of technologies in classroom activities, non-existence of ICT policies in schools, lack of ICT trainings in schools for teachers, and teachers appreciate introduction and implementation of blended learning in school.

The findings suggest that majority of the schools' stakeholders are not ready for the implementation of blended learning.

5.5 SUMMARY OF CHAPTER

This chapter presented and discussed QUAN findings extensively. Data on the views of teachers′ understanding on blended learning in teaching and learning,

perceived ease of blended learning use, blended learning as a pedagogical technology strategy, learning as a process of connecting information resources and the improvement of blended learning areas were presented and discussed. A summary of QUAN findings was provided. In the next chapter QAUL findings and an integrated analysis is provided.

CHAPTER 6: QUALITATIVE DATA ANALYSIS AND PRESENTATION

6.1 INTRODUCTION

The previous chapter dealt with presentation and analysis of the QUAN strand results. This chapter deals with the presentation and analysis of the QAUL strand results. The purpose of this study was to examine the implementation of blended learning in Sekhukhune District schools in Limpopo Province, South Africa. To achieve this purpose, the research questions, namely, “how do teachers connect information using technology resources in their instructional teaching and learning? To what extent do teachers in rural schools have the necessary skills for the successful implementation of blended learning?” What are teachers’ recommendations for the introduction and improvement of blended learning in rural schools? and What are the elements to be considered for the design of blended learning model? The next sections provide detailed narratives of the principals, HoDs and teachers and the document analysis.

6.2 RESEARCH FINDINGS FOR PRINCIPALS′ INTERVIEWS

The findings of QUAL are provided in the next sections. This was done in relation to the research questions of the study. The findings include: lack of teachers′ understanding of blended learning in teaching and learning, lack of technology knowledge to manage and implement blended learning, awareness of blended learning benefits in teaching and learning, encountering of difficulties in blended learning implementation, experiencing of challenges in the implementation of blended learning, acceptance of the introduction and implementation of blended learning in schools, teachers are influenced positively in their practices through using blended learning, lack of enabling structures for blended learning implementation, insufficient usage of technological appliances in schools, schools are currently not implementing blended learning, teachers′ willingness to blend technological approaches with traditional approaches, inadequate teachers′ technological skills, insufficient teachers′ technological support and recommendations for the introduction of BL in rural schools.

Each of the findings is discussed.

6.2.1 Finding 1: Lack of teachers' understanding of blended learning in teaching and learning

The first finding was about the principals' views on teachers′ understanding about the blended learning in teaching and learning. The finding originated from the question, "What are your views on teachers′ understanding of blended learning in teaching and learning?"

From the principals′ responses, it was revealed that teachers have little or no understanding of blended learning in teaching and learning and hence they were not implementing blended learning in their respective schools. The finding is in line with (Tshabalala, Ndeya-Ndereya and Van der Merwe, 2014; Botha and Herselman, 2015; Majoni and Majoni, 2015). Furthermore, Tshabalala, *et al.* (2014) in their study on the implementation of blended learning at a developing university uncovered that the teachers, head of departments in particular, displayed little or no understanding of the concept blended learning. The study by Botha and Herselman (2015) also revealed that inadequate knowledge of ICTs by educators constituted a failure to effective integration of ICTs in the classroom. Another study by Majoni and Majoni (2015) showed that although the teachers were aware of the benefits of blended learning, they lack relevant knowledge of the ICTs.

The principals presented their views about the teachers′ understanding of blended learning as follows:

SSP1 explained blended learning as follows,

"Eh…, I think it is about teaching using visuals in the teaching and learning situations. Eh.... when videos and charts, but mostly slides are used by teachers to supplement their teaching together with a computer we talk of blended learning. Contrarily, in our case teachers lack the necessary knowledge and skills for blended learning application, so they are not able to implement blended learning."

Whereas PSP1 explained blended learning as follows:

“I think blended learning is a type of learning whereby teachers use mix methods or mixed strategies, as I see this word blended. I think there is a mixture of different methods and strategies. Our teachers were not trained in this and are not ready for blended learning.”

When scrutinising the responses of the principals, one could easily deduce that they did not exactly know what blended learning is. This further suggested that the case schools were not practicing blended learning.

PSP2 indicated:

“Blended learning!! Meaning what? I do not understand”.

The researcher clarified the concept and then after she replied,

“If it is concerning computers or the new technology that we are approaching, eh… we have not yet started, though we had some computers previously, the only challenge we had was that we did not have skilled teachers to empower learners about using computers”.

It was worrying that a principal, who was supposed to take a lead in technologies in her school did not know about blended learning. Principals as the directors of their schools were supposed to be knowing much about technologies so that to be best positioned to guide and develop their subordinates. Contrary to this, this seemed to be not the case in these principals. This further intensify a need of teachers′ training in technologies.

6.2.2 Finding 2: Lack of technology knowledge to manage and implement blended learning

The second finding was lack of teachers′ technological knowledge to administer and manage blended learning in their practices. Implementation of blended learning is informed by how knowledgeable principals and teachers are in technologies.

Principals need to possess adequate knowledge of technologies to be able to administer and manage the implementation. This study revealed that the principals lack technology knowledge to administer and manage the implementation of blended learning. The finding of this study is also in consistent with Lekgothoane and Thaba-Nkadimene (2019) in a study done in Mopane Circuit, Limpopo Province when they revealed that principals and teachers lacked modern educational technologies with the result that minimal usage levels of technologies were experienced.

The principals indicated that they were at the computer literacy levels due to the fact that they were able to perform some of their work by using computers. To confirm this, SSP1 had this to say:

“Yes, I think I have moderate technology knowledge because recently I did ICT with the University of Limpopo … but I can’t use this to teach learners in the classroom. I do need knowledge to use computers for teaching and learning purposes”.

This utterance confirms Mathevula and Uwizeyimana (2014) finding that revealed that even though some teachers had some form of ICT knowledge, it was evidenced that their training had minimal impact on their abilities and confidence to use ICTS in their teaching practices.

Principal SSP2 also stated his technology knowledge by submitting that:

“I think I have enough knowledge of computers because I have used technology devices in my studies. However, for the reason that I did not use them for teaching and learning purposes I cannot use them for teaching and learning activities”.

The principals of the primary schools were sceptical about their technology knowledge. PSP1 registered her doubts by saying,

“No, I do not have enough technology knowledge, I only know how to type using Word but unable to use Excel and Power-Point, So I cannot use a computer in teaching and learning situations” while PSP2 on the other hand confessed:

”Not exactly, but I have basic computer skills. I am able to use a laptop to type my management and administration documents, teaching and learning documents which included assessment tasks and lesson preparations”.

6.2.3 Finding 3: Awareness of blended learning benefits in teaching and learning

Another finding was the principals′ awareness of the benefits of blended learning in curriculum implementation. Literature highlights numerous benefits of blended learning in the teaching and learning environment (Kim. 2007; Pratt and Trewen, 2011; Parkes, Zaka, and Davis, 2011; Eryilmaz, 2015; Dangwal, 2017). In this study the participants were asked to give their perceptions about the benefits of blended learning in their schools. They answered the question: What do you perceive to be the benefits of using blended learning in your school?

The study showed that the principals were aware of the benefits of implementing blended learning in their schools and submitted that they are failed by the schools' unconducive circumstances. The findings of this study are in line with Rajkoomar and Raju (2016) in their study on blended learning in one South African university in South Africa that revealed the benefits of blended learning as: effective combination of different modes of delivery, methods of teaching, learning theories, learning styles and competencies.

Beyers and Hlala (2015:164) revealed similar findings in their study which was done at Nokotlou Circuit, Limpopo Province in South Africa where they found that teachers were aware of the importance of blended learning and were thwarted to adopt technologies due to the lack of equipment and network coverage in schools. Other findings that are also in agreement with the findings of this study are by Majoni and Majoni (2015) done on the views of primary school teachers with regard to the use of information and communication technologies in teaching and learning in which they revealed that teachers were well aware of the benefits of ICTs in curriculum implementation, however, they

were not accessible to the ICTs, thus, they did not use the technologies in the curriculum implementation.

The statements of the principals were as follows:

The principals of the case schools appreciated the benefits of blended learning in the teaching and learning environment greatly. SSP1 outlined the benefits of technologies as follows:

"For me I think it saves time for learners in activities such as classwork and also that learners are able to see real things if videos, for example, are used. Personally, this blended learning will help me as I am doing my Master of Education Degree in visualisation using technology, so I shall benefit a lot".

Whereas the SSP2 stated that:

The benefits of blended learning are numerous. As the previous participants indicated earlier, learners can obtain good results through blended learning. They further indicated that BL can also benefits teachers profoundly because they are enabled to obtain valuable sources through internet to supplement their teaching content.

PSP1 and PSP2 concurred that the benefits of blended learning include offering quality education. PSP1 emphasised this by saying:

"I think blended learning would benefits learners and teachers a lot. Learners will get better quality education and the teachers will have the opportunities to improve their ICT knowledge and skills. By employing blended learning both teachers and learners are able to get more information through internet and, hence complementing their existing contents".

PSP4 indicated that through blended learning learners understand better by submitting that,

"Through blended learning learners are able to obtain more information from technologies and it helps teachers with their lesson planning, assessments tasks. I think blended learning also makes it possible for teachers and learners to contact each other any time and anyway if they need one another".

6.2.4 Finding 4: Encountering of difficulties in blended learning implementation

The fourth finding was teachers′ encountering in using blended leaning in the teaching and learning set up. The implementation of blended learning often meets with some difficulties. It is important that these difficulties are known and addressed. So that the implementation of blended learning in schools becomes successful. Hew and Brush (2007:223) highlights variables that can make it difficult for blended learning implementation include resources, institution, subject culture, attitudes and beliefs, knowledge and skills and assessment. To find out the difficulties teachers were experiencing in using blended learning the question, “What is your perceive difficulties of using blended learning?” was posted.

Regardless of encountering difficulties, teachers were found to be positive to implement blended learning The finding of this study is in line with Mathipa and Mukhari (2014) in the study done in Gauteng Province, South Africa which revealed that lack of application programs, lack of confidence and skills constituted some of the difficulties teachers experience in the implementation of blended learning. The study by Pholotho (2017) on broadband services delivery model in public schools in South African schools also found lack of access to technologies as one of the difficulties teachers face in using technologies. One other study finding which are consistent with this study are by du Plessis and Webb (2012) in South African school about teachers perceptions revealed that insufficient ICTs for large classes, lack of project leadership makes it difficult for the teachers to implement blended learning. To find out the difficulties the teachers in the case schools they were asked the question “What is your perceived level of difficulty of using blended learning?”

The principals were positive to the implementation of blended learning but indicated that they are failed by various difficulties. They highlighted the

following difficulties which they were encountering: SSP1 complained by submitting that,

“Yah Ne! Downloading, downloading some teaching materials is time consuming. It takes a lot of time to prepare and to connect when you are in class. This is the difficult case because we were not trained in technologies”.

SSP2 stated:
“I think it will be difficult to me to use blended learning, I do not have the ability to download content from computer. Generally, I shall not be able to teach using technological devices. The department must develop us to avoid us been frustrated in front of learners”

PSP1 complained that by saying that,
“The most difficulty we have is the protection of the few technology equipment and infrastructure that we have. We have a problem with the community who is regularly vandalising our school and not support us regarding the education of their own children”
PSP2 highlighted that the only problem which creates them difficulties is lack of teachers training. He indicated this by when he said:
“Sir, if we are developed in technologies enough, I do not foresee any difficulty. Let us first be developed and also provided with resources then it will be easy to apply blended learning in our teaching”

6.2.5 Finding 5: Experiencing of challenges in the implementation of blended learning

The next finding was about the challenges that impede teachers to engage in blended learning. The study revealed that teachers experience challenges which impeded them from implementing blended learning. The finding emanated from the question, ´What are your views on the challenges that impede teachers from engaging in blended learning. The challenges identified included unreliable electricity, no internet connectivity, teachers’ attitudes, lack

of resources, lack of skills and lack of support from management in the implementation of blended learning.

The finding of this study is in line with Mathipa and Mukhari (2014) study done in South African urban schools which revealed challenges which impede teachers to implement blended learning as inclusive of: insufficient number of computers, lack of ICT skills, lack of application programs, inadequate training, poor school leadership and lack of confidence as some challenges experienced.

The study by Tshabalala, Ndeya-Ndereya and Van der Merwe (2014) done on blended learning in a developing university in South Africa also revealed consistent findings to this study. Tshabalala *et al.* (2014) revealed that blended learning implementation is faced with the perceptions of blended learning policy, support by management, teachers' computer skills and inadequate access to computers. Pholotho (2017), also revealed similar findings in his study Master of Technology dissertation when he found that lack of access to electronic educational information and services challenges teaching and learning in schools.

A study done in Nigeria by Ayeni and Ogunbameru (2013) also uncovered similar findings when they researched about the effectiveness of utilising ICT facilities. They revealed that a shortage of ICT facilities, low capacity teachers, irregular power supply. Inadequate technical support and poor funding and maintenance dominated the challenges encountered in schools.

Principals presented the challenges that impeded them to implement blended learning as follows:

SSP1 lamented:

"We would love to apply blended learning, but we experience some challenges such as unreliable electricity in our school and time constrains. The worse problem is that our school is not internet connected and …"

Whereas SSP2 asserted:

“I think blended learning requires a reasonable number of learners per classroom. With us we have large classes. We also have a problem with the teachers because they are reluctant to adopt technologies”

PSP1 accused her teachers when she said:

“We have problems with the teachers’ attitudes to technologies. They do not have interest or maybe I can say they are lazy to acquire new skills and …”

PSP2 cited lack of resources as a challenge when she highlighted:

“With us, I think we lack suitable infrastructure and technology facilities. Our teachers do not have ICTs skills and also our time-table will be constrained with these technologies”.

6.2.6 Finding 6: Acceptance of the introduction and implementation of blended learning in schools

The sixth finding was about teachers’ wishes on the introduction and implementation of blended learning. The study sought to find out from the principals how would they like the introduction and implementation of blended learning to be unfolded in schools. The finding emanated from the question, “What are your recommendations for the introduction and improvement of blended learning implementation?” As informed by the recommendations, this study revealed that teachers were positive for the introduction and implementation of blended learning in schools and were ready to implement. The principals recommended that if DBE can provide sufficient technological resources, ICTs training and development to teachers, internet connection in schools, proving of computers and laptops to all teachers and learners and provide security in all schools, then they were more than ready to implement blended learning.

The findings of this study affirm findings by Mwapwele, Marais, Dlamini and Van Biljon (2019:159) done in South African rural schools that found that 90% of teachers in rural areas are ready to use technology despite the financial, technical and digital literacy challenges that they faced. In another study by

Makgato (2014) in some schools in South Africa recommended that the DBE should provide enough computers, computer literacy and training for teachers to ensure effective integration of technologies in schools. A study by Nkadimeng and Thaba-Nkadimene (2017) emphasised that the DBE need to provide sufficient technological facilities and infrastructure in Sekhukhune schools as well as adequate training to pre-service and practising teachers so that the schools and teachers reap the benefits of technologies, thus, obtaining quality education.

The finding of this study is also in agreement with Mathipa and Mukhari (2014) on the use of ICTs by teachers in South African urban schools in which they recommended that DBE avails adequate training opportunities for all teachers, teachers be encouraged to consult ICT competent teachers amongst themselves for ICT developmental purposes and conscientizing teachers to use ICTs regularly. Furthermore, the finding agrees with a recent study by Thaba-Nkadimene and Mogatli (2020) on the use of technologies by principals and teachers in Mopani-Limpopo schools which recommended that DBE should provide all public schools with E-Tech that is active, advanced and interactive and also train and support principals and teachers in digitals.

Principals presented as follows:

Almost all the principals called for the training of teachers in technologies by DBE. One principal recommended for the establishment of ICT committees in schools to oversee the implementation and development of teachers in schools in blended learning. SSP1 had this to say,

"I recommend that training of teachers in technologies be done by the DBE. I think the teachers must also be motivated to use technologies in their teaching and …"

SSP2 recommended the establishment of committees and prosed this by saying,

“My recommendation to DBE is that they provide training for teachers. The ICT committees need to be established in schools to oversee implementation and workshopping of teachers at school level”.

PSP2 agreed by submitting that,
“I recommend that the department train the teachers. For us at school level, we need to outsource technological experts train our teachers”.
The recommendations of the principals disclosed that they want blended learning introduction and implementation to be undertaken in a conducive environment. An environment which has enough resources, competent teachers and regular development of the implementers of technologies.

6.2.7 Finding 7: Teachers are influenced positively in their practices through using blended learning

The seventh finding was the influence of blended learning on the teachers’ practices. This finding emerged from the question “How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

This study revealed that the introduction and implementation of blended learning was embraced by the teachers. However, the teachers complained about lack of facilities and infrastructure and therefore were not able to use the technologies. The finding agrees with Getenet (2013) finding that teachers held positive beliefs about the use of computers in teaching and learning but those beliefs were not positively related to their actual practises in the classroom.

The finding is also in agreement with Salehi and Salehi (2012) study on high school teachers on the use of ICT which revealed that teachers had strong desires to use ICTs in the classroom but were encountered with some barriers. In another study by Montrieux, Courtois, De Grove, Raes, Schellens and De Marez (2014) is also in agreement with the finding of this study when in their study they found that the attitudes of the teachers on the rollout of tablets in

schools was generally positive and the teachers welcomed it as a useful and ease to use aid.

The statements of the principals were as follows:

The principals stated they were influenced positively and welcome the use of technologies in teaching and learning. SSP1 had this to say:

"Usage of technologies in teaching and learning influences me negatively. This is because I am unable to use computers due to lack the necessary skills. I am afraid to be stranded with these technologies in front of learners. We must first be developed so that we use the technologies"

SSP2 agreed with SSP1 and confirmed his positive attitudes by stating:

"I am positive for the implementation of blended learning in schools. The learners enjoy using ICTs and I think implementation of blended learning could boost their performances. It also saves teachers preparation and facilitation time".

PSP1 applauded the influence of using the technologies and stated:

"Implementation of blended learning is nice because it benefits both the teachers and learners in their teaching and learning activities. It also influences learners as I see that they participate actively when taught through technologies"

PSP2 admired the usage of a laptop in teaching by saying:

"Eh…! For teaching and learning, I think it is time consuming, but when one uses the laptop and projectors learners understand better because they are able to see what they are taught about practically"

6.2.8 Finding 8: Lack of enabling structures for implementation of blended learning

Another finding of the study was the lack of enabling structures for implementation of blended learning. It emerged from the question, "Do you think

your school has enabling structures for the implementation of blended learning?"

The study uncovered that almost all the case schools lack enabling structures to implement blended learning. The finding of this study agrees with Mathevula and Uwizeyimana (2014) that revealed scarcity of ICT resources available in schools as a challenge for ICTs integration in South African secondary schools. In another study by Nkadimeng and Thaba-Nkadimene (2017) on e-learning in rural Limpopo schools, it was also found that there was a serious lack of enabling structures such as technology devices and suitable building structures for implementation of e-learning in schools. The finding of this study is also in agreement with Vandeyar's (2015) that showed non-alignment of e-policies between the districts and provincial e-learning leaders, capacity and lack of competence on the leaders as obstructions to e-learning implementation.
In answering the sub-theme question, the principals submitted the following:
SSP1 complained:
"Our school does not have any enabling structures for us to implement technologies. We do not have tech resources; internet connectivity and we teachers are also not trained and are not supported by the department and …"

The other principal (PSP1) also protested by saying:
"Yes, I think we have enough classrooms which can be converted into technology classrooms for learners, but the problem is that we do not have ICT resources. If the department, we can provide us with this and train our teachers this blended learning can be applied …"

6.2.9 Finding 9: Insufficient usage of technological appliances in schools

The ninth finding was insufficient usage of technological appliances in schools. This finding emanated from the question, "Is your school currently implementing blended learning?

Apart from insufficient usage of technology appliances, the study established that teachers have basic technology application for administrative activities but unable to use the technologies for teaching and learning. This finding agrees with Botha and Herselman (2016)'s on ICTs in rural education in South Africa which revealed that educators had inadequate ICT and pedagogical competencies for effective integration of ICTs in the classroom. The finding also resonates with George and Ogunniyi (2016) on their study on ICT in a CAL environment to enhance the conception of science concepts which concluded that teachers in rural education did not use technology appliances due to inadequate ICTs and lack of pedagogical competencies. Mundy, Kupczynski and Kee (2012) revealed the same finding in their study when they revealed that teachers who were equipped with computers used them for administrative functions but not for teaching and learning activities.

The principals responded as illustrated:
SSP1 stated:
"Use of technology appliances in the school is good. It helps learners to visualise abstract content. Just that we are unable to take this advantage because we do not have resources …but we use the computers to type our work".

On the other side, SSP2 indicated:
"You see! We have few computers in our school, but regretfully teachers and learners are reluctant to use them. I think when used effectively, they can improve the performance of our learners"
.
PSP1 acknowledged the usage of technologies in his school and said:
"The use of technology appliances can improve curriculum implementation, unfortunately, we are not using them for teaching because we do not have resources".
PSP2 submitted the importance of using technologies and stated:

“I think usage of technology appliances will help a lot in curriculum, since I said when one is researching for more information one can obtain that from internet. It also assists learners to get more information for their assessment tasks”.

6.2.10 Finding 10: Majority of schools are currently not implementing blended learning

Majority of schools are currently not implementing blended learning. In the interviews one school among four schools was using blended learning. The survey shows that few case schools, 2.3% were implementing blended learning. This finding originated from answering the question, “Are you currently using blended learning in your school?” This is due to the fact that from the schools in which interviews and document study were conducted, it was established that only one school was using blended learning for teaching and learning purposes. It was also revealed that majority of the schools do not possess teaching and learning technology devises. Furthermore, the researcher observed that majority of the schools use the few computers and laptops that they have for administration purposes.

The study revealed that majority the case schools were currently not implementing blended learning or any form of technology learning. The principals submitted various reasons why they were not implementing blended learning. These included lack of skills, inadequate resources, internet connection and suitable accommodation for technology learning.

The finding of this study agrees with Herselman (2003) study which revealed that three drawbacks fail teachers from implementing technology leaning in rural areas of South African schools. He identified the three drawbacks as basic drawbacks (lack of buildings and stationery; remotely situated rural schools; lack of experienced and skilled teachers), communication drawback (lack of telephone facilities; lack of computer hardware and software; lack of teacher training) and other drawbacks (lack of library facilities; lack of transport facilities; large student to learner ratio) as the factors which unable teachers to implement technology learning.

In a study by Aguinaldo (2013) in an impoverished Academic Institution it was revealed that unavailability of internet connection and inadequacy of technology resources are critical factors that obstruct teachers to implement blended learning. The following were the statements furnished by the various principals. SSP1 indicated:

“In fact, I cannot say we use computers, only few teachers make use of them sometimes, for example a Life Sciences and Accounting teachers. In essence, teachers are currently not implementing blended learning and so is the school”

The principal (PSP1) confessed and said: “I use it sometimes when I want my learners to see the real situation as opposed to theoretical content in their textbooks and …Otherwise, as a school we are currently not employing blended learning for teaching and learning”.

PSP2 shared the same sentiments and submitted:

“No, our school is currently not using blended learning because we do not have resources and also our teachers are not trained. I think we must start by training teachers and purchasing sufficient resources”.

6.2.11 Finding 11: Teachers' willingness to blend technological approaches with traditional approaches

The eleventh finding was the willingness of teachers to blend technological approaches and traditional approaches in the teaching and learning. This finding emanated from answering the question, “What are your views on the blending of technological approaches and the traditional ways of teaching together?” The study revealed that teachers are willing to combine technological approaches with traditional approaches but were unfortunately still holding on traditional approaches due to some factors such as lack of pedagogical and technological knowledge and skills as well as lack of resources.

The finding of this study is in line with Lekgothoane and Thaba-Nkadimene (2019) on their study undertaken on implementation of e-Education policy by principals and teachers in Limpopo Province. Lekgothoane and Thaba-Nkadimene (2019) revealed that there were still teachers who prefer traditional teaching approaches over to digital teaching approaches. Makgato (2014) in his study about integration of educational technology in South African schools revealed that teachers are afraid to new innovations and change despite the availability of ICTs. Some participants highlighted this fear as outlined by Makgato (2012) in his study. The finding is also in agreement with Hew and Brush (2007) that some teachers do not use technologies in their teaching simply because they were unfamiliar with the pedagogy of using technologies.

The narratives of the participants are presented underneath. The principal of secondary school 1 (SSP1) had this to say:
“Sir, we are experiencing problems in as far as todays education is concerned. Teachers are still hanging on traditional approaches and resist the new technological approaches. They fear technologies and sometimes they think technology is going to take their jobs and so they reject it”.

The principal of primary school 2 (PSP2) applauded the blending of technology and traditional approaches and reported:
“I think combining the two approaches is good because it can improve learners understanding. However, we are not able to do this because we lack technological know-how …”

6.2.12 Finding 12: Inadequate teachers' technological skills

Finding12 was inadequacy of teachers′ technological skills. It was established that teachers find it difficult to apply technologies in their teaching and learning activities. The finding emerged from the question “What skills do you think teachers need to implement blended learning? Effective teaching and learning are informed by access to a rich, well-organised and integrated knowledge and skills from the teachers, increasingly, knowledge and skills in technology

(Koehler, Mishra and Cain, 2013). In this study it was revealed that teachers have inadequate technological skills to implement blended learning.

The finding agrees with Lekgothoane and Thaba-Nkadimene (2019) finding in their study in Limpopo Province schools on assessment on the implementation of e-Education policy implementation which revealed that teachers lack pedagogical technologies for their teaching and learning activities. Nkadimeng and Thaba-Nkadimene (2019) concur with the finding in their study in Sekhukhune District which revealed that teachers lack skills on technology related teaching and learning strategies. In a study that was conducted by Majoni and Majoni (2015) on the use of ICTs in primary school, lack of teachers' technological skills was observed. Herselman (2003) shares the same spoils in his study in rural areas on the implementation of ICTs when he revealed that many schools in rural areas lack teachers with appropriate technical skills and experience.

The principals' narratives about their technology skills are presented underneath:

The principal of secondary school 1 (SSP1) reported that,

"Teachers are in dire need of computer literacy skills which they do not have. For example, Word; excel and power point skills to implement blended learning. I think they also need to be motivated and encouraged to use ICTs".

SSP2 reiterated by registering that,

"I think we need to be trained in computer literacy and the basic application of word; excel and power point to enable teachers to apply in their teaching activities".

PSP1 confirmed the skills that teachers need to possess by saying,

"I think the skills that teachers need include typing skills, how to use an overhead projector, usage of power-point software and how to interpret slides …"

PSP2 concluded that,

“Eh…! I think teachers need to have basic computer literacy skills. They also need to know how to search information in the internet. Teachers need to also develop themselves in these new technologies apart from the departmental initiatives”.

6.2.13 Finding 13: Insufficient teachers' technological support

The last finding of the study is Finding 13. It emanated from the question What support do you think is needed for the teachers to implement blended learning? The study revealed that teachers were insufficiently supported in technologies and thus, impacting application of technologies negatively. Teacher support is a critical aspect for the successful implementation of technologies. DBE (2015) informs us that a successful ICT support is made possible by among others: improved teachers professionalism; teaching skills; subject knowledge and computer literacy, accessibility of technologies, quality monitoring and support and the availability of infrastructure.

The finding is in line with Tshabalala, *et al.* (2014) finding that found management support, computer skills and inadequate access of computers and teachers support lacking to implement technologies in curriculum. Mathipa and Mukhari (2014) also revealed lack of support as one of the factors which have influence in the use of ICTs in South African urban schools. In its report on the support services the DBE (2013:34) revealed that visits by district officials to support schools are minimal. For example, in 2011 96% of schools were visited once in a year and 88% at least twice in a year. The report further indicated that the more historically disadvantaged a school is, the lesser the visits and hence schools in the provinces like Eastern Cape and Limpopo were the least visited.

Another study by Kisanga and Ireson (2015) in Tanzania about the adoption of e-learning in teaching that also revealed inadequate support of teachers to be impacting negatively on the adoption of e-learning in Tanzania higher learning institutions.

The principals presented the following statements:

SSP1 registered a point and said:

“Yah, I think support is important for blended learning practices. The DBE need to support schools by providing ICT infrastructure and resources as well as training teachers in technologies. I also think that if the SMT encourage and motivate the teachers to always teach by technology devices. We are trying to practice even though we have very few resources …”

PSP2 agreed with SSP1 and submitted:

“The support needed in our school is the provision of technological resources to the teachers and learners. If the DBE can buy each teacher and all the learner’s computers or laptops, I think this would be a good support”

6.2.14 Finding 14; Recommendations for the introduction and improvement of BL

Participants were asked to provide recommendations on the introduction and on how blended learning can be improved. The principals recommended amongst others that school stakeholders (principals, HODs and teachers) be trained in Technologies, establishment of technology committees and that School Governing Bodies make funds available for school-based technological developmental programmes.

6.3 RESEARCH FINDINGS FROM THE HODS’ INTERVIEWS

The next group of the interviewees were the HoDs. After the analysis of data, the study confirmed the following findings: limited teachers′ understanding of blended learning in teaching and learning, insufficient technology knowledge to manage and implement blended learning, HoDs are aware of blended learning benefits in teaching and learning, HoDs experience difficulties in blended learning implementation, various challenges are encountered in the implementation of blended learning, HoDs applaud the introduction and implementation of blended learning in their departments, HoDs are positively influenced by using blended learning in their departments, lack of enabling

structures for blended learning implementation, insufficient usage of technological appliances in the classrooms, HoDs are not currently implementing blended learning, HoDs welcome the blending of technological approaches with traditional approaches, inadequate teachers′ technological skills, insufficient teachers′ technological support and recommendation for the introduction and improvement of blended learning in rural schools.
A discussion of each of the findings is presented below.

6.3.1 Finding 1: HoDs' views on teachers' understanding of blended learning in teaching and learning

The HoDs, by virtue of being the phase heads, subject heads, curriculum managers, curriculum leaders, instructional leaders and managers are expected to know and understand the new trends in education to be best positioned to lead and manage their departments (Javadi, Bush and Ng, 2017; Basset and Robson, 2017; De Nobile, 2018; Kasim, Zakaria and Basran, 2015; Maingi, 2015; Shaked and Schechter, 2017).

Finding 1 emanated from the question “What are your views on teachers′ understanding of blended learning in teaching and learning. In this study, the HoDs′ confirmed that teachers have a limited understanding of the blended learning in teaching and learning. The study also revealed that the HoDs have positive perception for use of technologies in the teaching processes.

However, according to the HoDs′ deliberations, it was revealed that the HoDs also were fully not conversant with blended learning. This exposure is in line with Tshabalala, *et al.,* (*2014*) which revealed that the HoDs displayed little or no understanding of the concept blended learning and that this impacted negatively on the implementation of blended learning in one developing university in South Africa.
The finding of the study also resonates with Nene (2019) who showed in his study that HoDs lack basic knowledge and understanding of curriculum implementation. Another study by Mncube, Olawale and Hendricks (2019) also

found that teachers do not use e-learning in their teaching and learning practices due to reasons such as not understanding the technologies and lack of resources

SH1 appeared not to be understanding what blended learning is, she showed this and said:
“I do not know what blended learning is. Can you tell me what it is?” The researcher clarified and then after she replied and said, “My understanding is that it is using technology in teaching together with traditional approaches. I think it is good, although it depends on the teachers’ willingness and readiness”. It is really a concern that the HoDs, whose one of his responsibilities is to assure and guide teachers in curriculum developments but seem to possess little knowledge about blended learning.

PH1 explained:
“Oh! I think blended learning is the combination of old teaching approaches with technological approaches in the teaching and learning situation. It is a new type of learning and our teachers are not yet been exposed in it”
while PH2 remarked:
“My understanding of blended learning is that it is a situation where a teacher uses normal teaching and joins it with technologies. Lately our teachers are only applying the old ways of teaching”.

6.3.2 Finding 2: Lack of technological knowledge of administering and managing blended learning

Achievement and improvement of quality learning and teaching across the education and training systems can only attained if the HoDs have the necessary knowledge (DBE, 2004). It is for this reason that it is important that teachers need to possess adequate technological knowledge for a successful implementation of blended learning. Finding 2 emerged from the question “Do you think your level of technology knowledge is enough for administering and managing blended learning in your department?”

The study revealed that the HoDs have insufficient technological knowledge to administer and manage blended learning in their respective departments.
The finding agrees with Lekgothoane and Thaba-Nkadimene (2019) study that found lack of knowledge of pedagogical technologies as an obstacle of technology learning implementation. In another study by Majoni, Majoni (2015) lack of relevant knowledge on how to use ICTs in teaching and learning was uncovered. A study done by Ayeni and Ogunbameru (2013) in Nigeria also revealed a low capacity of teachers in the use of ICTs in secondary schools.

Like their seniors, the HoDs seemed to be only having basic level of computer skills. This was very important due to the fact that the HoDs, as curriculum managers, need to have sufficient technology knowledge to be enabled to lead their departments in technological issues. The HoDs echoed the following statements regarding their technology knowledge:
SH1 exclaimed:
" … I can say I am at the moderate level as far as technology knowledge is concerned. I use a laptop to prepare my teaching and learning activities. Unfortunately, I cannot use it for teaching and learning".

The HoDs confirmed that they had basic knowledge of using computers. SH2 confirmed:
"Yah, my level of technology knowledge is enough because I once being trained on how to use computers. I use laptop to prepare my lessons and for assessment tasks".
The HoDs of the primary schools also registered the following statements to confirm their technology knowledge:
PH1 conceded:
"No, I do not have enough knowledge, I still need training. Maybe, if the Department of Basic Education can organise some developmental workshops, we can have sufficient technology knowledge".

PH2 stated:

“I have some knowledge but need further development in technologies. The department need to develop us so that we can be able to use these technologies in the teaching and learning situations”.

6.3.3 Finding 3: Benefits of using blended learning

The next finding was the awareness of the benefits of blended learning in teaching and learning by the HoDs. This finding emanated from the question, “What do you perceive to be the benefits of using blended learning in your department?”

The study revealed that the HoDs found blended learning useful for the provision of quality education. This finding is consistent with Singh and Reed (2001) that revealed the benefits of blended learning as inclusive to improving education quality, effectiveness, convenience and cost of learning experiences. This finding also aligns with Rasmitadila, Widyasari, Humaira, Tambunan, Rachmnadtullar and Samsudan (2020) who uncovered that 66.94% of teachers’ perception indicated that blended learning adds learning experiences, knowledge, variations of learning models and that in blended learning learners learn more flexibly and independently and thus, increasing their performances. Poon (2012) study had also indicated greater flexibility for learning and improvement in students’ experiences and engagement as the benefits of blended learning which result quality learner achievement.

The HoDs responded as reflected below:

SH1 said:

“You know, with blended learning the learners can grasp better, and it saves time for teachers and learners. By using blended learning, the teachers and learners are able to obtain important information by internet to complement available resources”.

With the same breadth, SH2 also valued the benefits of blended learning highly but crumbled:

"Oh, Yes! Blended learning reduces time of obtaining necessary information. It makes teaching and learning successful. I think it benefits learners and teachers a lot because through the computers teachers are able to get more information for the learners. The only problem is lack of equipment".

PH1 and PH2 also esteemed the benefits of implementing blended learning. PH2 highlighted:

"I wish that the government let us implement blended learning in our schools because it will improve communication between the teacher and learners. It will also reduce our workload. Unfortunately, our schools are not supported to benefit from the advantages provided by blended learning".

6.3.4 Finding 4: Difficulties of using blended learning

The fourth finding was about the difficulties teachers encounter in the implementation of blended learning. The finding emerged from the question, "What is your perceived difficulties of using blended learning in your department?

From the responses of the HoDs, the study revealed that the HoDs encounter various difficulties to implement blended learning. Amongst the difficulties they indicated the usage of technologies in the teaching and learning as their main difficulty. The finding aligns with (Rasheed, Kamsin and Abdullah, 2020; Ma'arop and Embi, 2016; Yacipi and Akbayin, 2012). Rasheed, Kamsin and Abdullah (2020) revealed that the main difficulty of teachers in blended learning was the use of technology learning. In a study by Ma'arop and Embi (2016) it was also uncovered that the difficulty of teachers in implementing blended learning was finding the right blend of face-to-face and online learning together. The study also aligns with Yacipi and Akbayin (2012) which showed that teachers experienced difficulties of playing videos in the course of blended learning implementation.

The HoDs provided the following statements with regards to the difficulties teachers experienced in blended learning.

SH1 said:

"I think lack of laptops and knowledge to use them are some of the difficulties we experience. The other problem is that learners are not able to use the laptops. Most of the teachers cannot even just open a laptop. I think training is needed".

The SH2 agreed with SH1 when he indicated:

"The difficult part in using blended learning, I think is that most of us are unable to use the technologies and this makes it hard for us to apply. But I think if we can be trained, we will not find it difficult to practise blended learning in our school".

Apart to difficulties in using the technologies, PH1 complained about the access to the technologies and declared:

"I find it difficult to use software for teaching and learning purposes. I think I need practise, but the biggest problem is the accessibility to the technologies. We do not have enough computers through which we can use in the teaching and learning".

6.3.5 Finding 5: HoDs views on challenges that impede teachers to engage in blended learning

Finding 5 originated from the question, "What are your views on the challenges that impede teachers from engaging in blended learning? This study found that teachers are faced with many challenges. Some of the challenges highlighted include lack of resources, unreliable electricity, no internet connectivity, teachers' attitudes, lack of skills and lack of support from management.

The findings of this study agree with Mathipa and Mukhari (2014) study which revealed that insufficient number of computers, inadequate teacher training, lack of skills, lack of support and poor leadership as some of the challenges experienced as the factors that influence the use of ICTs in teaching and

learning in South African rural schools. Similar findings were revealed by Tshabalala, *et al.* (2014) in their research study on the implementation of blended learning in a developing university in South Africa which included support by management, lack of computer skills by teachers and inadequate access to computers as the challenges hindering the implementation of blended learning. The findings also confirm Pholotho (2017) findings that lack of access to electronic educational information and services impact negatively on the delivery of education in South African public schools.

The HoDs submitted the following statements:

SH1 stated,

"…the dominant challenges as I have highlighted earlier are lack of resources, internet connectivity and lack of teachers' technological skills. I think if the department can capacitate us as HoDs in terms of developing us and providing technology resources we can be better placed to develop teachers to implement blended learning".

SH2 complained about the department towards blended learning and showed:

"… Although our teachers seem to be resistant to changes, there are no supportive and development structures from the department, and this give the teachers chances of not using technologies. I think one other challenge that we as management overlook is motivating the teachers to use the technologies in their daily teaching and learning activities".

PH2 also emphasised lack of technological resources and said:

"… I think lack of resources impose serious challenges to almost all our schools. One other factor worth mentioning is the resistance of teachers to technologies. I think if enough resources can be available in our schools, it will be easy for teachers to engage in blended learning".

6.3.6 Finding 6: Recommendations for introduction and implementation of blended learning

The next finding was about the recommendations for the introduction and implementations by the HoDs. This study sought to find out how best do HoDs

thought blended learning should be introduced and improved. The finding emanated from the question, “What are your recommendations for the introduction and improvement of blended learning implementation?”

Based on the recommendations from the HoDs, the study established that the HoDs showed deep-seated willingness and readiness to implement blended learning, but they emphasised a need for them to be trained and developed in technologies. The recommendations also uncovered that the case schools are inadequately resourced and hence the HoDs desire for availability of adequate supply of resources.

The findings of this study align with Tshabalala, *et al.* (2014) that recommended that teachers should undergo training in technologies to be able to use technologies in blended learning. Nkadimeng and Thaba-Nkadimene (2019) recommended that the Department of Basic Education need to provide sufficient technological facilities and infrastructure in school for the successful implementation of e-learning. Another study by Özdemir (2017) also proposed that for the successful integration of ICTs in school, inadequacy of technology infrastructure, ICT inadequacy of the teacher, inadequacy of course materials and ICT inadequacy of students need to be addressed.

The submissions of the HoDs were captured as reflected below:

SH1 emphasised a need of training and suggested:

“To the DBE I recommend that they establish training programmes for the teachers and the SMTs. I also recommend that the SMTs take it up to themselves to workshop the teachers regularly and ensure that blended learning is implemented”.

SH2 agreed:

“My recommendation is that intensive training of teachers be undertaken to teachers and SMTs. Not the hours, two hours or so, presently given to teachers. In addition, I think if regular school-based workshops for teachers and the parents could be done this can help successful implementation and…”

PH1 shared the same spoils and indicated:

“My recommendations are that intensive training of teachers be undertaken to teachers and SMTs. Not the hours, two hours or so given to teachers deemed as trainings. In addition, I think if regular school-based workshops for teachers and the parents could be done this can ensure a successful implementation of blended learning”.

6.3.7 Finding 7: HoDs’ perceptions on the influence of blended learning implementation on teachers’ practices

This seventh finding emanated from the question, “How has the introduction and implementation of blended learning influenced your department to engage or not to engage in blended learning? The study showed that the HoDs were influenced positively for the implementation of blended learning in their teaching practices. The finding of this study is consistent with (Mwapwele, Marais, Dlamini and Van Biljon (2019) that teachers in rural South African schools appreciate using technologies for teaching and learning in their schools.

In a study by Mabaso (2017); Bergdahl, Nouri, Fors and Knutsson, (2020) it was also found that rural teachers use technology-based learning in the teaching and learning because technologies stimulate high-performance, enable learners to develop strategies to use digital technologies in a supportive and productive ways. Another study by Yanti and Setiawan (2018) established that teachers perceived e-learning as a useful and easy to use technology and were satisfied with the advantages of the use of the new technology in their teaching practices.

The narratives of the HoDs are illustrated below:

SH1 indicated:

“For me, it has influenced me positively. It is good because it saves me time in preparing lessons and getting more information about the content. When I go to class, I just use the computer and projector to teach instead of writing on the

chalkboard which is time consuming. I really enjoy using computers in my teaching activities”

PH1 seconded and said:

“I like it because it saves time. Through technology I am able to contact learners anyway regardless of where they are, even when they are at home. Technology makes my work simple and manageable”.

PH2 admired blended learning but highlighted:

“Eh…! Technology has never been a challenge to me. The problem is procurement of the necessary resources in the classroom. One other problem is the reluctance of teachers to use the technologies. I think if there can be enough resources then we can teach using the technology”

6.3.8 Finding 8: Enabling structures for implementation of blended learning

Finding 8 was about enabling structures for a successful implementation of blended learning. The finding emerged from the question, “Do you think your department has enabling structures for the implementation of blended learning?” The study revealed that all the case schools′ departments lacked adequate enabling structures to implement blended learning. The predominant enabling structures which the case schools lacked included: insufficient technological facilities and infrastructure, lack of teacher skills in technologies, lack of teacher training and development, lack of internet connectivity and inadequate support of teachers.

The findings of this study are in line with studies by Beyers and Hlala (2015); Kisanga and Ireson (2015); Buabeng-Andon (2012). In their study Beyers and Hlala (2015) established that teachers in the Department of Education, Limpopo Province lack technology skills, lack e-learning equipment and network coverage and therefore experience difficulties to implement e-learning. Furthermore, in a study by Kisanga and Ireson (2015) undertaken in Tanzania poor infrastructure, financial constraints, inadequate support, lack of e-learning

knowledge and teachers' resistance to change were uncovered as structures which made e-learning unsuccessful were observed.

Buabeng-Andon (2012) also undertook a study in Ghana to establish factors which influence teachers to integrate technologies in teaching and revealed that lack of teacher ICT skills and confidence, lack of teachers' training, lack of suitable educational software and limited access to ICTs as structures which were lacking in e-learning teaching in schools.

The HoDs answers are reflected underneath:
SH2 asserted:
"I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking about e-learning but does not train teachers. How do they think technology education can be successful without teachers?"

PH1 on the other side complained:
"I think we do not have enough resources. We do not have an overhead projector, internet, and the like but, we have few computers that can be used for teaching. The school is at the moment arranging to buy more laptops for teachers to use for teaching and learning purposes".

PH2 also crumbled about lack of training and resources and said:
"You, see! The problem is we are not having training structure in technologies and the school does not have technological resources for teaching and learning purposes. As a result, I think it will be difficult for the school to adopt blended learning".

6.3.9 Finding 9: Usage of technology appliances

The other finding involved the use of technology appliances in the execution of blended learning. This finding emerged from the question, "How to you find the

usage of technology appliances in curriculum implementation?" The study revealed insufficient usage of technological appliances in the classroom. Factors such as lack of adequate ICT and pedagogical competencies were highlighted as obstacles. The finding is in line with Botha and Herselman (2015) who found that educators in South African rural areas lacked adequate ICT and pedagogical competencies.

A recent study by Rasheed, Kamsin and Abdullah (2020) found usage of learning technologies in teaching as the main teachers' challenge. Mundy, Kupczynski and Kee (2012) in their study on the perceptions on the use of technology in schools showed that more than half of the teachers who were equipped with computers used them for administrative functions at the expense of teaching and learning purposes due to lack of technological proficiency.

The HoDs responded as follows:
SH1 welcomed the usage of the technologies but worried about his colleagues' inadequate technology skills and submitted:
"I think is good to use technology appliances in the curriculum, although I sometimes fear that most of the educators are not clear in using them, which means they would first be trained and this is a hell of work to do".

PH1 responded:
"Technology appliances makes curriculum implementation easier, but we are experiencing lack of these appliances in our school. I think if the department can provide teachers and learners with technologies, then blended learning can be implemented in our schools".

PH2 complemented the use of technologies by and stated:
"I think is good to use technology appliances in the curriculum. Today's learners like technology so we need to teach them through what they like most so that they understand better. Unfortunately, only few teachers in our school can use a computer. I am struggling to use a computer myself".

6.3.10 Finding 10: Current implementation of blended learning in schools

The tenth finding was obtained from the answers of the question, “Is your department currently implementing blended learning?” The study showed that all the case schools′ departments were not implementing blended learning. The participants indicated lack of teachers′ technology skills, lack of resources and lack of internet facilities as some of the hindrances that fail them to implement blended learning.

The finding of this study aligns with Moila (2008) that lack of relevant educational technology tools and inadequate educators training on the use of technologies in teaching and learning hinder schools from implementing blended learning. In the study by Botha and Herselman (2015) it was also observed that effective integration of ICTs was lacking because of inadequate ICTs and educators′ pedagogical competencies. Pholotho (2017), in his study on the resource-constrained public schools found that lack of access to electronic educational information and services were the limiting and challenges factors for the implementation of technologies in schools.

The participants recorded their frustrations to implement blended learning as illustrated below:

In one school, it was established that only a few teachers employ blended learning in their teaching sometimes. Regarding this assertion, SH1 submitted:

“Yes, I am using it” and a follow up question “How are you using it? Was posted and she responded as follows: “I just go to class with my laptop, play videos of my preparation for learners. I see only few of us using computers when teaching. So, I cannot say the school is currently implementing blended learning “.

SH2 confessed that their school was not employing blended learning. He said:

“Eh..., I can say no, because we only use laptops for typing our lesson preparations and assessment activities. As I said earlier, they are used for administration purposes only”.

PH1 had this to register:

“Uhm…I can say, to an extent, yes. I use it when I am searching information from Google using my own data. But as a school we are actually not currently using computers for teaching and learning in the classroom”.

PH2 confirmed they’re not using blended learning and stated that,

“No, not at all” After having been clarified the respondent and said:

“We are not implementing blended learning due to lack of laptops, projectors and tablets for learners. We have not yet started with the usage of ICTs in our school”.

6.3.11 Finding 11: blending of technological approaches and traditional approaches of teaching

Finding 11 was with regards to blending the technological approaches and traditional approaches in the teaching and learning situation by teachers. This finding emanated from the question, “What are your views on the blending of technological approaches and traditional ways of teaching together?”

The study established that the HoDs embrace the blending of technological and traditional approaches. The finding is in line with de Jager (2015) study on the use of DVD in teaching and learning which found that both the learners and the teachers liked the combination of the technological and traditional methods used. For example, teachers indicated that through the usage of the DVD learners were able to learn at their own pace; they were confident and interactive and that the unclear concepts were easily clarified.

In a study by Alaneme, Olayiwola and Reju (2010) it was also established that students and teachers preferred a combination of both traditional and e-learning methods of teaching for an effective learning. The finding is also in keeping with Akkoyunlu and Soylu (2004) that students and teachers liked blended learning environment.

To indicate their approval of the blending of technological and traditional approaches, the HoDs presented the following narratives:
SH1 had this to say:
“I think if the two approaches are combined, they support each other. The weaknesses of one approach will be boosted by the strengths of the other approach and hence a provision of quality teaching and learning”

SH2 supported and said:
“… The two approaches boost each other. We are still hanging on the traditional teaching ways due to the fact that our schools lack technology resources. I think we also need training for the usage of the technology devices to be able to combine the two approaches successfully”.

PH1 said:
“I think it is good to combine the two approaches because learners are able to apply their theoretical knowledge practically. The combination of the two approaches also boosts the strengths of each approach and minimises the weaknesses. It is unfortunate that we are not able to combine these approaches because of lack of technologies”.

6.3.12 Finding 12: Teachers' technology skills

Another finding emerged from the question, “What skills do you think teachers need to implement blended learning? Based on the responses of the HoDs, the study found that the teachers have insufficient technological skills for the implementation of blended learning including the basics and advanced technology skills. Similar finding was uncovered by Lekgothoane and Thaba-Nkadimene (2019); Botha and Herselman (2015); Ma’arop and Embi (2016).

In their study on the assessment of principals in e-learning project in schools, Lekgothoane and Thaba-Nkadimene (2019) revealed lack of pedagogical technological skills to be one of the problems that teachers experience to use technologies. Botha and Herselman (2015) also uncovered that most educators

have inadequate ICT and pedagogical competencies to integrate ICTs in their teaching practices. Lack of pedagogical and technical skills was also established by Ma'arop and Embi (2016) as obstacles which influenced implementation of blended learning by educators negatively.

The HoDs responses were as follows:
SH1 indicated:
"I think teachers need computer usage skills and practical application of ICT tools. Schools should also take responsibilities to develop us through some workshops. As they do not have expertise, they must outsource"

SH2 agreed and submitted:
"Yah, I think the skills that teachers need include computer literacy, word; excel and power point. Teachers must also be encouraged and be motivated to use the computers regularly"
PH1 saw encouragement and motivation of teachers in the usage of technologies important and contested:
"… Apart from computer literacy, I think the teachers must be encouraged and motivated to use ICTs in their teaching practices. This will assist them to get used to technologies"
Whereas PH2 highlighted a need of development and said:
"Some of the teachers are already having basic skills of computers, I think they also need serious development in the application of the technological devices. The school development team must put emphasis on the use of technologies in the school"

6.3.13 Finding 13: Teacher support on blended learning implementation

The last finding about teachers' technological support originated from the question, "What support do you think is needed for the teachers to implement blended learning?" The study established that teachers were inadequately supported in the use of technologies. The finding of this study aligns with DBE, 2013; Moila, 2008; Ndlovu and Gumbo, 2018.

The statistic survey undertaken by the DBE (2013) revealed that there was an insufficient support given to schools and teachers. The survey indicated that a high percentage (96%) of schools was visited once per year while 88% twice a year. This is a clear indicative that majority of schools did not received support with the result that the schools' performance might suffer the consequences. Ndlovu and Gumbo (2018) also established that insufficient support from the department constitutes to challenges experienced in the teaching system.

In his study, in a secondary school In South Africa Moila (2008) found that inadequate training of teachers as a form of support on the use of educational technologies in teaching and learning was one of the major reasons for no use of technologies in schools.

The HoDs registered that they were not supported by submitting the statements that follow:
SH1 suggested:
"I think the department must provide schools with sufficient technological resource. DBE need also to train and develop teachers in the use of technologies. The SMT and the SGB must also support teachers to implement blended learning"

This was supported by SH2 when he proposed:
"I think teachers can be supported by training them in technologies and give them bursaries to study qualifications in technologies. The community must also play a supportive role in protecting the technology facilities"

PH1 shared the same sentiments with the other HoDs by affirming:
"I guess the support teachers need is to be provided with personal computer which they can always use in their teaching practices. They also need regular development because these technologies are ever changing with time …"

PH2 emphasised a need of workshops and monitoring and said,

“I think teachers need to be regularly workshopped in ICTs. The SMT members must monitor the implementation of blended learning regularly to ensure that teachers are given support spontaneously …”

6.3.14 Recommendations for the introduction and improvement of BL in rural schools

The HODs, like their principals recommended that they be trained in the use of technologies. They further recommended that the DBE provide enough technology devices for teaching and learning so that to be enabled to implement BL. They also called for the SMTs to provide technological development in the schools.

6.4 FINDINGS FROM THE TEACHERS′ INTERVIEWS

The teachers of the case schools were also interviewed to find first-hand information from horses’ mouth. The analysis of the teachers′ interviews data culminated with 13 research findings. These findings are: teachers′ little understanding of blended learning, insufficient technological knowledge to administer and manage blended learning, teachers are aware of the benefits of blended learning in teaching and learning, teachers encounter numerous difficulties which hinder them to use blended learning, several challenges prohibit teachers to adopt blended learning in the classroom, teachers eager and ready to implement blended learning but awaiting development in technologies, blended learning influence teachers positively in their teaching practices, lack of sufficient enabling structures in the schools, inadequately used technology appliances in schools, none implementation of blended learning in all case schools currently, teachers appreciate the blending of technological approaches and traditional ways of teaching highly, teachers′ lack of technological skills, teachers′ insufficient technological support in blended learning processes and recommendations for the introduction and improvement of blended learning in rural schools. The findings are fully presented underneath.

6.4.1 Finding 1: Lack of understanding of blended learning

It is vital that a concept is clearly understood before is practically applied. In the same vein, this study sought to find answers to the question, “What is your understanding of blended learning? It was revealed that the teachers in the case schools had little understanding of the blended learning in teaching and learning. This was established by the fact that the researcher had to clarify the concept blended learning to some of the participants to get their understanding about blended learning.

The finding concurs with Nene (2019) study in the South African primary school that found the head of departments lack basic knowledge and understanding of curriculum concepts and therefore fail to implement the curriculum expectations, for example. Supervision of CAPS curriculum. Another study by Aydin (2013) uncovered that teachers had little knowledge about the software and therefore experience difficulties using the computers. This clearly exposed a need to first understand a concept before one can apply it. In a study undertaken in some secondary schools by Bukaliya and Mubika (2011) found that majority of teachers were computer illiterate because they were not exposed to ICTs in their training.

The teachers expressed their understanding of blended learning as follow:

ST1 had this to submit: Uhm, I do not know. The researcher had to clarify the concept, but the respondent could not have any understanding of blended learning.

ST2 explained her lack of blended learning and confessed:

“Technology knowledge! No, Sir, I was never exposed to ICTs before”

PT1 had some ideas of what blended learning is. He, had this to say:

“Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. So, learners learn by seeing what you are teaching them about practically”

PT2, similar to PT1, understood the concept blended learning. He registered his opinion and illustrated:

“Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. This type of learning enables learners to learn by seeing what they are taught practically. Technological resources are used to supplement our usual face-to-face teaching in this type of learning”

6.4.2 Finding 2: Lack of technological knowledge of administering and managing blended learning in teaching and learning

To administer and manage the implementation of blended learning teachers need to possess adequate knowledge of technologies. The study wanted to find out about the teachers′ technology level in the administration and management of blended learning. The finding emerged from the question “Do you think your level of technology knowledge is enough for administering and managing blended learning in your teaching?” The study revealed that teachers have insufficient technological knowledge to implement blended learning in teaching.

The finding is consistent with Majoni and Majoni (2015) that showed that primary school teachers lacked relevant knowledge on how to use ICTs in teaching and learning. In the study by Bukaliya and Mubika (2011) it was also shown that limited knowledge on how to use ICTs in the classroom made teachers not to use the ICTs. Aydin (2013) study on teachers′ perceptions about the use of computers in EFL teaching and learning found that teachers had little knowledge about the software and therefore experienced difficulties in using computers.

Mishra and Koehler (2006) emphasise that for teachers to integrate technologies in their teaching practices, their technology knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) should be synthesised to form Technological Pedagogical Content Knowledge (TPACK).

According to Chai, Koh, Tsai and Tan (2011:1185) Technology knowledge (TK) refers to – knowledge of how to operate computers and relevant software, Pedagogical knowledge (PK) means the knowledge of how to plan instructions, deliver lessons, manage students and address individual differences, Content knowledge refers subject matter knowledge and TPACK means knowledge of facilitating students learning of specific content through pedagogy and technology.

This study uncovered that the teachers in the case schools had TK but lack both PK and TPACK. The finding is consistent with (Ford and Botha, 2014; Were, Rubagiza and Sutherland, 2011; Bytheway, Cox, Duma and Van Zyl, 2012). Ford and Botha (2014) in their research study on the integration of ICT into education in South Africa found that teachers in rural areas lack PK and TPACK to integrate technologies in the teaching and learning situations. This finding is in keeping with Botha and Herselman (2015) which revealed that most teachers in rural areas have inadequate ICT and pedagogical competencies for effective integration of ICTs in their classroom practices.

Similar findings were found by Bytheway et al. (2012) on their critical analysis of educators discourse on ICT in education at the University of Cape Town that observed

In addition, Were, *et al.* (2011) in their study about bridging the digital divide in Rwanda also revealed that teachers lacked PK and TPACK.

Teachers′ narratives on their technology knowledge for teaching blended learning unfolded as illustrated hereunder:

ST1 reported:

“Eh, what can I say? I have a computer certificate done some years ago, but truly, I know nothing at the moment, especially for teaching and learning purposes. I need to be trained again so that I can use computers in the classroom”

ST2 confessed:

“Technology knowledge! No, Sir, I was never exposed to ICTs before …”
Similarly, PT2 shared the spoils with ST2 and stated:
“Definitely No. I do not have any technology knowledge …”
PT1 doubted his technology knowledge level by saying,
“I cannot say it is enough, we still have a lot of room to learn, because technology is a new thing to all of us. You see, our schools are not yet ready for technology education”.

6.4.3 Finding 3: Benefits of using blended learning

Blended has many benefits for teachers and learners. In this study the researcher investigated the perceptions of the teachers on the benefits of blended learning in them in teaching and learning. This finding emanated from the question, “What do you perceive to be the benefits of using blended learning in your teaching?” The study showed that teachers are aware of the benefits of blended learning in teaching and learning.

The finding of this study agrees with Louw (2012) that revealed that blended learning has many benefits which can be applied appropriately in particular contexts. In a study by Rasmitadila, *et al.* (2020) it was also showed a positive perception about blended learning approach benefit to students. The finding of this study is also in line with Mdlongwa (2012) done in Pearson High School in Port Elizabeth, South Africa that established the benefits of blended learning in the teaching and learning include improvement of knowledge and work standard, acquirement of a variety skills, for example: typing skills in Microsoft Word, Access and Excel programs, improvement of administrative tasks and visualisation of real-life situations.
The teachers illustrated how they perceive the benefits of blended learning as follows:

ST1 valued the benefits of blended learning and said,
“Surely, the use of blended learning will benefit us very much. It will provide more knowledge to both teachers and learners and hence the improvement of learners’ performance”

ST2 on the other hand stated that,

“According to me, blended learning has numerous benefits. I think it reduces teaching time and we can easily gather information using technologies. The usage of internet is really helping us a lot, especially in blended learning. We are able to provide quality teaching through blended learning”

Similarly, PT2 configured:

“My guess is blended learning has many benefits, these include improvement of learners’ understanding, improvement of teachers technology knowledge, development of communities in the usage of technological tools at their homes. For us, teacher’s technologies help us to provide quality education as well as enabling us to search and download very important information from internet”

6.4.4 Finding 4: Difficulties of using blended learning

Some difficulties are sometimes experienced during blended learning implementation. This study wanted to find out the difficulties that teachers encounter in the implementation of blended learning processes. The finding emanates from the question “What is your perceived difficulties of using blended learning in your teaching? The study revealed that teachers numerous difficulties prohibit teachers in the implementation of blended learning processes. The teachers submitted that due to difficulties such as lack of computers in schools, lack of technology skills and confidence, lack of training and support, lack of internet connectivity and poor leadership, they were unable to practice technologies in the teaching and learning situations.

The finding of this study confirms the findings by Alfonsi, Gallo and Lagana (2003) which found that lack of confidence of teachers in using computers and overestimation of the level of computer literacy of those few teachers who already were computer literate and lack of computers as well as limited access to internet made it difficult for teachers to implement blended learning in schools. Mathipa and Mukhari (2014) also showed that factors such as insufficient number of computers, inadequate teacher training, lack of skills and

support, lack of teachers confidence and poor management constituted difficulties that impeded ICT implementation in schools. Similarly, a study by Herselman (2003) found that lack of experienced and skilled teachers, lack of computer hardware and software and lack of technical training appeared to be difficulties that made difficult for the rural areas in South Africa to use ICTs.

Teachers disclosed their difficulties on implementing blended learning as follows:

ST1 disclosed:

“Yes, we experience some difficulties in using these technologies. Most of us as well as the learners are unable to use the technologies. We lack knowledge and skills to use technologies and I think we need to be trained. I think the department must take responsibilities in this regard”.

Similarly, ST2 highlighted:

“I have insufficient technology capabilities, so I encounter challenges to teach learners with computers. The Department together with the management of the school must train us to use computers”

PT1 complained:

“I think we have several difficulties to use blended learning in our school. Sometimes we have electricity challenges, like last week I failed to teach because there was no electricity in that building block and I had to relocate the learners, and this took much of my time and that of the learners”.

PT2 concurred with the other teachers and stated,

“Yah! Our challenge is that we were not trained in these things. If we can be given training, I think we can be able to cascade the technology knowledge to our learners. Other difficulties which we experience include access to the technology devices; insufficient resources; internet connectivity and security. You see, the few laptops that are available are strictly located in the principal’s office and used for administration and management activities only”

6.4.5 Finding 5: Challenges that impede teachers to engage in blended learning

The study further aimed to establish the challenges that might be impeding teachers to implement blended learning in the case schools. Finding 5 emerged from the question, “What are your views on the challenges that impede teachers from engaging in blended learning? It was exposed that there were several challenges that impede teachers to implement blended learning in the case schools. Teachers highlighted lack of training, inadequate technology infrastructure, lack of access to computers and internet connectivity among the challenges which impede them to engage in blended learning.

The finding of this study is in line with Maphoto and Monyela (2019) that lack of access to computers and internet connectivity was a challenge to both teachers and learners at Gerson Ntjie Secondary School, Limpopo Province, South Africa. Department of Basic Education (2004) that although teachers realised the incorporation of technologies, they were unable to do that due to lack of training of teachers in technologies, inadequate infrastructure and integration with the curriculum. In his study on technology diffusion in a rural university in

South Africa, Rahim (2018) revealed that access to technologies proved to be a major concern. He also uncovered that low of interest of staff members in the use of technology for teaching and learning purposes was another challenge.

ST1 highlighted the challenges he was experiencing and explained:

“I think some of the challenges that we experience include lack of resources and teachers skills. These hinder us to use the technologies in their teaching and learning activities regardless of the fact that we force to use the few devices that we have. I also think that theft of the computers adds to the challenges that we encounter”

ST2 proclaimed:

“Sir, teachers are unfamiliar with the technologies and I think this makes them resistant to embrace it. We were not trained how to use technology in teaching during our training. I think for us to be able to use them; we must first be trained”

PT2 complained:

“You see, we are impeded by so many challenges to implement blended learning, Sir. We do not have technological skills. I think if we can be developed in the technologies then we can be able to implement. It is unfortunate that we do not have some technology developmental structures in our school. The other challenge is technological resources. We don’t have resources in our school, I and this constitute one of the challenges which impedes us”

6.4.6 Finding 6: Recommendations for the introduction and implementation of blended learning

The study wanted to find out the expectations of teachers on the introduction and implementation of blended learning in schools. The finding originated from the question, “What are your recommendations for the introduction and improvement of blended learning in teaching and learning?” The study revealed that teachers were eager and ready to implement blended learning but wished it

could be implemented in a conducive and well-prepared technological environment.

The finding confirms Salehi and Salehi (2012) finding that revealed that teachers had strong desire to use ICTs in the classroom but prevented by barriers such as insufficient technical support, little access to internet and ICTs. The study by Chasingo, *et al.* (2020) exposed that teachers had a positive attitude towards the adoption of technologies and ready to integrate ICTs in their teaching, but they lacked the requisite ICT skills. A study undertaken in Pakistan also showed that teachers had a positive perception for technology in teaching processes, however, suitable ICTs should be available.

Teachers presented their views as outlined:

ST1 submitted:

“I think the government must support the teachers, give them laptops and all the technology material needed. I also recommend that DBE provide schools with data and security for a successful implementation”

In addition, ST2 highlighted:

“Yah, I recommend that our school be internet connected and that enough ICT resources be made available to ensure successful implementation. I think ICT Centre also need to be built in the school”

PT2 concurred:

“My recommendation is that the DBE train teachers in technologies and SGB (School Governing Body) provides a budget for the development of teachers in blended learning programmes. I also recommend that the SMT organise school-based developmental programmes for teachers so that we remain skilled in technologies. Furthermore, community involvement in the safeguarding of the school should be intensified”

6.4.7 Finding 7: Positive teachers' influence by blended learning on teachers' practices

The success of implementation of blended learning is informed by an appropriate usage of technological resources. In this sub-theme, the investigation sought to find out the influence of blended learning on the teachers' practices. The sub-theme emanated from the question "How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning? The study revealed that blended learning influenced the teachers positively. However, they wanted to be trained and developed to acquire the necessary technological skills.

The finding of this study is in line with Montrieux, *et al.* (2013); Khaja, Suryandi & Wardhono (2019); Ford and Botha (2010) studies. Montrieux, *et al.* (2013), in their study on mobile learning in secondary schools exposed that teachers' attitudes on the rollout of mobile learning were generally positive, intrinsically motivated and welcoming the mobile learning as a useful technological aid. Similarly, the finding of this study agrees with Khaja, *et al.* (2019) that indicated a positive influence of blended professional training on teachers' creativity and their effectiveness. Their study showed that through blending in-service training teachers became effective, creative, knowledgeable, and independent. In their study, Ford and Botha (2010) also showed that teachers in rural areas were willing to use technology to support teaching and learning but lack pedagogical and technological knowledge towards integrating it into teaching activities.

Teachers highlighted the following pertaining the influence of the introduction and implementation of blended learning on their engagement to their teaching:

ST1 stated:

"I am positive to the implementation of blended learning because it saves my preparation and teaching time and it also makes learners to understand better. I am able to obtain additional information, and this makes me successful in my teaching"

Whereas ST2 contested:

"I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking about e-learning but does not train teachers. How do they think technology education can be successful without teachers?"

PT1 concurred:

"Ok, I can say it has helped me a lot. I use my laptop and a projector in class and teach learners by demonstrating and the learners are enabled to relate theory and practical reality. In so doing my learners understand better"

6.4.8 Finding 8: Enabling structures for implementation of blended learning

The successful implementation of blended learning requires enabling structures in schools. This sub-theme wanted to establish whether the case schools had enabling structures for the implementation of blended learning. The sub-theme emerged from the question "Do you think your school has enabling structures for the implementation of blended learning?" The study uncovered that the case schools lacked sufficient enabling structures for the implementation of blended learning.

The result of this study is in line with Johnson, Jacovina, *et al.* (2016) that indicated that schools did not possess adequate computers and fast internet connection which made the implementation of educational technology infeasible. The study by Albugami (2016) showed that although teachers perceived ICTs as important tool for improving performance, collaboration and learning outcomes, lack of enabling structures such as space, resources, maintenance, ICT skills and policies make it difficult for ICT implementation.

Teachers′ presented their perceptions as illustrated below:

ST1 emphasised:

“No, No, No the school does not have enabling structures. There are no resources; no internet connectivity; no accommodation and we are also not developed enough to implement technology learning in our school”

Whereas PT1 explained:

“Yes, we have enough classrooms but unfortunately the school has no ICTs for teaching and learning purposes. My take is if the government can provide us with computers and develop all the teachers, then we shall be able to practice blended learning in our schools”

PT2 expressed his dissatisfactions about lack of enabling structures and confirmed:

“You know, we have no requisites for the teaching of blended learning. As you see these old dysfunctional computers, they are not working. Nobody uses them because we are not all being trained. I think the school is not yet ready. The department and the SMT must train us and avail the necessary technology facilities so that we can implement blended learning in our schools”

6.4.9 Finding 9: Usage of technology appliances in schools

Availability of resources is key for blended learning. However, these resources need to be efficiently and effectively used. This sub-theme aimed to detect the teachers′ use of technology appliances in curriculum implementation. It emanated from the question “How to you find the usage of technology appliances in curriculum implementation?”

The study uncovered that technological appliance were inadequately used. Some of the reasons presented by the teachers included lack of technological skills, lack of resources, lack of confidence and lack of training and support.

The finding conforms with Makgato (2014) that indicated poor usage of computers by teachers and learners which contributed to poo integration of educational technologies in some schools in South Africa.

Alfonsi, *et al.* (2009) study also showed that teachers lack confidence in the use of computers and they also had insufficient and lack of access to internet and as a result, experience inadequate usage of technological appliances. Getenet (2013) identified factors that impede teachers to use technology appliances to

be lack of knowledge about computers, difficulties using computers as well as lack of technical and instructional support.

Presentation of the teachers' narratives follows:
ST1 lamented: "You see, I have some certificates in computers, but I really find it hard to use computers in the teaching and learning situations. I think I need more intensive development in technologies"
ST2 explained her position and expressed:
"We only use the technology appliances when administering teaching and learning activities like tests, assessment documents. Because we do not have the ability to use the computers for teaching, we are not able to use them for teaching and learning practices. We need training for the usage of technologies in the classroom"

PT1 shared:
"… Technology appliances are more relevant to be used for today's type of education, it is a pity that we do not have these appliances in our school because of lack of knowledge and skills in technologies. I for one, because I am offering Technology as a subject, I often use my computer to teach some of the content. Learners really enjoy this"

PT2 confessed his struggle in the use of technologies and emphasised:
"You see, we are all struggling with the use of technology devices in our school. I think before we can even talk about implementation we need to be thoroughly trained. Our schools are not provided with computers for teachers and learners for teaching and learning and I think this must also be sorted out by the department and the SMT. If the ground is adequately levelled, we are ready to implement blended learning".

6.4.10 Finding 10: Current implementation of blended learning in schools

Recent developments in technology encourage teachers to apply blended learning in their classroom (Güzer and Caner, 2013). This present sub-theme

aimed to find out whether teachers were currently implementing blended learning in their teaching practices. The sub-theme originated from the question "Is your school currently implementing blended learning?" The study revealed that almost all schools were not implementing blended learning. Teachers highlighted lack of skills, lack of resources and internet connectivity as the reasons why schools were not implementing blended learning.

The finding is in line with confirms the results of the studies undertaken by Tshabalala *et al.* (2014); Mathipa and Mukhari (2014); Ndlovu (2018). In their study, Tshabalala, et al. (2014) showed that successful implementation of blended in schools was prevented by lack of management support; computer skills and inadequate access of computers.

Whereas Mathipa and Mukhari (2014) revealed factors impeding the integration of ICTs as insufficient number of computers, lack of application programs, teacher generation gap, inadequate teacher training, lack of ICT skills, lack of teacher confidence, poor school leadership and lack of public support. In a study by Ndlovu (2018) it was also showed that limited availability of technologies hinders implementation of blended learning.

The assertions of the teachers unfolded as illustrated.

ST1 stated:

"Currently, we are not implementing blended learning in our school. This is due to the fact that we do not have the necessary expertise. One other thing is there are no technological resources like computers and internet for teachers and learners"

ST2 confirmed:

"No, Sir. We are not using blended learning currently. There are no computers and internet in our school. We also do not have enough knowledge on how to use them. I think we need training in this area"

PT2 emphasised:

“No, our school is currently not using blended learning. This is because we do not have resources and our teachers are also not been trained. I think it must start by training teachers and purchasing of sufficient resources”.

6.4.11 Finding 11: Blending technological approaches and traditional approaches

Blended learning encompasses the blending of technological and traditional teaching approaches. The study wanted to find out the views of the teachers on the combination of the two approaches in the teaching and learning environment. Sub-theme 11 emerged from the question “What are your views on the blending of technological approaches and traditional ways of teaching?” The study uncovered that teachers admire the blending of technological teaching approaches and traditional teaching approaches.

The finding of this study conforms with de Jager (2015) that found that learners and teachers liked the combination of technological and traditional approaches due to fact that through the combination learners achieve more. In a study by Alaneme *et al.* (2010) it was indicated that students preferred a combination of both traditional and e-learning methods of teaching for the effective learning. In the same vein, Akkoyunlu and Soylu (2004) also revealed that students like blended learning environment.

The illustration of the teachers′ highlights are presented underneath.

ST1 alluded:

“I think the combination can make a big difference. It can make teaching and learning active and thus, ultimately increasing the learners’ performances. However, in our case the schoolteachers are not trained in ICTs and therefore are not blending technology approaches to their teaching and learning activities”

PT1 proclaimed:

“I think it will be important to combine the two approaches. By using technology approaches and traditional approaches simultaneously will help because the two will boost and strengthen each other and therefore enhancing learners’ performances. You see, learners like viewing things on the screen and I think the blending will make them participative and interactive in the teaching and learning activities”

Similarly, PT2 stated:

“Ok, I think the combination of old teaching approach and new technological approaches is good because they can strengthen each other and as a result making teaching and learning successful. We are not blending the two approaches here because we are not skilled in technologies”

6.4.12 Finding 12: Teacher skills in blended learning implementation

Theme 3 composed of two sub-themes namely: Teacher technology skills and Teacher support on blended learning implementation in schools. This theme emanated from the question “To what extent do teachers have the necessary skills for the implementation of blended learning? Detailed presentation of the theme′s findings follows next.

6.4.13 Finding 13: Teacher technology skills

The success of blended learning is informed by how skilled teachers are in technologies. It is for this reason that the researcher deemed it fit to investigate how skilled were the teachers in technologies. This sub-theme emerged from the question “What skills do you think teachers need to implement blended learning? The study found that teachers lack some technological skills for blended learning implementation.

The finding is in line with the study by Moila (2008) which revealed that rural areas teachers fail to implement technologies because of lack of relevant educational technology tools and inadequate educators′ training on the use of educational technologies in teaching and learning. Makgato (2014) also

uncovered poor usage of computers by teachers and learners because of lack of skills.

A study undertaken by Buabeng-Andon (2012) in Ghana revealed that barriers for ICT implementation include lack of teacher ICT skills, lack of teacher confidence, lack of pedagogical teacher training and lack of resources and access to ICTs.

Teachers outlined their technological skills as illustrated below:

ST1 said:

“You see! Sir, we need serious development in ICT skills, I think our principal must invite technology experts to come and develop us. You know, I have a computer certificate, but I cannot teach by using them. Yah, we are really having big problems”

Whereas ST2 explained:

“Yes, I think we need a practical usage of word; excel and power point to be able to implement blended learning. Uhm, I think we need these skills because implementation of technologies requires basic computer literacy. I think we also need to have skills on how to use internet to get the necessary information”

PT1 indicated:

“Yah, Ne! Technology skills…I think we lack computer application skills, usage of software and hardware. We also need to be developed on the policies which relate to ICT such as e-Education Policy and Professional Teacher Training in Digital Integration in Schools”

PT2 shared the same sentiment and said:

“Sir, I think we need basics computer skills. I mean knowing the computer parts, how to operate it and the software. Unfortunately, there are no computers in our school which we might be using to acquire skills. I think we also need to be first developed so that we attain skills to implement blended learning

6.4.14 Finding 14: Teacher support on blended learning implementation

Apart from having the necessary technological skills and pedagogical skills, teachers need to be supported at all times. In this sub-theme the study sought to find out as whether teachers were supported in the implementation of technologies. The sub-theme originated from the question" What support do you think is needed for the teachers to implement blended learning?" The study disclosed that teachers received insufficient support for the implementation of blended learning. Teachers highlighted that they did not the necessary support from both their SMTs and DBE. Their highlights are shown below.

The result is in line with Ndlovu and Gumbo (2018) that indicated inadequate training and insufficient support from the department as constitute teachers technology challenges in schools. Maphoto and Monyela (2019) study also found that lack of access to computers and internet connectivity were the indicators that teachers and learners are not supported in the implementation of technologies.

The finding of this research study and similar studies as quoted above is confirmed by DBE (2013) in its assessments responsibilities when it gave a report that lack of dedicated ICT implantation budget, lack of provincial ICT plans, lack of competent human resources for ICT implementation at the provincial, districts and schools as well as limited connectivity network coverage and its high cost provide serious challenges to the implementation of technologies in schools.

The teachers illustrated their lack of support as outlined.

ST1 stated:

"I think DBE need to develop teachers in technologies. It must establish training and workshops programmes for teachers and members of SMT. The SMT also encourage and motivate us and the learners to make use of computers for teaching and learning regularly"

ST2 submitted,

“I think to ensure a successful implementation of blended learning, the DBE should organise and monitor training programmes for teacher development in technologies. In that way, the teachers will be best positioned to integrate technologies in the teaching and learning”

ST1 complained:

“Sir, I sometimes lay a blame on our SMT members for not using technologies in our school. They do not train and develop us in these technologies. I think the SMT must encourage and motivate us to employ technologies in our teaching and learning practices. The DBE as well must support schools by providing all the technological facilities needed to the school”

Similarly, PT2 also confirmed lack of support and said:

“You see! Teachers do not have money. I think the department can support us by buying laptops and data for us. I also think that we need some encouragement and motivation to implement blended learning”

6.4 FINDINGS FROM DOCUMENT STUDY

Seedlings proliferate profoundly in a fertile soil. Same is applicable to learners in technologically vibrant schools. However, this depends on the ability of the top management who are able to responds to the technological opportunities or pressures to portray their competitiveness and viabilities (Wiersema and Bantel, 1993). This simply means that the success of schools recites on its top management team to plan, organise and manage all the requisites for using technologies in the teaching and learning environments.

With regard to this study, the researcher studied the documents and structures needed for a successful implementation of blended learning. These included the availability or unavailability of ICT Centre, teaching and learning computers and laptops, internet connectivity, access of internet by teachers and learners, pedagogical digital software, appropriate Edu-Tech policies, electrification of school buildings, reliability of electricity, technological support systems,

computer training of teachers, teacher development programmes and instructional strategies beyond normal school time. Next follows the findings of the document study. Content analysis was employed to study the documents, technology facilities and infrastructure pertaining blended learning implementation in the case schools. Table 6.4 displays results of the document study.

Table 6.4 Document study findings

ITEM	Available	Unavailable
ICT Centre	1 (25%)	3 (75%)
Teaching and learning computers and laptops and other technologies	1 (25%)	3 (75%)
School internet connectivity	0 (0%)	4 (100%)
Internet access by all teachers and learners	0 (0%)	4 (100%)
Pedagogical digital software	1 (25%)	3 (75%)
Appropriate Edu-Tech policies	0 (0%)	4 (100%)
Electrification of all school buildings	4 (100%)	0 (0%)
Reliable electricity	4 (100%)	0 (0%)
Technical support systems	0 (0%)	4 (100%)
Computer training for teachers	1 (25%)	3 (75%)
Developmental programmes	0 (0%)	4 (100%)

Table 6.4 illustrated the results of the documents and infrastructure that were studied. Details of the results are discussed in detail below.

6.4.1. ICT Centre

The study revealed that majority of the case schools had no ICT Centres (75%) and that only one school (25%) had a dysfunctional ICT Centre. This centre had no technological facilities except old computers which the principal confirmed they were used by an outside expert who volunteered to teach the learners computer literacy.

Figure 6.1: ICT Centre at one case school

Figure 6.1 displays a converted classroom in one case school. This has some old computers which the principal indicated were used by an outside computer expert who volunteered to assist learners in computer literacy. The researcher established that almost all those computers were not working. The fortunate part of the school was that the Circuit Manager and University of Limpopo joint hands to develop the centre for e-learning in this school. At the time of this study the progress of taking this initiative was at an advanced stage.

The finding of this study is in keeping with Lasame and Seti (2014) study in East Cape Province on technology access centres which revealed that even though in some areas a centre was available it was dysfunctional and did not serve the users. Another study by Majoni and Majoni (2015) done on the teachers' use of ICTs in primary schools agrees with the finding of this study when it found that lack of ICT infrastructure in schools impacted negatively on the teachers' use of technologies. Mojapelo (2015) in his dissertation on the provisioning of libraries in public schools also revealed the non-functional of existing libraries in those few public schools which they had.

6.4.2 Teaching and Learning computers and laptops

The study revealed that most (75%) the case schools did not have teaching and learning computers and laptops. Schools were only in possession of laptops for the management and administration purposes, and these were strictly kept in the principals' offices. Czerniewics, Murray and Probyn (2000) highlight that the availability of adequate learning materials (resources) is an extremely important condition for the achievement of good quality education. However, this was not the case in the case schools. This finding is in line with Mathevula and Uwizeyimana (2014) who found that the scarcity and lack of ICTs impact teaching and learning negatively. It was therefore not surprising that the teachers in the case schools were not implementing ICT learning like blended learning. A study by Mathipa and Mukhari (2014) in Gauteng Province, South

Africa also revealed insufficient number of computers which made it difficult for teachers to teach using technologies.

6.4.3 Internet connectivity

The study revealed that all the case schools (100%) did not have internet connectivity. Thus, this meant that the teachers and learners did not enjoy the opportunities and privileges provided by internet facilities. The principals indicated they relied on their cell phones and modems wherein they would purchase data and download documents for the teachers. Connectivity is utmost important in schools. Fisher, Bush and White (2017: 63) confirm that "even if schools were to possess computers for every child, poor connectivity could stifle putting those devices to work".

The finding of this study is in line with Fisher, Bush and White (2017) when they revealed that connectivity in South Africa ranked among the greatest challenges for the implementation of technologies in schools. In his study in Greater Tubatse Municipality, Pholotho (2017) revealed lack of electronic access as a constraining factor in public schools. The finding of this study is also in agreement with Aguinaldo (2013) investigation on implementation of blended learning in an impoverished Academic Institution revealed unavailability of internet connectivity as a crucial obstacle which impact implementation of blended learning negatively. It is for this reason that in this study the participants were rightfully claiming that lack of internet connectivity failed them to use technologies.

6.4.4 Pedagogical digital software

The study revealed that majority of the case schools (75%) did not have pedagogical digital software for teaching and learning. Once more, the teachers and learners were denied opportunities for quality education offered by technological learning such as blended learning. This also suggested that the teachers in these schools were still rooted in the old traditional ways of teaching. The finding is in line with Pholotho (2017) in his study in Greater

Tubatse Municipality public schools that revealed lack of internet connectivity as one of the factors that obstruct use of technologies. Another study by Mathipa and Mukhari (2014) also revealed that insufficient of pedagogical software as making it difficult for provision of technology learning. Tshabalala, Ndeya-Ndereya and Van der Merwe (2014) also revealed that lack of technological resources in schools places a serious threat for the implementation of technologies.

6.4.5 Ed-Tech policies

Almost all the case schools did not possess school-based technological policies. Most principals failed to produce the standardised national e-policies such as E-Education Policy 2004, Guidelines for teacher training and professional development in ICT and Professional Development Framework for Digital Learning which broadly deliberate on implementation and training of teachers in technologies nationally. This simply implied that the case schools did not have any vision of where they wished their schools to be with regards to technology (Lawson and Comber, 1999). Mojapelo (2014) revealed that lack of school policies is tantamount to a lack of strategic direction and therefore compromise the quality of teaching and learning of the school. This might also have suggested that there were no school-based ongoing professional development for teachers with regard to technologies (Schiller, 2002).

The finding is also in line with Tonduer, Van Keer, Van Braak and Vakke (2008) that revealed school policies on ICT are often underdeveloped and underutilised. Vandeyar (2015) agrees with the finding of this study when he revealed that districts and provincial e-learning leaders superficially understood the e-Education policy and thus missing its intent and, hence living schools in the dark.

6.4.6 School Electrification and reliability

The study revealed that all the case schools (100%) had available and reliable electricity. However, one case school submitted that they experience problems

sometimes. Furthermore, the study revealed that the schools experience high cost of electricity which failed them to satisfy other needs. This study is in line with Samuels and Booysen (2019) findings that revealed that South African schools find electricity costly and this impact their management and administration negatively.

6.4.7 Technical support

With regard of technical support, the study revealed that all the case (100%) did not receive any form of technical support. This situation was expected as the case schools did not have computers, computers and were not implementing ICT learning at all. The finding of this study is in line with Salehi and Salehi (2012) in the study about ICT challenges that revealed insufficient technical support as one of the challenges for ICT usage by teachers. Pholotho (2017) also revealed teachers lack support in using technologies. Herselman (2003) in his study also revealed that lack of technical support impedes implementation of ICTs in schools.

6.4.8 Computer training for teachers

It is important that teachers are given more regular training and support to accomplish their work in ICTs (Mouzakis, 2008:477). However, with regard to this study it was revealed that training of the teachers in computers was never done in majority of the case schools (75%). This finding is in line with Mathipa and Mukhari (2014); Herselman (2003); and Tshabalala, *et al.* (2014) which revealed lack of teacher training in institutions and thus affecting implementation of ICTs negatively.

6.4.9 Teacher ICT development programmes

It was not surprising that the study revealed that there were no teacher development programmes since all the case schools were not implementing blended learning, not undertaking any computer teacher training nor in possession of computers for teaching and learning activities. Consequently, 100% of the case schools did not have any teacher development programmes

for ICTs. Lack of teacher development could be attributed to incompetence of the province, the districts and the schools. This was confirmed by Department of Basic Education (2013) when it revealed that the provinces and districts lack ICT implementation plans, unable to align provincial ICT plans with the targets to the Action Plan to 2014 as well as a lack of competent human resources dedicated to ICT implementation.

6.5 CHAPTER SUMMARY

Chapter 6 presented the results from interviews and document study that were performed in order to respond to the specific research questions identified in the initial stages of this study. The narratives of the principals, HoDs and teachers were presented and discussed in detail, culminating in useful and integrated inferences that responded to the research questions. In addition, presentation and discussion of data derived from document study was undertaken in order to confirm and validate the findings. The next chapter provides a refined convergence of the QUAN and QUAL results such that useful conclusions are drawn on the entire study.

CHAPTER 7: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Chapter 5 and 6 presented QUAN and QUAL results separately. A combined summary results is provided in this chapter. The merged results of QUAN and QUAL constitute the final submissions derived from the study. Furthermore, the chapter presents the recommendations and conclusion. Based on the summary of results and recommendations, a proposed blended learning model implementation is designed and submitted as the ultimate contribution of this study to new epistemic horizons.

The aim of this study was to investigate the implementation of blended learning in Sekhukhune District schools, in Limpopo Province. The study sought to answer research questions stated next:

- How do teachers perceive the usefulness of blended learning approach in teaching and learning?
- How do teachers connect information using technology resources in blended learning? and
- To what extent do teachers have the necessary skills for successful implementation of blended learning?
- What are teachers' recommendations for the introduction and implementation of blended learning in rural schools?
- What are the elements to be considered for the designing of blended learning model for schools?

The specific objectives of the study included:

- How do teachers perceive the usefulness of blended learning approach in teaching and learning?
- How do teachers connect instructional information using technology resources in blended learning? and

- To what extent do teachers have the necessary skills for successful implementation of blended learning?
- What are teachers' recommendations for the introduction and implementation of blended learning in rural schools?
- What are the elements to be considered for the designing of blended learning model for schools?

The results of the study were obtained by using convergent parallel design of mixed methods research. The convergent parallel design assisted the researcher to fully appreciate and understand the problem (Beck, LoGiudice and Gable, 2015). The different data results from QUAN and QUAL strands complemented each other and this ensured strong outcomes supported by the evidence established (Johnson and Onwuebuzie (2004). For the research objectives 1, 2 and 3 the researcher employed questionnaires to collect data and for research objective 4 interviews were conducted. The results of the quantitative strand (QUAN) and qualitative strand (QUAL) outlined in Chapter 5 and 6 are merged, discussed and summarised in this chapter. This chapter also proffers the proposed model of blended learning model implementation in schools as the ultimate epistemic contribution of this study.

7.2 MERGING QUAN AND QUAL RESULTS

According to Creswell and Plano Clark (2011), in a convergent parallel design after collecting data concurrently and separately analysing it, the results need to be merged for both confirmation and validation purposes. Data can either be merged by side-by-side comparison or by joint display. In this study a side-by-side comparison was employed, hence the distinctive presentations in Chapter 5 and 6.

The results of the questionnaire, interviews and document study were merged, and key findings were identified. The key findings included: perceptions of teachers on the usefulness of blended learning, supply and usage of technology resources, teachers′ digital skills, enabling structures for the implementation of

blended learning, e-tech policies, ICT training, teachers' technology knowledge, teachers' technological support and recommendations for the introduction of blended learning in schools. Table 7.1 illustrates the merged results from the QUAN and QUAL strands.

Table 7.1: Converged results

Finding	QUAN Strand	QUAL Strand	
	Questionnaire	Interviews	Document Study
Perceptions of teachers on the usefulness of blended learning	100% teachers agree with the implementation of blended learning	Teachers embrace introduction of blended learning in schools Teachers experience difficulties and challenges in technologies	-
Supply and usage of technology resources	97.7% do not use technologies in classroom	Insufficient technology resources Inadequate usage of tech appliances	No computers and laptops in schools for teaching and learning
Technological skills	96.61% agree that blended learning improves teaching skills	Basic tech skills but lack adequate tech pedagogical	Lack of ICT training for teachers
Enabling structures for blended learning in schools	97.74% indicated inadequate tech supply No pedagogical digital software	Inadequate enabling tech structures	inadequate connectivity Inadequate internet accesses Unavailable pedagogical digital software No ICT centre
E-tech policies	97.7% indicate no e-tech policies	Principals do not implement policies	No tech policies
ICT training	96.6% indicated lack of ICT training	Teachers need development programmes	No ICT teacher training
Teacher technology knowledge	91% indicated lack of	Insufficient tech knowledge to	No pedagogical digital software

	tech knowledge	administer and manage blended learning Teachers have basic tech knowledge	
Teachers' support	98.3% agree that tech support is required	Inadequate tech support provided in the use of tech	No teacher development programmes No technical support
Recommendations for blended learning introduction and implementation	100% recommend introduction of BL in school	Participants recommend technological training and resources	

Table 7.1 displays the merged results obtained from the analysis of the questionnaires, interviews and document analysis. Eight key findings emerged from the merged results. These are perceptions of teachers on the usefulness of blended learning, supply and usage of technology resources, teachers' technological skills, enabling structures for the implementation of blended learning, e-tech policies, ICT training, teachers' technology knowledge, teachers' technological support and recommendations for blended learning introduction and implementation. The next section discusses these key results.

7.3 DISCUSSION OF KEY RESULTS

Eight key findings were identified as critical for the successful implementation of blended learning from the converged QUAN and QUAL results. These included: embracing of blended learning, lack of supply and usage of technology resources, insufficient teachers' technological skills, lack of enabling structures for the implementation of blended learning, non-existent of e-tech policies, lack of ICT training, insufficient teachers' technology knowledge, insufficient teachers' technological support and recommendations for the introduction of blended learning in schools. A detailed presentation of the key findings follows next.

7.3.1 Embracing of blended learning

The initial results emanated from the theme perceptions of teachers on the usefulness of blended learning. This theme emerged from the question "How do

teachers perceive the usefulness of blended learning approach in teaching and learning?" The study established that teachers embrace the introduction and implementation of blended learning in schools. However, they indicated that they experience challenges such as lack of resources, lack of skills and support by the DBE and schools.

This finding is consistent to Chasingo, Marongwe, Mtsi and Matjedi (2020) study which verified that teachers had a positive attitude towards the adoption of technologies and were ready to integrate ICTs in the teaching and learning situation. The study by Rasmitadila, Widyasari, Humaira, Tambunan, Rachmnadtullar and Samsudan (2020) also uncovered that 66.94% of teachers indicated positive blended learning approaches for extending and enriching the learning experiences and knowledge of the learners. This finding is affirmed by Chasingo, Marongwe, Mtsi and Matjedi (2020) study that confirmed that teachers had a positive attitude towards the adoption of technologies and were ready to integrate ICTs in the teaching and learning situation.

Regardless of their willingness to adopt blended learning, the teachers highlighted several hindrances which impede the efficient use of blended learning. These obstacles included a lack of technologies in schools, teachers' insufficient technology knowledge and skills, a lack of suitable infrastructure and connectivity; (Lekgothoane and Thaba-Nkadimene. 2019, Thaba-Nkadimene & Mogatli, 2020) all exacerbated by a lack of support from schools, districts, PED and DBE.

The QUAN strand disclosed that 100% of the teachers agree with the implementation of blended learning. This therefore suggests that if the challenges experienced by the teachers are addressed, then the implementation of blended learning could be successful in schools, especially in Sekhukhune District rural schools of Limpopo Province.

7.3.2 Lack of supply and usage of technology resources

The second finding of the study emerged from the question “How do teachers connect information resources in blended learning teaching and learning?” The supply and usage of technological resources emerged as a serious challenge towards the implementation of blended learning in schools since the study established that there was inadequate supply and usage of technology resources in the case schools.

Similar findings were observed by Thaba-Nkadimene and Mmakola (2019) in their study in Limpopo University which confirmed a lack of school resources and infrastructure as impediments to the performance of teachers. Rasheed, Kamsin and Abdullah (2020) also identified lack of teachers′ use of technologies as a serious concern in teaching and learning.

The study by Botha and Herselman (2015) found that teachers did not use technology appliances due to inadequate ICTs and lack of pedagogical competencies. Lack of access to computers and internet connectivity in schools was confirmed by Maphoto and Monyela (2019) in their study done in Grade10 and 11 learners at Gerson Ntjie secondary school in Limpopo Province. Johnson, Jacovina and Soto (2016) warns that if a “school does not possess adequate computers and fast internet connection” the likelihood of any successful implementation of educational technology is minimal.

Despite the fact that 100% participants in the QUAN strand agreed with the introduction and implementation of blended learning in schools, there is shattering evidence that 97.74% do not use technologies in the classroom for teaching and learning purposes. However, participants submitted that the technology resources that are available in schools are used for administration purposes. Lack of adequate technological resources and inadequate usage thereof, is also verified by the QUAL strand and the document study. The document study pointed to a lack of computers and laptops for teaching and learning in schools. This finding complements the QUAN finding that teachers

do not use technologies in the classroom. Despite lack of pedagogical and technological knowledge, the teachers in Sekhukhune District schools are willing to use technologies to support their teaching and learning activities (Bytheway, Cox, Dumas and Van Zyl (2012).

7.3.3 Insufficient teachers' technological skills

The third finding established in the study is the insufficient teachers′ technological skills. This finding emanates from the question “To what extent do teachers have the necessary skills for successful implementation of blended learning?”

It is worth noting that teachers serve as a deciding human factor for the success of blended learning implementation in schools. It is, therefore, undisputed that they should possess adequate technological skills. However, in this study insufficient teachers′ technological skills were observed. The finding confirms what was established in the study by Nkadimeng and Thaba-Nkadimene (2019:59) in Sekhukhune Limpopo schools where a lack of teachers′ competence on technology related teaching and learning strategies were observed. This study also resonates with studies undertaken by Tshabalala, Ndeya-Ndereya and Van der Merwe, (2014); Mathipa and Mukhari, (2014); Majori and Majori, (2015) which observed lack of technological skills as one of the factors that hinders teachers from implementing technologies in their teaching practices.

The QUAL strand results found that teachers have basic technological skills but lack the critical pedagogical skills. Regardless of lack of training as reflected in the document study, the QUAN strand established that 96.61% agree that blended learning improves teaching skills. These results show a positive willingness on the part of the teachers to implement blended learning in their teaching practices regardless of the challenges encountered.

7.3.4 Lack of enabling technological structures for blended learning

The next key finding of this study was a dire lack of enabling structures for blended learning implementation. This finding was in response of “How do teachers connect information using technology resources in blended learning?” The study participants registered lack of enabling structures such as appropriate technological classrooms ICT centres, unreliable electricity, lack of connectivity and digital software all of which seriously militate against successful blending of technologies in the classroom.

The finding of QUAN strand results indicates that 97.74% of the participants confirmed inadequate technological structures such as computers, laptops and pedagogical digital software which if availed would mitigate the dire problems identified. The results of the QUAL strand also confirmed inadequate enabling technological structures in the schools. This is further confirmed by the document study that verified inadequate connectivity, inadequate internet accesses for teachers and learners, unavailable pedagogical digital software and absence of ICT centres.

The finding of this study confirms the results of studies by Tshabalala *et al.* (2014), Mathipa and Mukhari, (2014); Pholotho, (2017); Kisanga and Ireson, (2015); Aguinaldo, (2013) which, from disparate investigative angles established inadequate access to computers, insufficient number of computers, lack of access to electronic educational, lack of or poor infrastructure, financial constraints for maintenance of technologies and unavailability of internet connection and inadequacy of technological resources. As these are the critical requisite of a successful implementation of blended learning, those in authority should ensure that these deficiencies are effectively and efficiently addressed.

7.3.5 Non-existence e-tech policies

The other key finding of the study is the non-existence of e-tech policies in the schools in Limpopo. The finding emerged from answering the question: “To what extent do teacher have the necessary skills for blended learning?” The

merged results from the QUAN and QUAL strands confirmed non-existence of e-tech policies in the case schools. The QUAN strand results indicated that 97.7% of the participants confirmed that there are no e-policies in their schools while the document study showed that all the schools in the QUAL did not have e-tech policies.

The finding is also confirmed when all the interviewed principals responded that their schools did not have e-tech policies. The finding of this study is consistent to Kihoza, Zlotnikova, Bada and Kalegele (2016) who identified a lack of a clear policy framework to support blended learning implementation in schools.

The finding of this study also concurs with the results of Vandeyar (2015) that verified that the district and provincial education departments e-learning leaders superficially understood the e-Education policy and their role as policy intermediaries. Vandeyar (2015) further established that leaders perceive their role in e-learning as policy conduits focusing on dissemination of the policy to schools and districts rather than generating and recommending astute policy frameworks. In their study, Tondeur, Van Keer, Van Braak and Vakke (2008) also verified that school policies are often underdeveloped and at most underutilised. The finding of this study is further confirmed by Kihoza, Zlotnikova, Bada and Kalegele (2016) in which they revealed lack of policy framework to support blended learning implementation.

7.3.6 Lack of ICT training

The next key finding of the study is lack of ICT training for teachers. The majority of participants (96.6%) indicated lack of ICT training as the main obstacle in using technologies in schools. The finding responded to the research question: “To what extent do teacher have the necessary skills for blended learning?” The QUAL strand results agreed with the QUAN strand results by establishing that teachers need technological development programmes for them to use technologies in their teaching and learning practices. The document study also established that the case schools did not

undertake ICT training for teachers, a serious indictment on SMTs and the entire education department.

In a study by Moila (2008) inadequate educators' training on the use of educational technologies in the teaching and learning of mathematics was confirmed. Mathipa and Mukhari (2014) also found that training of teachers in technologies was inadequate. The finding of this study further agrees with Ndlovu and Gumbo (2018) wherein teachers were not provided with adequate training in technologies and consequently they lacked technology education qualifications. In a study by Boitshwarelo (2009) it was also confirmed that there was a deficiency of training providers in blended learning implementation programmes.

The finding of this study confirms what was established in Tapala (2019) on the observed a lack of training and development of teachers, incoherently organised training sessions which were often badly managed and abruptly undertaken. It is therefore advised that teachers be coherently and appropriately trained in educational technologies to equip them with required digital skills to ensure their effective and efficient use of technologies in teaching and learning.

7.3.7 Insufficient technology knowledge amongst teachers

Another key finding of this study is insufficient technology knowledge amongst teachers for the implementation of technologies in their practices. The finding was arrived at from responding the question: "To what extent do teacher have the necessary skills for blended learning?"

The merged QUAN and QUAL results concurred that teachers have insufficient technological knowledge. According to the QUAN strand, 91% indicated lack of tech knowledge. The QUAN finding is consolidated by the QUAL strand results that established that teachers have insufficient tech knowledge to administer and manage blended learning.

The finding of this study concurs with Majori and Majori (2015) which found that teachers in primary schools lacked relevant knowledge on how to use ICTs in the teaching and learning spaces. The finding also agrees with Tshabalala *et al.* (2014) that detected that head of departments (HODs) displayed little or no understanding of the blended learning. Tshabalala *et al.* (2014) finding is confirmed by Aydin (2013) who found that teachers had little knowledge about technologies in Turkey schools.

7.3.8 Insufficient teachers' support

The last key finding from the merged results is insufficient support offered to teachers in the implementation of technologies. The finding responds to the question: “To what extent do teacher have the necessary skills for blended learning?” The results obtained from the QUAL strand confirm what is established in the document analysis where there is vast literature that confirmed the insufficient tech support provisioning to the teachers in the use of technologies.

This finding agrees with Mashau, Steyn, Van der Walt and Wolhuter (2008) study which revealed non-existence or unavailable support services to most schools in Limpopo Province, South Africa. Mashau, Steyn, Van der Walt and Wolhuter (2008) study verified the non-existence or unavailable support services to most schools in Limpopo Province, South Africa. Lack of teacher support was also registered by Mathipa and Mukhari (2014) in their study about the use of ICTs in teaching and learning in South African urban schools. A study undertaken by Ayeni and Ogunbameru (2013) in Nigeria confirms this study's finding that revealed lack of technical support to teachers in the teaching and learning spaces.

7.3.8 Recommendations for blended learning introduction and implementation

One of the research questions the study sought to answer was: What are your recommendations for the introduction and implementation of blended learning in rural schools? The study revealed that participants recommend the introduction

and implementation of blended learning in schools. However, they are worried about their competencies in the use of technologies therefore recommended training and development in technologies.

The finding of this study resonates with Herselman (2003) study which recommended that teachers be trained and workshopped in technologies to use and implement them in their teaching and learning environments. Mathevula (2015) in his research on ICT effects on teaching and management of curriculum study also recommended teachers be trained and developed in technologies. Mathevula (2015) recommended that DBE and School Governing Bodies make funds available for technological resources.

7.4 RECOMENTATIONS OF THE STUDY

Based on the research findings from the questionnaire; interviews and document study, the following recommendations are presented:

7.4.1 Recommendation 1

The first key finding of the study is that teachers embrace readily the introduction and implementation of blended learning in schools. To consolidate and acknowledge this initiative, this study recommends that DBE and PED provide incentives which would keep teachers positive and persuade them to use technologies in their teaching practices.

7.4.2 Recommendation 2

The next key finding is lack of supply and usage of technology resources. To resolve this impediment, it is recommended that DBE provides enough funding for the establishment, procurement and maintenance of all the requisites of technological resources to all the schools in Limpopo and across South Africa in general.

7.4.3 Recommendation 3

The other key finding relates to inadequate teachers′ digital skills. The successful implementation of a programme is informed by the skills of the implementers. However, in this study it was established that teachers have inadequate digital skills. To address this inadequacy, this study recommends that all the officials and teachers in the education system be digitally skilled and re-skilled. This therefore suggests that some digital training programmes should be developed.

7.4.4 Recommendation 4

The fourth key finding pointed to the inadequate enabling technological structures in the schools. These include unavailability of suitable infrastructure for technologies, ICT centres, connectivity and unsuitable human resources. The study recommends that the DBE and PED avail adequate funds for the building of technological structure relevant for the implementation of blended learning.

7.4.5 Recommendation 5

The firth key finding relates to non-existent of e-tech policies in the schools. Lack of e-tech policies in schools suggests that there are no technological advocacies in the schools. It is therefore recommended that each level of the education system, (that is DBE, PED, District, Circuit and school) develops and applies the e-tech policies. It is believed that the implementation and monitoring of tech-policies in schools can conscientize stakeholders to apply technologies in their practices.

7.4.6 Recommendation 6

The next key finding is inadequate ICT training of teachers. This finding is affirmed by Tapala (2019) who found that existing training to training programmes were incoherently organised, badly managed and were of minimal benefit. He further observed that trainings were done over short period of time like once-off induction and after hours while teachers are tired. This study

therefore recommends that intensive and coherent ICT training be conducted by the departmental officials and by the schools themselves.

7.4.7 Recommendation 7

Another key finding which the study confirmed is insufficient teachers′ technology knowledge. Teachers′ technology knowledge is key to the provisioning of quality technology education by teachers. It is recommended in this study that DBE, PED, District and schools develop some technological programmes for in-service teacher training. It is advised that teachers develop themselves in technologies regardless of the department initiatives.

7.4.8 Recommendation 8

The other key finding is insufficient teachers′ technological support in the implementation of blended learning. The fact that the study uncovered that teachers embrace introduction and implementation of blended learning suggests that if they be supported implementation can be successful. However, this study revealed shortcomings in this regard. It is therefore recommended that adequate technological support be provided by the education providers at all levels of education with more emphasis to the provincial and district for the support of schools and teachers.

7.4.9 Recommendation 9

The recommendations from the participants included that enough technology resources be made available, training and development of technology end-users. To realise the application of the recommendations, it is vital that a plan be designed. Subsequently, the recommendations together with the study findings enabled a design of blended learning model (BLM) which might be used in rural schools.

7.5 PROPOSED MODEL FOR BLENDED LEARNING IN SCHOOLS

The e-Education Policy of 2004, Action Plan of 2019, the ISPFTED, the Guidelines for teacher training and development in ICT, the Professional

development for digital learning framework as outlined in Chapter 2 clearly articulate and emphasise the implementation of technology education in all South African schools. The frameworks also emphasise the supply of enough technology facilities and infrastructure, training and development of teachers in digital technologies. However, to date (2021) minimal evidence can be witnessed as revealed by the findings of this study. This suggests that there are insufficient management, monitoring, evaluation and implementation of the technology frameworks in all the levels of the education system (DBE, PED, Districts, Circuits and schools). To contribute to the existing technology frameworks, this study proposes a Blended Learning Model which might be utilised by schools.

7.5.1 Proposed Blended Learning Model (BLM)

As alluded above, the study findings together with the recommendations informed the design of a proposed blended learning model to be implemented in rural schools. The study adopted a blended learning model by Tshuma (2012) as a guiding framework for the implementation of blended learning. Literature review and this study finding indicates insufficient technology resources, inadequate technological support, lack of policies and lack of developmental programmes which are the joint roles and responsibilities of DBE, PED, Districts, Circuits and schools. However, the well-spelt technological policies and digital developmental policies developed by the National Department suggests lack of management, implementation, monitoring and evaluation plans. Furthermore, Tshuma (2012) model clearly articulates the alignment of teaching and learning principles with strategies for better performance. The researcher submits that the inclusion of DBE, PED, Districts and Circuits roles and responsibilities on Tshuma's Blended Learning Model could be a useful blended learning for schools. Figure 7.1 presents a proposed blended learning model for the rural schools.

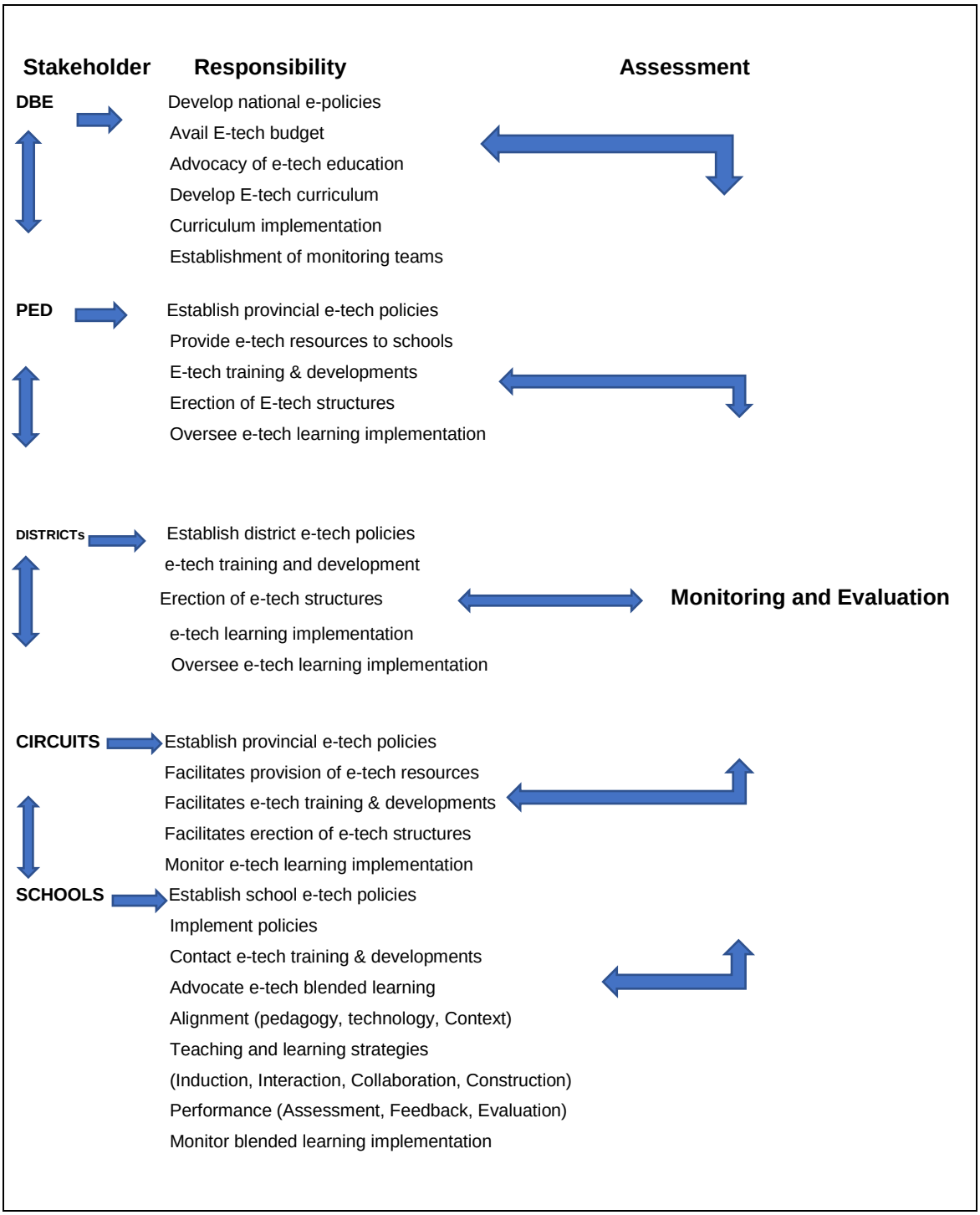

Figure 7.1: Proposed BLM (Designed by Mampuru Philemon Nkadimeng, 2020)

Figure 7.1 displays a proposed blended learning model implementation in schools. The model shows the stakeholders and their responsibilities. The pivotal point of the model is regular-regular-regular monitoring and evaluation of all activities by each stakeholder at their level to ensure efficient and effective blended learning implementation.

7.5.2 Structure of the BLM

The BLM focuses on the roles and responsibilities of the five key stakeholders of department of education namely: Department of Basic Education (DBE), Provincial Education Department (PED), District, Circuit and schools. Each component has specific roles and responsibilities to play as shown on Figure 7.1.

7.5.2.1 DBE

The principal responsibility of DBE is to provide sufficient funds for the successful implementation of technological programmes. Without the adequate provision of funding for infrastructure and human resources it would be difficult to get blended learning off the ground. Thaba-Nkadimene (2017-156) concurs that the success of a project depends on the funding, human and infrastructure resources. Indeed, funding is the lifeblood of any project (Bush and Glover, 2012). However, the study found that not much funding is provided to schools for sufficient technology resources. The study further discovered that the technology programs and policies designed for schools are not monitored and evaluated. Thus, unavailability of remedial actions and failing blended learning to be off the ground. DBE need to perform regular monitoring and evaluation in the PEDs, Districts, Circuits and schools to ensure implementation, identify some loopholes so that to do the necessary improvements in the implementation of blended learning. The proposed model submits the responsibilities as critical for DBE to consider and implement:

- Development of national e-policies,
- Availing of e-budget,
- Advocacy of e-tech education,

- Development of e-tech curriculum,
- Establishment of e-tech monitoring teams, and
- Monitoring of e-tech curriculum implementation.

It is advised that each of the roles be implemented and strictly monitored and evaluated regularly. The feedback will enable to do the necessary corrections for a successful implementation of blended learning by all the implementers.

7.5.2.2 PED

Provinces serve as a conduit through which the DBE's aims and objectives filter to the schools. It is therefore vital that provinces carry their responsibilities earnestly and effectively. Provinces need to apply and implement directives from the national fully. Based on data and information from the national, provinces need to formulate provincial policies and directives to manage implementation in the provinces. Monitoring, evaluation, and feedback need to be regularly undertaken to ensure the achievement of implementation. As much as is the role of DBE to monitor and evaluate PED in the implementation of blended learning, the PED should also undertake regular monitoring and evaluation of blended learning implementation to do the necessary corrections and improvements where needed.

The roles of the PED would include:

- Developing provincial e-tech policies based on the national policies,
- Providing e-tech resources to schools,
- Advocacy initiatives for e-tech education,
- E-tech training & developments of district officials,
- Erection of E-tech structures,
- E-tech learning implementation, and
- Monitoring and evaluation.

7.5.2.3 District

The District is essentially a mediator between the province and the circuit. If things fall apart in schools, the blame points to the paucity in the functionality of

the District. According to this Model, the District becomes a critical pivot point through which the implementation of blended learning is centred. The District's effectiveness in the implementation of directives from both the provincial and national department is critical the success of blended learning in schools. The functions of the District would be:

- Developing district e-tech policies based on provincial and national policies,
- Advocacy initiatives for e-tech education,
- E-tech training and development of Circuit officials and principals,
- Erection of e-tech structures,
- Administering and superintending e-tech learning implementation in the district; and
- Monitoring and evaluation.

It is emphasised that enough monitoring and evaluation of all the implementation activities be done. DBE and PED need to do frequent monitoring and evaluation of blended learning by the District. This will ensure proper implementation of blended learning across all the senior stakeholders. The District need to also do monitoring and evaluation to identify their successes and failures in the implementation processes.

7.5.2.4 Circuits

The main role of the circuit is to ensure that the coal in the fireplace is burning. This simply means that the circuits need to ensure that schools are supported at all times regarding the establishment of tech-policies, technology resources, training, development of teachers for blended learning implementation and availability of suitable infrastructure. DBE, PED and District need to monitor and evaluate blended learning implementation by the Circuits. The Circuits need to also ensure that monitoring and evaluation is regularly exercised.

The roles of the Circuit would therefore be:

- Establishing e-tech policies based on the district and provincial e-tech policies,

- Ensuring provision of e-tech resources,
- Guaranteeing the provision of e-tech training & developments to school and teachers in particular,
- Making certain the erection of e-tech structures,
- Overseeing e-tech learning implementation, and
- Monitoring and evaluation.

7.5.2.5 Schools

Schools are the principal sites of blended learning implementation. The communication and coordination of educational technologies among DBE, PDE, District and Circuit need to be extremely effective for schools to succeed in practising blended learning. It can therefore be argued that schools serve as the measuring barometer in the success of blended learning. This is why it is important that the role players in this area are technologically skilled.

The model puts emphasis on the training and development of teachers. Teachers need to be trained and developed in order for them to able to align their skills (pedagogy, technology, context) using blended learning. They also need to be developed in utilising various teaching and learning strategies such as induction, interaction, collaboration, and construction through blended learning. Regular monitoring and evaluation of the application and implementation in all the roles need to be done by the SMT and educational officials from the DBE, PED, District and Circuit.

The envisaged roles which schools need to play in the Model are:

- Establishing school e-tech policies,
- Implementing policies,
- Formulating and implementing e-tech training & developments programmes,
- Advocating e-tech learning and blended learning,
- Overseeing e-tech and blended learning implementation.
- Alignment (pedagogy, technology, context),

- Teaching and learning strategies (Induction, interaction, collaboration, Construction),
- Performance (Assessment, Feedback, Evaluation),
- Monitor blended learning implementation, and
- Monitoring and evaluation.

7.5.3 Importance of the BLM

The model is aiming at providing a framework on which blended learning implementation in schools can be successful. It is worth noting that the successful application of the model would be informed by the availability of adequate funding, skilled human resource and infrastructure resources. Thus, DBE is reminded that funding, human and infrastructure resources are crucial requirements for the success of blended learning implementation in schools. Furthermore, the model will be beneficial to curriculum designers for the formulation of e-tech curriculum and policies for the schools.

7.5.4 Benefits of the Model

The BLM will benefit e-tech educational designers, e-tech officials, schools, teachers, and learners. E-tech educational designers will use this model as a framework to design blended learning policies. E-tech officials will also make use of the Model to acclimatise themselves with their respective roles in their areas. The effective implementation of blended learning will benefit schools, teachers and learners in that the schools′ performance will improve, and the teachers′ technological knowledge and skills will also improve. Importantly, through the usage of this model, learners will be provided with quality education offered by blended learning.

7.5.5 Monitoring and Evaluation of the BLM

Otieno (2000) asserts that many projects fail to be successful due to lack of understanding of the importance of monitoring and evaluation. This means that the role players need to take monitoring and evaluation of projects at heart This would enable the designers and implementers of the project to do some

remedial measures on where things went wrong. Regarding this BLM, the role players include DBE, PED, District, Circuit, and schools. It is therefore necessary that each of the role players need to do regular monitoring and evaluation for the successful implementation of blended learning. The monitoring and evaluation would uncover the shortfalls pertaining technological resources, the need for training, development as well as support of the blended learning implementers.

7.6 LIMITATION OF THE STUDY

Like in many research studies, this study also witnessed some limitations. The following limitations were encountered:

Firstly, as the study was undertaken during Covid-19 pandemic, observation of Covid-19 protocols, especially the social distance regulation made it difficult for the researcher and participants and respondents to communicate effectively.

The second problem pertained the inaccuracy of data collected from the interviews, document study and questionnaire. The study employed a mixed-methods research to cater this limitation, however, Cook and Campbell (1979) advices that participants and respondents tend to report or respond what they believe the researcher wants to hear or see or report positively on their own opinions, knowledge, and abilities at the expense of being realistic. Based on this it is possible that some that data derived from the same school might contradict each other from the individual participants and respondents of the school.

One other limitation experienced was that the study used a small scale sample of schools, participants and respondents and hence limiting the generalization of the findings.

Lastly, although the researcher had a limited time due to irregular school functionality caused by Covid-19 protocols, the researcher managed to collect data from all the participants and respondents.

7.7 IMPLICATIONS FOR FURTHER RESEARCH

The summary of the findings and recommendations were presented above. This section deals with the implications of this study for further research. Since this research concentrated on the implementation of blended learning using a smaller sample, therefore the findings cannot be generalised. It is therefore recommended that similar study be done using a large sample across the length and breadth of South Africa so that the results can be generalized.

The BLM proposed in this study can be vital to policy makers for the development of technological policies as it can be used as a framework. Based on the national policies the provinces, districts and schools should develop their own e-tech policies according to their environmental needs. The model can also be valuable to researchers in the same field of technology for reference purposes.

7.8 CONCLUSION

The purpose of this study was to examine the implementation of blended learning in Sekhukhune District schools in Limpopo province, South Africa. To achieve the aim, the study was driven by the research questions as outlined in the initial chapter (1.5).

The study was guided by pragmatism paradigm. TAM, Connectivism and Connected Learning theories were used to frame and anchor the study.

The study identified several shortcomings which impede successful implementation of blended learning in schools: inadequacies in the supply of e-Tech resources and connectivity; insufficient usage of educational technology in schools; inadequate teachers′ digital skills, inadequate enabling structures for the implementation of blended learning, non-existent of e-tech policies, inadequate ICT training, insufficient teachers′ technology knowledge and insufficient teachers′ technological support.

Following up on these identified shortcomings, the study developed and generated a BL model as proffered in 7.5.1. Its benefits are evident for e-tech educational designers, e-tech officials, schools, teachers and learners. In the ultimate adjudication of the efficacy of the proposed model, it is imperative to recognise that schools are the principal sites of blended learning implementation. The communication and coordination of educational technologies among DBE, PDE, District, Circuit and schools need to be extremely effective if the blended learning model is to be successfully implemented.

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APPENDICES

APPENDIX A: A LETTER TO THE UNIVERSITY OF LIMPOPO RESEARCH OFFICE

P O Box 1132
Sekhukhune
1124
10 May 2019

The Office of Research Unit
Director: University of Limpopo
Private Bag X1106
Sovenga
0727

Dear Sir/Madam/Doctor/Professor

I hereby request your office to grant me permission to conduct research in your institution. The participants of my research study are composed of principals/deputy principals, HODs and teachers in Sekhukhune District schools. The topic of my study is **Implementation of Blended Learning in Sekhukhune District schools, Limpopo in South Africa.**

Your assistance is highly appreciated.

Yours truly

Nkadimeng Mampuru Philemon:
Email: mampurunkamideng@gmail.com

APPENDIX B: APPROVAL LETTER FROM UNIVERSITY OF LIMPOPO

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: 17 June 2020

PROJECT NUMBER: TREC/105/2020: PG

PROJECT:

Title:	Implementation of Blended Learning in Sekhukhune District schools in Limpopo Province, South Africa
Researcher:	MP Nkadimeng
Supervisor:	Dr KL Thaba-Nkadimene
Co-Supervisor/s:	Dr F Rahimi (UL, ICT) Prof J Cronje (CPUT)
School:	Education
Degree:	PhD in Curriculum Studies

PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**

ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**

iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

APPENDIX C: A LETTER TO SEKHUKHUNE EAST CIRCUIT MANAGER

P.O.BOX 1132
Sekhukhune
1124
16 MAY 2019

Sekhukhune East Circuit Manager
Limpopo Department of Education

Dear Sir/ Madam

I am applying to conduct research at secondary schools in your district. I am currently studying towards my PhD Degree in Education through the University of Limpopo and request to carry out fieldwork research at Sekhukhune secondary schools in Malegale Circuit. The day-to-day functioning of the school will not be disrupted because all activities will be conducted after hours at a convenient time for teachers. My topic research is **Implementation of Blended Learning in Sekhukhune District schools, Limpopo Province in South Africa.**

After completion of studies, I take it upon myself to communicate the research results through your office.

Yours in education

MP Nkadimeng (201109037)
Email: mampurunkamideng@gmail.com

APPENDIX D: Approval from Department of Basic Education

CONFIDENTIAL

LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION
SEKHUKHUNE EAST DISTRICT

Enq: Maloma K.H Tel: 073 954 3712 Date: 18.06.2020

To: The Principal

From: Circuit Manager
Malegale Circuit

SUBJECT: PERMISSION TO CONDUCT RESEARCH IN SCHOOLS WITHIN THE SEKHUKHUNE EAST DISTRICT

The above matter refers.

1. This is to confirm that Nkadimeng Mampuru Philemeon, PHD Degree Student at University of Limpopo is granted permission to conduct above research at your school. **Tittle of research project: Implementation of blended learning in Sekhukhune District schools in Limpopo Province South Africa.**
2. Conditions attached to the permission are:
   - Participation is voluntary.
   - Information collected will only be used for study and remain confidential.
   - No names should be written on questionnaire.
   - Participants are free to withdraw anytime during the process.

   NB. DATA COLLECTION AND ADMINISTRATION OF QUESTIONNAIRE MUST BE DONE ONLY DURING BREAKS AFTER TEACHING HOURS.
3. Thank you.

MALEPE F.M
CIRCUIT MANAGER

DEPARTMENT OF EDUCATION
SEKHUKHUNE EAST DISTRICT
MALEGALE CIRCUIT
2020 -06- 1 8
PRIVATE BAG X1220. SEKHUKHUNE 1124
TEL:
LIMPOPO PROVINCE

18.06.2020
DATE

SCHOONOORD CIRCUIT CLUSTER: PRIVATE BAG X 1220 SEKHUKHUNE 1124 TEL: 013 260 9904/5/6 FAX: 013 260 9907

The heartland of Southern Africa – development is about people

APPENDIX E: Letter to Sekhukhune District Schools

P O Box 1132
Sekhukhune
1124
10 May 2019

The Principal

_____

_____

_____

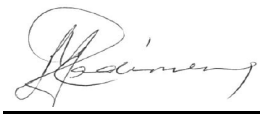
Dear Sir/Madam/Doctor/Professor

Request to conduct research on Sekhukhune District E-Learning Project schools

I hereby request your school to grant me permission to conduct research. The participants of my research study are composed of principals/deputy principals, HODs and teachers in Sekhukhune District schools. The topic of my study is **Implementation of Blended Learning in Sekhukhune District schools, Limpopo in South Africa.**

Your assistance is highly appreciated.

Yours truly

Nkadimeng Mampuru Philemon: 

Yours in education

Email: mampurunkamideng@gmail.com

APPENDIX F: Approval from schools

APPENDIX G: Consent Form

RESEARCH PROJECT TITLE: **Implementation of Blended Learning in Sekhukhune District schools, Limpopo Province in South Africa.**

(*It is compulsory for the researcher to complete this field before submission to the Ethics Committee*)

RESEARCH PROJECT LEADER/SUPERVISOR: MR MP Nkadimeng

(*It is compulsory for the researcher to complete this field before submission to the Ethics Committee*)

I, Mampuru Philemon Nkadimeng hereby voluntarily consent to participate in the following project: **Implementation of Blended Learning in Sekhukhune District schools, Limpopo Province in South Africa.**

(*It is compulsory for the researcher to complete this field before submission to the Ethics Committee*)

I realise that:

1. The study deals with people's experiences, perceptions, and experiences.

(e.g. effect of certain medication on the human body) (*It is compulsory for the researcher to complete this field before submission to the Ethics Committee*).

2. The procedure or treatment envisaged may hold some risk for me that cannot be foreseen at this stage.

3. The Ethics Committee has approved that individuals may be approached to participate in the study.

4. The research project, i.e. the extent, aims and methods of the research, has been explained to me.

5. The project sets out the risks that can be reasonably expected as well as possible discomfort for persons participating in the research, an explanation of the anticipated advantages for myself or others that are reasonably expected from the research and alternative procedures that may be to my advantage.

6. I will be informed of any new information that may become available during the research that may influence my willingness to continue my participation.

7. Access to the records that pertain to my participation in the study will be restricted to persons directly involved in the research.

8. Any questions that I may have regarding the research, or related matters, will be answered by the researcher/s.

9. If I have any questions about, or problems regarding the study, or experience any undesirable effects, I may contact a member of the research team

10. Participation in this research is voluntary and I can withdraw my participation at any stage.

11. If any medical problem is identified at any stage during the research, or when I am vetted for participation, such condition will be discussed with me in confidence by a qualified person and/or I will be referred to my doctor.

12. I indemnify the University of Limpopo and all persons involved with the above project from any liability that may arise from my participation in the above project or that may be related to it, for whatever reasons, including negligence on the part of the mentioned persons.

_____

SIGNATURE OF RESEARCHED PERSON SIGNATURE OF WITNESS

_____

SIGNATURE OF PERSON THAT INFORMED THE RESEARCHED PERSON

SIGNATURE OF PARENT/GUARDIAN

Signed at _____on this _____day of _____ 2019

APPENDIX I: Questionnaire for respondents

The principals, deputy principals, HoDs and teachers responded to a questionnaire shown below:

Please answer the questionnaire by marking with a tick (√) and an answer in the correct place where is required.

A: BIOGRAPHIC INFORMATION			
1	What is your gender?	Male	
		Female	
2	What is your age band?	21-30	
		31-40	
		41-50	
		51-60	
3	What is your job designation?	Senior Teacher	
		Master Teacher	
		HOD	
		Deputy Principal	
		Principal	
4	What is your highest academic/professional qualification?		
5	What is your ICT qualification?		
6	What is your ICT training you received? Describe		

B. PERCEIVED USEFUL OF BLENDED LEARNING	**Agree**	**Disagree**
7. Schools are supplied with adequate educational technologies		
8. BL provides for effective teaching and learning		
9. BL promotes self-regulated learning among learners		
10. Using BL improves my teaching skills		
11. Using BL improves learner performance in the school		
12.Using BL promotes collaborative learning		
13.BL requires schools to have pedagogical technologies required to teach 21st Century skills		
C. PERCEIVED EASE OF USE	**Agree**	**Disagree**
14. It is ease to me to carry out teaching activities on educational technologies available in my school		
15 I use BL in many of my classroom instructions		
16. I find it easy to assess learners in BL		

17. The school is moving towards paperless education as prescribed by E-Education policy		
18. My school has policy that guides the implementation of BL		
D. SCHOOL READINESS IN IMPLEMENTING BLENDED LEARNING AS PEDAGOGICAL TECHNOLOGY STRATEGY	**Agree**	**Disagree**
19. Our school has suitable ICT policies in place		
20. Teachers are trained on the use of educational technology for teaching		
21. Teachers changed from traditional teaching methods to digital pedagogical strategies		
E. LEARNING IS A PROCESS OF CONNECTING INFORMATION RESOURCES	**Agree**	**Disagree**
22. Combination of traditional teaching methods with technological devices provides better knowledge to learners		
23. Teachers can contact learners any time through BL		
24. Administration of learners' tasks is easily because submission, control, feedback and analysed can be done through Edu-tech.		
25. Learners can connect with technology devices and learn in the absence of the teacher in BL		
26. I recommend that all rural schools practice BL		
F. IMPROVING BLENDED LEARNING IN RURAL SCHOOLS	**Agree**	**Disagree**
27. Provision of adequate technological equipment will improve implementation of BL in rural schools		
28. Availability of suitable technological infrastructure will improve provision of BL in rural schools		
29. Training of teachers in ICT will improve BL implementation in rural schools		
30. Adequate technical support is required if BL implementation has to be successful		
31.All rural schools classrooms should be electrified for successful implementation of BL		
32. All rural schools classrooms should be internet connected for successful implementation of BL		

APPENDIX J: INTERVIEWS SCHEDULE FOR PRINCIPALs

After having sanitising and measuring the temperatures of the participants in terms of Covid-19 protocols, they were asked the questions underneath.

Please answer the following research questions to the best of your ability.

Be informed that probing questions will be asked where necessary.

1. What are your views on teachers' understanding of blended learning in teaching and learning?
2. Do you think your level of technology knowledge is enough for administering and managing blended learning in your school? Explain.
3. What do you perceive to be the benefits of using blended learning in your school?
4. What is your perceived level of difficulty of using blended learning?
5. What are your views on the challenges that impede teachers from engaging in blended learning?
6. What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?
7. How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?
8. Do you think that your school has enabling structure for the implementation of blended learning? Explain.
9. How do you find the usage of technology appliances in curriculum implementation?
10. Is your school currently using blended learning? Explain.
11. What are your views on the blending of technological approaches and the traditional ways of teaching together?
12. What skills do you think teachers need to implement BL successfully?
13. What support do you think is needed for the teachers to implement BL?

APPENDIX K: INTERVIEWS SCHEDULE FOR HODs

After having sanitised and measuring the temperatures the participants in terms of Covid-19 protocols, they were asked the questions below.

Please answer the following research questions to the best of your ability.

Be informed that probing questions will be asked where necessary.

1. What are your views on teachers' understanding of blended learning in teaching and learning?
2. Do you think your level of technology knowledge is enough for administering and managing blended learning in your department? Explain.
3. What do you perceive to be the benefits of using blended learning in your department?
4. What is your perceived level of difficulty of using blended learning in your department?
5. What are your views on the challenges that impede teachers from engaging in blended learning?
6. What are your recommendations for the introduction and improvement of the implementation of blended learning in your department?
7. How has the introduction and implementation of blended learning influenced your department to engage or not to engage in blended learning?
8. Do you think that your department has enabling structure for the implementation of blended learning? Explain.
9. How do you find the usage of technology appliances in curriculum implementation?
10. Is your department currently using blended learning? Explain.
11. What are your views on the blending of technological approaches and the traditional ways of teaching together?
12. What skills do you think teachers need to implement BL successfully?
13. What support do you think is needed for the teachers to implement BL?

APPENDIX L: INTERVIEW SCHEDULE FOR TEACHERS

After having sanitising and measuring the temperatures of the participants in terms of Covid-19 protocols, they were asked the questions that follow next..

The following questions were posed to teachers for qualitative data collection:

Please answer the following research questions to the best of your ability. Be informed that probing questions will be asked where necessary.

1. What is your understanding of blended learning in teaching and learning?
2. Do you think your level of technology knowledge is enough for administering and managing blended learning in your teaching? Explain.
3. What do you perceive to be the benefits of using blended learning in your teaching?
4. What is your perceived level of difficulty of using blended learning in your teaching?
5. What are your views on the challenges that impede teachers from engaging in blended learning?
6. What are your recommendations for the introduction and improvement of the implementation of blended learning in your teaching?
7. How has the introduction and implementation of blended learning influenced you to engage or not to engage in blended learning?
8. Do you think that your school has enabling structures for the implementation of blended learning? Explain.
9. How do you find the usage of technology appliances in curriculum implementation?
10. Are you currently using blended learning in your teaching? Explain.
11. What are your views on the blending of technological approaches and the traditional ways of teaching together?
12. What skills do you think teachers need to implement BL successfully?
13. What support do you think is needed for the teachers to implement BL?

APPENDIX M: DOCUMENT STUDY

The documents reflected in the table underneath were studied.

Item	Available	Unavailable
ICT Centre		
Teaching and learning computers, laptops and other technologies		
School internet connectivity		
Internet access by all teachers and learners		
Pedagogical Digital software		
Appropriate Edu-Tech policies		
Electrification of all the school buildings		
Reliable Electricity		
Technical support systems		
Computer training for teachers		
Developmental programmes		

APPENDIX N: ALIGNMENT OF RESEARCH QUESTIONS AND INTERVIEW QUESTIONS

Research Question	Interview Question
Research Question1: How do teachers perceive the usefulness of blended learning?	• What is your understanding of blended learning?
	• Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?
	• What do you perceive to be the benefits of using blended learning in your school?
	• What is your perceive difficulties of using blended learning?
	• What are your views on the challenges that impede teachers from engaging in blended learning?
	• What are your recommendations for the introduction and improvement of blended learning implementation?
Research Question2: How do teachers connect information using technology resources?	• How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?
	• Do you think your school has enabling structures for the implementation of blended learning?
	• How to you find the usage of technology appliances in curriculum implementation?
	• Is your school currently implementing blended learning?
	• What are your views on the blending of technological approaches and traditional ways of teaching?
Research Question 3: To what extent do teachers have the necessary skills for successful implementation of blended learning?	• What skills do you think teachers need to implement blended learning?
	• What support do you think is needed for the teachers to implement blended learning?

APPENDIX O: RESEARCH QUESTION, THEMES AND SUB-THEMES ALIGNMENT

Research Question	Theme	Sub-theme
Research Question1: How do teachers perceive the usefulness of blended learning?	Theme 1: Teachers' perceptions of blended learning in teaching and learning	Sub-theme 1: Understanding of blended learning
		Sub-theme 2: Technological knowledge of administering and managing blended learning
		Sub-theme 3: Benefits of using blended learning
		Sub-theme 4: Difficulties of using blended learning
		Sub-theme 5: Challenges that impede teachers to engage in blended learning
		Sub-theme 6: Recommendations for the introduction and improvement of blended learning implementation
Research Question2: How do teachers connect information using technology resources?	Theme 2: Connection of technology resources in blended learning	Sub-theme 7: Influence of blended learning implementation on teachers' practices
		Sub-theme 8: Enabling structures for implementation of blended learning
		Sub-theme 9: Usage of technology appliances
		Sub-theme 10: Current implementation of

		blended learning in schools
		Sub-theme 11: Blending of technological approaches and traditional approaches of teaching
Research Question 3: Do teachers have the necessary skills for successful implementation of blended learning?	Theme 3: Teachers' skills for blended learning implementation	Sub-theme 12: Teachers' ICT skills
		Sub-theme 13: Teachers' support on blended learning implementation

APPENDIX P: INTERVIEW TRANSCRIPTS FOR PRINCIPALS

The interviews started on the 29 June 2020 and ended on 03 July 2020.

The interviewer greeted and welcomed all the participants warmly. All the participants were measured their temperatures and sanitised. The researcher further thanked each participant for giving their time for the interviews. The participants were asked their consent for the recording of the interviews and they all agreed that the interview be recorded. Furthermore, the researcher assured all the respondents that their identities and those of their schools will be kept confidential. They were also assured that the information obtained from the interviews would only be used for the purpose of the research study. All the participants were informed that they could refrain from answering a question at any time they so wished.

Date: 29 June 2020

Participant: SSP1

Interviewer (Question 1): What is your understanding of blended learning?

SSP1: Eh…, I think it is about teaching using visuals in the teaching and learning situations. Uhm, it is when videos and charts but mostly slides are used by teachers to supplement their teaching together with a computer we talk of blended learning. Contrarily, in our case, teachers lack the necessary knowledge and skills for blended learning application, so they are not able to implement blended learning"

Interviewer: Okay.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

SSP1: Yah…I think out of ten I can say give me six. Yes, I think I have moderate technology knowledge because recently I did ICT with the University of Limpopo …´

Interviewer: Okay, do you sometimes use technologies in your class?

SSP1: Yes, but so far, I had challenges last but this year I was able to use it once. I used videos but did not use slides because they are challenging to use.

Interviewer: Do you think you need some assistance in order to use slides?
SSP1: Yes, I think if I can be taught some strategies to use them, then I fine and fast.
Interviewer: That's fine.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?0

SSP1: Eh…It is quite challenging as the first starter. The usage of technologies in teaching and learning influences me negatively. This is because I am unable to use computers due to lack the necessary skills. I am afraid to be stranded with these technologies in front of learners. We must first be developed so that we use the technologies.
Interviewer: Okay.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

SSP1: I can say no. Our school does not have any enabling structures for us to implement technologies. We do not have tech resources; internet connectivity and teachers are also not been trained and are not supported by the department and …"
Interviewer: Okay.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

SSP1: For me I think in terms of performance it saves time for learners in activities such as classwork and also that learners are able to see real things if videos, for example, are used. Personally, this blended learning will help me as I am doing my Master of Education Degree in visualisation using technology, so I shall benefit a lot.
Interviewer: That's right.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

SSP1: Yah Ne! Downloading, downloading some teaching materials is time consuming. It takes a lot of time to prepare and to connect when you are in class. This is the case because we were not trained in technologies. Sometimes one panics in using technologies in front of learners because we are not confident enough.
Interviewer: How is your school assisting you regarding downloading data?

SSP1: No, Sir. The school doesn't assist us with data, we use our own data.
Interviewer (Question 7): Are you currently using blended learning? Explain
Participant: In fact, I cannot say we use computers, only two teachers make use of them sometimes. The other teacher and I use blended learning.

Interviewer: You said sometimes, how often do you use it?
SSP1: Once in a while, Sir.

Interviewer: What subjects are you teaching?

SSP1: I teach Life Sciences and Agricultural Sciences and the other teacher teaches Accounting and Mathematics.
Interviewer: Okay.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

SSP1: I find it relevant because I teach Sciences. The usage of technology appliances in the school is good because it helps learners to visualise abstract content. Just that we are unable to take this advantage because we do not have resources. The appliances help a lot because the learners are able to see reality through visualisation.
Interviewer: All right.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

SSP1: Sir, we are experiencing problems in as far as today's education is concerned. Teachers are still hanging on to traditional approaches and resist the new technological perspectives. They fear technology and sometimes they think technology is going to take away their jobs and so they reject it. I think that is high time that we blend the two approaches.
Interviewer: Okay.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

SSP1: Yah, the likes of electricity. For example, last week I wanted to teach at that block, only to be disturbed by lack of electricity and I had to move around to find another class and this wasted my time and that of learners. We would love to apply blended learning, but we experience some challenges such as unreliable electricity in our school and time constrains. The worse problem is that our school is not internet connected.

Interviewer: I see! Are all the classrooms electrified?

SSP1: Some are, and some are not. Most of the dysfunctional classrooms have been vandalised. One other problem is that there is no internet connection and we are using our own data.
Interviewer: Okay, fine.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

SSP1: All right, before I can talk of the skills, I think teachers must first be motivated and orientated on technologies so that they know what technologies are. Teachers are in dire need of computer literacy skills which they do not have. For example, Word; excel and power point skills to implement blended learning. I think they also need to be motivated and encouraged to use ICTs.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

SSP1: Yah, I think support is important for blended learning practices. The DBE need to support schools by providing ICT infrastructure and resources as well as training teachers in technologies. I also think that if the SMT encourage and motivate the teachers to always teach by technology devices. We are trying to practice even though we have very few resources. The other support worth mentioning is the connection of WI-FI and installation of projectors in all the classrooms.

Interviewer: Do the HoDs support teachers about technologies in their various departments?

SSP1: No, Sir. Maybe it is because they are unskilled in technologies.
Interviewer: That's fine.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

SSP1: My recommendation is that the DBE train and develop us in the technologies. They should not just provide technology devices, but they should also show us how these devices function, especially in the teaching and learning environment.
Interviewer: Okay, Sir

Conclusion
Interviewer: Thank you very much for your time in this interview Sir. As I said, your identity and the school identity will be protected. Everything discussed will be solely used for the purpose of this study. Should a follow up interview be necessary, will you be available Sir?
SSP1: Yes, I will Sir. Thank you.

01 Jul7 2020
Participant: SSP2
Interviewer (Question 1): What are your views on teachers′ understanding of blended learning in teaching and learning?

SSP2: What I understand by blended learning is that, eh… it is a form of communicating with learners, without their presence, that is remotely, and getting information from different sources such as computers, projectors, videos”
Interviewer: Okay.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

SSP2: I think I have enough knowledge of computers because I have used technology devices in my studies. However, for the reason that I did not use

them for teaching and learning purposes I cannot use them for teaching and learning activities.
Interviewer: Do you think you cannot use them for teaching?

SSP2: I think I can, but I shall first need some developmental assistance.
Interviewer: Okay

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

SSP2: I am positive for the implementation of blended learning in schools. The learners enjoy using ICTs and I think implementation of blended learning could boast their performances. It also saves teachers preparation and facilitation time. The learners are able to see the content on the screen and this makes them to understand better.
Interviewer: That's fine. Thanks.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

SSP2 You, see! Lack of resources and suitable accommodation for teaching blended learning is a burning issue for us. If these can be sorted out, I think we will be ready to implement blended learning.

Interviewer: Who do you think should sort this out?
SSP2: The department. I think the department should sort this out because they want us to implement technology learning in our schools.
Interviewer: Okay.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

SSP2 The benefits of blended learning are numerous. As I said earlier, the learners like technology, so it can be used as a way of getting good results, especially Grade 12 results. It also benefits teaches a lot because they are able to obtain valuable sources through internet to supplement their teaching content.

Interviewer: Do you mean the results in all Grade 12 subjects?

SSP2: No, with specific reference to Life Sciences, Mathematics and Physical Sciences.
Interviewer: Thanks.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

SSP2: I think it will be difficult to me to use blended learning, I do not have the ability to download content from computer. Generally, I shall not be able to teach using technological devices. The department must develop us to avoid us been frustrated in front of learners.
Interviewer: That's fine.

Interviewer (Question 7): Are you currently using blended learning? Explain

SSP2: Yes, by some few teachers. Life Sciences and Mathematics teachers use technologies sometimes. Maybe, it might be because of lack of skills to use them. I would wish that all teachers use the technology appliances in all the subjects
Interviewer: Why only few teachers are using blended learning?
SSP2: Maybe it is because they do not have the necessary knowledge of using the technologies.
Interviewer: Okay.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?
SSP2: You see! We have few computers in our school, but regretfully the teachers are reluctant to use them. I think when used effectively, they can improve performance of our learners.

Interviewer: Have they ever been motivated and encouraged to use them?

SSP2: I always emphasise the usage of these computers in our meetings but nothing positive comes out.
Interviewer: That's fine.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

SSP2: Sir, like I said earlier, few teachers make use of the technology facilities. I personally, find the combination of the approaches good because when you combine them together, they complement each other and so teaching, and learning becomes effective and successful.
Interviewer: Thank you.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

SSP2: I think blended learning requires a reasonable number of learners per classroom. With us we have large of learners per class because we do not have enough classrooms. Blended learning requires a small number of learners and therefore we will experience a challenge with accommodation. We also have a problem with the teachers because they are reluctant to adopt technologies.
Interviewer: What do you think make them reluctant to adopt the technologies?

SSP2: You see, most of our teachers are old and I think maybe because they are just about to retire, they think it is not necessary for them to have technology knowledge.
Interviewer: Sir, but they are presently still in the system. Maybe you need to motivate them to adopt these technologies for the benefit of the learners. Thank you.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

SSP2: I think teachers need to be trained in computer literacy and the basic application of word; excel and power point to enable them to apply in their teaching and learning activities. It is unfortunate that teachers lack these technological skills and I think they need to be trained.
Interviewer: Who is supposed to train them?

SSP2: By the DBE, Sir.
Interviewer: What about the school?

SSP2: No. no. Sir, it is the responsibility of the department to train teachers.

Interviewer: But the department gave you some money for teacher development. What do you use that money for?

SSP2: I am not aware of such money.
Interviewer: Okay.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

SSP2: I think teachers need to be exposed to technologies by way of workshops and training by the department. Some of them think using

technologies is difficult and I think exposure will make them aware that it is not difficult. The DBE must support us by providing enough ICT resource and developmental programmes for teachers.
Interviewer: What about the school?

SSP2: I think the school need to establish school-based training programmes to develop the teachers in the technologies.
Interviewer: Thank you.
Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

SSP2: My recommendation to DBE is that they provide training for teachers. The other recommendation is that ICT committees need to be established in schools to oversee implementation and workshopping of teachers at school level.

Interviewer: This brings us to the end of the interview. Thank you very much for your time. As I indicated when we started, your identity and that of your school shall be kept confidential and the contents of our discussions shall only be used for the purpose of this study. Sir, if the need arises for an interview follow up, would you be available for the interviews?
SSP2: Oh, Yes why not. Thank you, Sir.

30 June 2020
Participant: PSP1
Interviewer (Question 1): What are your views on teachers' understanding of blended learning in teaching and learning?

PSP1: I think blended learning is a type of learning whereby teachers use mix methods or mixed strategies, as I see this word blended. I think there is a mixture of different methods and strategies. It is a mixture of teaching

approaches. Our teachers were not trained in this and are not ready for blended learning."
Interviewer: Okay, Ma'am.

Interviewer (Question 2) : Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?
PSP1: No, no, I do not think so, because in some instances I just know how to use a laptop to type but communicating with other people is difficult for me. So, I cannot use a computer in the teaching and learning situations.

Interviewer: How do you think you can have the technology knowledge?

PSP1: I think I can have it through training in technologies. The department must train us.
Interviewer: Thank you.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

PSP1: Ok, I think it has influenced me positively because with this blended learning my teachers and learners and the community at large are now having more understanding of the technologies and are able to use it. It also influences learners as I see that they participate actively when taught through technologies.
Interviewer: Thank you.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

PSP1: Yes, I think we have enough classrooms which can be converted into technology for learners, but the problem is that we do not have ICT resources. If

the department can provide us with this and train our teachers, then we will be best positioned to apply blended learning in our school.
Interviewer: Okay

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PSP1: I think blended learning would benefits learners and teachers a lot. Learners will get better quality education and the teachers will have the opportunities to improve their ICT knowledge and skills. By employing blended learning both teachers and learners are able to get more information through internet and, hence complementing their existing contents.

Interviewer: That's fine.
Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PSP1: Oh, you know, the most difficulty we have is the protection of the few technology equipment and infrastructure that we have. We have a problem with the members of the community who are regularly vandalising our school and instead of supporting us regarding the education of their own children. We also do not have support from the parents because most of our learners stay with their grandmother who know nothing about technologies. So, nobody assists these learners when they are at home.
Interviewer: That's bad, Ma'am.

Interviewer (Question 7): Are you currently using blended learning? Explain

PSP1: Not at all, because of lack of teachers' technology knowledge and skills. We are also incompetent to use the technology resources that we presently have because of lack of knowledge and skills of using technologies.

Interviewer: When do you think your school can implement blended learning?
PSP1: I think immediately the resource are available and we have been trained.
Interviewer: That is fine

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

PSP1: Oh, I think technology appliances create a positive teaching and learning environment. This was even evident lately during the Covid-19 lockdown. Schools which are advanced with technologies had their learners taught while they were at home while those like ours were totally dysfunctional. To a little extent, our teachers here are using the technologies. They just need development so that they fully and confidently use them.
Interviewer: That sounds great, Ma'am.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

PSP1: I think my view is technological approach is good as compared to traditional approach. As we are living in the world of technology everyone should embrace the technologies. The traditional approaches are obsolete nowadays.

Interviewer: What is your perception if the two approaches are combined, Ma'am?

PSP1: I think combining the two approaches can bear fruits because we will be able to get reference from the two approaches and they will also strengthen each other. The learners will be able to see abstract things visually and thus, improving their understanding.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

PSP1: I think it is only a lack of teacher's interest and laziness in using technologies. For example, I have advocated these technologies in our school and lately I see most of them using the laptops on their own. Interestingly, those who were claiming they are just to go out of the system are enjoying usage of the laptops and this is really encouraging.
Interviewer: That's interesting, Ma'am.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PSP1: Uhm, I think the skills that teachers need include typing skills, how to use an overhead projector, usage of power-point software and how to interpret slides.
Interviewer: Okay.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

PSP1 Eh, Yah, we have arranged some meetings for the development for the teachers here in our school. We have also arranged to purchase laptops for each of our teachers for teaching purposes and we are waiting for delivery. We have lately workshopped them on how to download documents from the laptop and hope they understood. We are really supporting them a lot. I think if the DBE can provide us with more technological facilities and train the teachers implementation of blended learning will be fully implemented in our school.

Interviewer: That's interesting Ma'am.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PSP1: I recommend that the DBE train our teachers in technologies as well as providing enough equipment to both teachers and learners. I also recommend that the DBE provide internet facilities to schools to enable implementation of blended learning.

Interviewer: Okay, Ma′am, This brings us to the end of the interview. Thank you very much for your time. As I indicated when we started, your identity and that of your school shall be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma′am, if the need may arise for the interview follow up, would you be available for the interviews?
PSP1 Oh, Yes why not. Thank you, Sir.

03 July 2020
Participant: PSP2
Interviewer (Question 1): What is your understanding of blended learning?

PSP2: Blended learning! Meaning what? Uhm, I don't understand what that is.
Interviewer: Eh, Ma'am, to blend is to combine. It means combining some learning types like old and new ways of learning. What are your views on the combination of the old and new ways of learning?

PSP2: Oh, if is concerning the computers or the new technologies that is talked about, we have not yet started with that type of learning. Though we had some computers in our school, the problem is we do not have teachers who can use them. They were only used by an outside expert who volunteered to train our learners.

Interviewer: When do you think your school will start using these technologies, Ma'am?

PSP2: The problem is lack of computer skill. I think immediately we got trained and the resources are available we can start.
Interviewer: That is okay.

Interviewer (Question 2) : Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

PSP2: Not exactly, but I have basic computer skills. I am able to use a laptop to type my management and administration documents, teaching and learning documents like assessment tasks and lesson preparations.

Interviewer: How are you planning to improve your knowledge?
PSP2: I am presently registered for a diploma in computer literacy with Avusheni Academy.
Interviewer: That's wonderful.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

PSP2: Eh, for teaching and learning purposes, I think it is time consuming, but when one uses the laptop and projectors learners understand better because they are able to see what they are taught about practically.

Interviewer: How do you think you can fully use blended learning in your teaching?

PSP2: I think we need to be developed first and is then that we can use blended learning.

Interviewer: That’s fine.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

PSP2: No, Sir! We do not have the necessary skills, so I think our school is not ready to implement blended learning. The department need to re-skill us in technologies in order for us to implement blended learning.

Interviewer: Do you have some computer in your school?

PSP2: Yes, Sir. We have about four computers, but they are for administration purposes. We do not have some for teaching and learning usage.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PSP2 Sir, I think through blended learning learners are able to obtain more information from technologies and it helps teachers with their lesson planning, assessments tasks. I think blended learning also makes it possible for teachers and learners to contact each other any time and anyway if they need one another.
Interviewer: Thank you

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PSP2: Sir, if we are not developed in technologies enough but I do not foresee any difficulty if we can acquire the necessary skills. Let us first be developed and also be provided with resources then it will be easier for us to apply blended learning in our teaching.
Interviewer: That's great.

Interviewer (Question 7): Are you currently using blended learning? Explain.

PSP2: No, the lack of teachers' technology knowledge and lack of resources make the school environment unconducive for technology learning. We are therefore, currently not practising any technology learning in our school. Maybe in future when we have been developed.

Interviewer: Thanks

Interviewer (Question 8): How do you find the usage of technological appliances in ?

PSP2: I think usage of technology appliances will help a lot in curriculum. Since I said earlier that when one is searching for more information one can obtain that from internet. Technology also assists learners to get more information for their assessment tasks.

Interviewer: How many teachers use the technology devices in their teaching practices?
PSP2t: I don't remember of seeing anyone, Sir.
Interviewer: I think you need to encourage them to use the technologies, Ma'am.
Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

PSP2: I think combining the two approaches is good because it can improve learners understanding. However, we are not able to do this because we lack technological know-how.

Interviewer: But, Ma'am, as a principal of this school I think you need to take a lead. Let it start with you and the rest will follow. You need to do something about this. Thanks

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

PSP2: Sir, with us, I think we lack suitable technological infrastructure and facilities. Our teachers do not have ICTs skills and also our time-table will be constrained with these technologies. These are challenges which make us fail to engage in blended learning.

Interviewer: Oh, I see. Thanks

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PSP2: Eh…! I think teachers need to have basic computer literacy skills. They also need to know how to search information in the internet. Teachers need to also develop themselves in these new technologies apart from the departmental initiatives.
Interviewer: Thanks

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

PSP2: The support that we need in our school is the provision of technological resources to the teachers and learners. If the DBE can buy each teacher and all the learner's computers or laptops, I think this would be a good support. The community as well, I think they can support the school by safeguarding its properties, especially the technological tools from thieves.

Interviewer: Thank you.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PSP2: Yah, I recommend that the department train our teachers in technologies. For us at school level, we need to outsource technological experts to develop our teachers as well. I also recommend that our school governing body (SGB) approve budget for the security of the technologies and development of teachers.

Interviewer: Thanks, Ma’am. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma′am, if the need may arise for the interview follow up, would you be available for the interviews?

PSP2: Oh, I will be available. Thank you, Sir.

APPENDIX Q: INTERVIEW TRANSCRIPTS FOR HEAD OF DEPARTMENTS

The interviews started on 29 June 2020 and ended on 03 July 2020.

The interviewer sanitised, measured the temperatures, greeted and welcomed all the participants warmly. He further thanked them for giving their time for the interviews. The Participants were asked their consent for the recording of the interviews and they all agreed that the interview be recorded. Furthermore, the researcher assured all the respondents that their identities and those of their schools will be kept confidential. They were also assured that the information obtained from the interviews will only be used for the purpose of the research study. All the respondents were informed that they could refrain from the interview and from answering a question at any time they so wished.

Date: 29 June 2020

Participant: SH1

Interviewer (Question 1): What is your understanding of blended learning?

SH1: Uhm, I do not know what blended learning is. Can you tell me what it is?"

Interviewer: Yes, Ma'am, it is about combining old and new ways of learning. For example, traditional and technology ways. What is your view about this?

SH1: Oh, it is the first time when I hear about the concept blended learning. Otherwise, I think is using computers together with face-to-face teaching in the learning environment. I think this can be good. But it requires that teacher must have technological skills.

Interviewer: You are right. Thanks.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

SH1: Uhm, I can say I am at the moderate level as far as technology knowledge is concerned. I use a laptop to prepare my teaching and learning activities. Unfortunately, I cannot use it for teaching and learning because I don't have the skills to do that. Maybe if I get trained, I shall use it in the classroom.

Interviewer: Okay, Thanks

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

SH1: For me, it has influenced me positively. It is good because it saves me time in preparing lessons and getting more information about the content. When I go to class, I just use the computer and projector to teach instead of writing on the chalkboard which is time consuming. I really enjoy using computers in my teaching activities.

Interviewer: What about the other teachers? Do they use their computers in class as well?

SH1: No, Ma′am, I only see two of us using our laptops to teach in class. I don't know, maybe they don't have their personal laptops.
Interviewer: Sorry to hear that. Thanks

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

SH1: Yah, Nee! With this one, I can say we are averaged. The school is not yet there. I would say we get support from our principal who always encourage us to use technology in class. He bought us some laptops, projector and TV to be used in our teaching. Unfortunately, we don't have the likes of internet connectivity and a computer centre.

Interviewer: That's not interesting.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

SH1: You know, with blended learning the learners can grasp better, and it saves time for teachers and learners. By using blended learning, the teachers and learners are able to obtain important information by internet to complement available resources. It is a pity that the school does not most of these resources. At any rate, we would like to use blended learning but due to the lack of resources we miss enjoying the benefits of blended learning in our school.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

SH1: I think lack of laptops and knowledge to use them are some of the difficulties we experience. The other problem is that learners are not able to use the laptops. Most of the teachers cannot even just open a laptop. I think training is needed for the usage of technological appliances.
Interviewer: Oh, Yes.

Interviewer (Question 7): Are you currently using blended learning? Explain

SH1 Yes, I am using it.

Interviewer: How are you using it?

SH1: I just go to class with my laptop, play videos of my preparation for learners. I see only few of us using computers when teaching. So, I cannot say the school is currently implementing blended learning.

Interviewer: What about the other teachers?
SH1: I don't know Sir. I never saw them employing technologies in their teaching practices. So, I cannot say the school is currently using blended learning.
Interviewer: That's not encouraging, Ma'am.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

SH1: I think is good to use technology appliances in the curriculum, although I sometimes fear that most of the educators are not able to use them, which means they would first be trained and this is a hell of work to do. I enjoy using the technologies in my teaching processes.

Interviewer: That's promising, Ma'am. Thanks.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

SH1: I like blending the two approaches every time when I am teaching. The two approaches if combined, support each other. The weaknesses of one approach will be boosted by the strengths of the other approach and hence a provision of quality teaching and learning. The other advantage is that the learners like the technology part and this makes them participate actively and interactively.
Interviewer: I see, thanks.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

SH1: Eh, the dominant challenges as I have highlighted earlier are lack of resources and lack of teachers' technological skills. I think if the department can

capacitate us as HoDs in terms of developing us and providing technology resources we can be better placed to develop teachers to implement blended learning.

Interviewer: Thank you.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

SH1: I think teachers need computer usage skills and practical application of ICT tools. Schools should also take responsibilities to develop us through some workshops. As they do not have expertise, they must outsource experts and technological service providers to develop their teachers.
Interviewer: You are right. Thanks

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

SH1: I think the department must prove schools with sufficient technological resource. DBE need also to train and develop teachers in the use of technologies. The SMT and the SGB must also support teachers to implement blended learning by making budget for technologies available.

Interviewer: Thank you.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

SH1: To the DBE I recommend that they establish training programmes for the teachers and the SMTs. I also recommend that the SMTs take it upon themselves to workshop the teachers regularly and ensure that blended

learning is implemented. I also recommend that teacher take upon themselves to do some developmental courses in technologies themselves.
Interviewer: Thank you very much. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school shall be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma'am, if the need may arise for the interview follow up, would you be available for the interviews?
Participant: Yah, sure, why not. Thank you, Sir.

Date: 01 July 2020
Participant: SH2
Interviewer (Question 1): What is your understanding of blended learning?

SH2: What? Blended learning? I do not have an idea what blended learning is.
Interviewer: Yah, it is a learning that combine different types of learning approaches like traditional and technologies. What is your perception about such type of learning?

SH2: Oh! With the technology approach, as teachers I think we will be able to get information from different sources and couple it with our usual teaching methods, so ensuring better learners' understanding. But I think the problem might be the availability of technological resources and skills of the teachers.

Interviewer: Okay, thanks

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

SH2: Yah, my level of technology knowledge is enough because I once being trained on how to use computers. I use laptop to prepare my lessons and for assessment tasks.

Interviewer: Are you using it for teaching and learning in the classroom as well?

SH2: No, Sir. For teaching using a computer I am not able to do that. I only use it to type and to search information in the internet.

Interviewer: Have you ever tried to use it for teaching in class?

SH2: Not once.

Interviewer: Thank you.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

SH2: Eh…! Like I said earlier that we do not have resources, we queue for a laptop from the office and sometimes it is difficult to get hold of it and this influences us negatively to use technologies in our teaching and learning practices.
Interviewer: Is the SMT not promising to buy the laptops for teaching and learning purposes?

SH2: They are but since last year until now nothing came forth.

Interviewer: Yah, nee. Thank you.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

SH2: I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking about e-learning but

does not train teachers. There are no technology resources, no internet connections, and no technology-skilled teachers but yet we are expected to use technologies. How do they think technology education can be successful without teachers?

Interviewer: Well said, thanks.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

SH2: Oh, Yes! Blended learning reduces time of getting the necessary information for teaching and learning activities. It makes teaching and learning successful. I think it benefits learners and teachers a lot because through the computers teachers are able to get more information for the learners and for themselves. The only problem is lack of technological equipment and internet connectivity.

Interviewer: Thank you, Sir.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?
SH2: Thank you, Sir. The difficult part in using blended learning, I think is that most of us are unable to use the technologies and this makes it hard for us to apply. But I think if we can be trained, we will not find it difficult to practise blended learning in our school.

Interviewer: Who do you think should train you?

SH2: I think that is the responsibility of the school and the department.
Interviewer: Thank you.

Interviewer: (Question 7): Are you currently using blended learning? Explain

SH2: Eh..., I can say no, because we only use laptops for typing our lesson preparations and assessment activities. As I said earlier, they are used for administration purposes only.

Interviewer: Don't you guys have your personal computers which you can use?

SH2: Some have them, but they do not bring them to school. I think the school must buy laptops for teaching and learning.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

SH2: Yah, I think they are user-friendly, because when using them in class you are able to give learners different task and examples visually and practically and this makes teaching and learning successful. I think the appliances enhance the learners' performances.

Interviewer: Thanks, Sir.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

SH2: Uhm, I think one of the views is that the two approaches boost each other. The weaknesses of one approach is strengthen by the strength of the other and thus making a strong front for quality provisioning of education. However, it is saddening that most of the teachers are still hanging on the traditional teaching ways due to lack of technology resources. I think we also need training to be able to use the technology devices.

Interviewer: Thank you Sir.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

SH2: You see, sometimes our teachers are part of the challenges. Some of them seem to be resistant to changes. Furthermore, there are no supportive and development structures from the SMTs and the department, and this give the teachers chances of not using technologies. I think one other challenge that we as management overlook is motivating the teachers to use the technologies in their daily teaching and learning activities.

Interviewer: Thank you, Sir.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

SH2: Yah, I think the skills that teachers need include computer literacy, word; excel and power point. Teachers must also be encouraged and motivated to use the computers regularly.

Interviewer: Thanks
Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

SH2: I think teachers can be supported by training them in technologies and give them bursaries to study qualifications in technologies. The community must also play a supportive role in protecting the technology facilities. One other factor that we sometimes overlook in the supervision of usage of technologies in the classrooms. I think if this can be done, the SMT will be best positioned to develop the teachers.
Interviewer: Thank you Sir.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

SH2: My recommendation is that intensive training of teachers be undertaken to teachers and SMTs. Not the hours, two hours or so given to teachers deemed as trainings. In addition, I think if regular school-based workshops
For teachers and the parents could be done this can help successful implementation of blended learning.

Interviewer: Who is supposed to provide training?
SH2: I think the DBE should provide training, Sir. I also think that the SMT members should, after having been trained, provide school-based training to develop those who are lagging behind.

Interviewer: Thank you very much Sir. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. If the need may arise for the interview follow up, would you be available for the interviews?

SH2: Yah, sure, why not. Thank you, Sir.

Date: 30 June 2020
Participant: PH1
Interviewer (Question 1): What is your understanding of blended learning?

PH1: Oh! Blended learning, I think is the combination of old teaching approaches with technological approaches in the teaching and learning situations. But this type of learning I think can only be implemented by a well-resourced school in terms of technology. In our case, I do not think we can manage.

Interviewer: Do you mean you do not use a computer in your teaching sometimes?

PH1: I only use it when I type my assessment documents that is all.

Interviewer: I propose that you try it in your teaching activities.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

PH1: No, I do not have enough knowledge, I still need training. Maybe, if the Department of Basic Education can organise some developmental workshops, we can have sufficient technology knowledge.

Interviewer: How did you obtain the knowledge you are having?

PH1: I did a computer certificate with a private computer institution last year.

Interviewer: I see, thank you.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

PH1: Uhm, it is influencing me positively. I like it because it saves me time for my teaching. Through technology I am able to contact learners anyway regardless and anytime of where they are, even when they are at home. Technology makes my work simple and manageable.

Interviewer: That’s great. Thanks

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?
PH1: No, I think we do not have enabling structures because we lack enough resources for the implementation of technological learning such as blended learning. We also do not have overhead projector, and internet connectivity. We have few computers that can be used for teaching. However, at the moment the principal has arranged to buy more laptops for all the teachers to be used for teaching and learning purposes.

Interviewer: That's wonderful. Thanks for the principal.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PH1: I think blended learning is beneficial to both teachers and learners. It provides quality education to the learners and also decrease teachers′ workload. It also makes it easier to communicate with the outside world to get useful information. You see, by using blended learning a teacher is able to give learners work even if they are at home. It makes our communication with the learners′ parents pertaining their schoolwork easier.

Interviewer: Okay, thanks

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PH1: I find it difficult to use software for teaching and learning purposes. I think I need a lot of practice, but the biggest problem is the accessibility to the technologies. We do not have enough computers which we can use in the teaching and learning.

Interviewer: Why do you not practice with your own computer?

PH1: I do not have one Sir. I rely on the school's computers.

Interviewer: I think you need to buy your own.

PH1: You are right, Sir.
Interviewer: Okay, thanks

Interviewer (Question 7): Are you currently using blended learning? Explain

PH1: Uhm…I can say, to an extent, yes. I use it when I am searching information from the internet. I use my own data because the school does not buy us data. In fact, as a school we are actually not currently using computers for teaching and learning in the classroom.

Interviewer: Why are you not using computers for teaching and learning in the classroom?
PH1: It is because we do not have skills for that, Sir.

Interviewer: But if you are able to search information you can use it for teaching and learning in the classroom. Is it not so?

PH1: No, Sir. We must first be trained to do that.
Interviewer: Oh, I agree.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

PH1: Technology appliances makes curriculum implementation easy, but we are experiencing lack of these appliances in our school. I think if the department can provide teachers and learners with technologies, then blended learning can be implemented in our schools.

Interviewer: Why does the school not buy you some computers? I see some schools buying computers for teachers to use for teaching and learning.

PH1: I do not know Sir. Maybe the school does not have enough money for that.
Interviewer: Okay, thanks

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?
PH1: I think it is good to combine the two approaches because learners will be able to apply their theoretical knowledge practically. The combination of the two approaches will also boost the strengths of each approach and minimises the weaknesses. It is unfortunate that we are not able to combine these approaches because of lack of technologies and lack of skills.

Interviewer: That's true, thanks

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

PH1: You know, our teachers are sometimes lazy and fearful of changes. They stick to writing their teaching and learning activities freehand instead of using technologies. I think the challenge here is transformation. Our SMT also contribute to this because they do not have knowledge of policies in technology. I think if they can advocate implementation of technology policies then blended learning can be easily implemented.

Interviewer: You are correct, thanks

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PH1: I think teachers need computer literacy skills. The SMT must also encourage and motivate teachers to use ICTs in their teaching practices. I think this can assist them to get used to technologies.

Interviewer: Does the SMT convene some workshops about the usage of technologies sometimes?
PH1: Yes, they do sometimes.
Interviewer: Thank you.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?
PH1: I think the teachers need to be provided with personal computer that they can always use in their teaching practices. They also need regular development because these technologies are ever changing with time. I think, most importantly, the school need to be internet connected so that we can use it to get information needed for teaching and learning.

Interviewer: Okay, thanks

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PH1: My recommendation is that intensive training be undertaken to teachers and SMTs. Not the hours, two hours or so given to teachers deemed as trainings. In addition, I think if regular school-based workshops for teachers and the parents could be done I think this can ensure a successful implementation of blended learning.

Interviewer: Thank you very much. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our

discussions will only be used for the purpose of this study. If the need may arise for the interview follow up, would you be available for the interviews?

PH1: Yah, sure, I will. Thank you, Sir.

Date: 03 July 2020
Participant: PH2
Interviewer (Question 1): What are your views on teachers′ understanding of blended learning in teaching and learning?

PH2: My understanding of blended learning is that it is the situation where a teacher uses normal teaching and joins it together with technologies. In this learning computers, projectors, videos and TVs are used to supplement normal teaching. I have seen it been practised by schools which have sound financial background.

Interviewer: Do you mean you do not practice it here?

PH2: Yes, we don’t practice it.
Interviewer: Why?
PH2: It is because were don’t have skills and also there are no technological resources in our school.
Interviewer: Oh, I understand.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

PH2: Uhm, I have some knowledge, but I think I need further development in technologies. The department need to develop us so that we can be able to use these technologies in the teaching and learning situations.

Interviewer: Where did you get that knowledge?

PH2: I obtained it from the private computer service providers'
Interviewer: What computer qualification do you have?
PH2: I have a diploma.
Interviewer: Oh, that's interesting.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

PH2: Eh…! Technology has never been a challenge to me. The problem is the implementation of the necessary resources in the classroom. One other problem is the reluctance of teachers to use the technologies. I think if there can be enough resources then we can teach using the technology.

Interviewer: Okay, thanks

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?
PH2: You, see! The problem is that we are not having a training structure for technologies in our school. The school does not have technological resources for teaching and learning purposes as well. As a result, I think it will be difficult for the school to adopt blended learning.

Interviewer: Do you mean you lack training in computers?

PH2: No, I mean experts who can train us on how to use the technologies in the classroom.
Interviewer: Oh, I understand.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PH2: I think blended learning makes it easier for us to communicate with the outside world to get useful information. You see, by using blended learning a teacher is able to give learners work even if they are at home. Here, in our school we are using it to communicate with parents pertaining their children schoolwork.
Interviewer: Oh, that's wonderful. Thanks.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PH2: Yah, we have many challenges, but I think the critical challenge we have is the structure to accommodate learners for technology learning. You see, if we were to implement blended learning, then we shall be expected to divide the learners into groups, and this will need more classroom which we don't have. It will also and it will also increase teachers' workload.

Interviewer: What are the other challenges?

PH2: We do not have enough technology resources; our school is not internet connected and most of our teachers are computer illiterate.
Interviewer: Okay, thanks
Interviewer (Question 7): Are you currently using blended learning? Explain
PH2: No, not at all.
Interviewer: Can you explain why?
PH2: We are not implementing blended learning due to lack of laptops, projectors and tablets for learners in the school. That is why we are unable to start with the usage of ICTs in our school.
Interviewer: I understand

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

PH2: I think is good to use technology appliances in the curriculum. Today's learners like technology so we need to teach them through what they like most so that they understand better. Unfortunately, only few teachers in our school can use a computer. I am struggling to use a computer myself.

Interviewer: How do you think of improving your usage of technology appliances?
PH2: We are only relying on the department, Sir. DBE should train us to use technologies.
Interviewer: That's true.
Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

PH2: Uhm, I think if the two approaches are combined, learners' understanding of content can be enhanced and also, the teachers' workload can be eased. It is a pity that we are not able to do this because we are incompetent to use computers. The other problem that would make the combination difficult is that the technology resources are not available in our schools.

Interviewer: Oh, I understand.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?
PH2: Eh, I think there are a lot of challenges that impede us to engage in blended learning. Lack of resources impose a serious challenge to almost all our schools. One other factor worth mentioning is the resistance of teachers to technologies. I think if enough resources can be available in our schools, it will be easy for teachers to engage in blended learning.

Interviewer: What are the other challenges?

PH2: I think the knowledge of teachers in technologies and internet connectivity constitute some of the challenges.
Interviewer: Okay, thanks

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PH2: Eh, you see, some of the teachers are already having basic skills of computers, I think they just need development in the application of the technologies. The school development team must put emphasis on the use of technologies in the school.

Interviewer: Do you have a school development team in your school?
PH2: Yes, Sir. Unfortunately, they cannot develop us in the technologies because they don't have skills.
Interviewer: I understand.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

PH2: I think teachers need to be regularly workshopped in ICTs. The SMT members must monitor the implementation of blended learning regularly to ensure that teachers are given support. I think the school must also support the teachers by ensuring that internet connectivity is done in the school.

Interviewer: Okay. Thanks

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PH2: I recommend that DBE train teachers, provide technology facilities and that the SMT monitor implementation of blended learning intensively. I also

think that teachers should develop themselves instead of awaiting the government.

Interviewer: Thanks very much for your time. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma'am, if the need may arise for the interview follow up, would you be available for the interviews?

PH2: Yes, sure. Thank you, Sir.

APPENDIX R: INTERVIEW TRANSCRIPTS FOR TEACHERS

The interviews started on 29 June 2020 and ended on 03 July 2020.

The interviewer greeted, welcomed, sanitised and measured participants' temperature o all the participants for Covi-19 purposes. He further thanked them for giving their time for the interviews. The participants were asked their consent for the recording of the interviews and they all agreed that the interview be recorded. Furthermore, the researcher assured all the participants that their identities and those of their schools will be kept confidential. They were also assured that the information obtained from the interviews will only be used for the purpose of the research study. All the participants were informed that they could refrain from the interview and from answering a question at any time they so wished.

Date: 29 June 2020

Respondent: ST1

Interviewer (Question 1): What is your understanding of blended learning?

ST1: Uhm, I do not know. Can you explain to me?

Interviewer: Blended learning involves combining different types of leanings, for example, old and new ways of teaching. What are your views about this?

ST1: Oh, then I think it is using computers together with face-to-face teaching in the teaching environments. I think it can be good, but it will require skilled teachers in technologies.

Interviewer: You are correct, thank you.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

ST1: Eh, what can I say? I have a computer certificate done some years ago, but truly, I know nothing at the moment, especially for teaching and learning purposes. I need to be trained again so that I can use computers in the classroom.

Interviewer: Thank you Ma'am.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?
ST1: Sir, I am positive to the implementation of blended learning. This is because it saves my preparation and time and it also makes learners to understand better. I am able to obtain additional information, and this makes me successful in my teaching.
Interviewer: Thank you.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

ST1: No, No, No, the school does not have enabling structures for the implementation of blended learning. There are no technological resources; no internet connectivity; no accommodation and we are also not developed enough to implement technology learning in our school.
Interviewer: Thanks

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

ST1: Surely, the use of blended learning will benefit us very much. It will provide more knowledge to both ourselves as teachers and the learners as well. I think the learners' performance will improve. We will really be able to provide quality education through using the blended learning.

Interviewer: That's true.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

ST1: Yes, we experience some difficulties in using these technologies. Most of us as well as the learners are unable to use the technologies. We lack knowledge and skills to use technologies and I think we need to be trained. I think the department must take responsibilities in this regard.
Interviewer: Thanks.

Interviewer (Question 7): Are you currently using blended learning? Explain.
ST1: Currently, we are not implementing blended learning in our school. This is due to the fact that we do not have the necessary expertise. One other thing is there are no technological resources like computers and internet for teachers and learners.
Interviewer: Yah, Ma′am, and then it is worrying.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

ST1: You see, I have some certificates in computers, but I really find it hard to use computers in the teaching and learning situations. I think I need more intensive development in technologies.
Interviewer: Do you have your personal computer?
ST1: No, Sir.
Interviewer: Maybe if you buy one you can be used to it.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

ST1: I think the combination can make a big difference. It can make teaching and learning active and thus, ultimately increasing the learners' performances. However, in our case the schoolteachers are not trained in ICTs and therefore are not blending technology approaches to their teaching and learning activities.

Interviewer: Does the SMT not develop you in computers sometimes?
ST1: Not at all.
Interviewer: Yah, then it is bad. Thanks

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

ST1: I think some of the challenges that we experience include lack of resources and teachers skills. These hinder us to use the technologies in their teaching and learning activities regardless of the fact that we force to use the few devices that we have. I also think that theft of the computers adds to the challenges that we encounter.
Interviewer: You are correct, thanks.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

ST1: You see! Sir, we need serious development in ICT skills, I think our principal must invite technology experts to come and develop us. You know, I have a computer certificate, but I cannot teach by using them. Yah, we are really having big problems.

Interviewer: How did you obtain your certificate?
ST1: From a certain computer service provider.
Interviewer: How long did it take?
ST1: Two weeks'
Interviewer: Joh, two weeks, anyway thanks Ma'am.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

ST1: I think DBE need to develop teachers in technologies. It must establish training and workshops programmes for teachers and members of SMT. The SMT also encourage and motivate us and the learners to make use of computers for teaching and learning regularly.

Interviewer: Thank you Ma′am.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

ST1: I think the government must support the teachers by giving them laptops and all the technology material needed. I also recommend that DBE provide schools with data and security for a successful implementation of blended learning.

Interviewer: Thanks, Ma′am. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school shall be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma'am, if the need may arise for the interview follow up, would you be available?
ST1: Yes, Sir. Thank you.

Date: 01 July 2020
Participant: ST2
Interviewer (Question 1): What is your understanding of blended learning?
Participant: Blended learning! I have never heard about this type of learning before.
Interviewer: It is a type of learning in which technology and our usual ways of teaching are combined. What are your perceptions about such type of learning?

ST2: I don't know Sir, because I don't understand these technologies.

Interviewer: Ma′am, I think it is high time that you understand the technologies. You are obliged because we are living in the world of technology. What subject are you teaching?
ST2: I am teaching Sepedi Sir.
Interviewer: I think the knowledge of technologies can help you a lot in teaching your subject, Ma′am.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

ST2: Technology knowledge! No, Sir, I was never exposed to ICTs before.
Interviewer: Do you sometimes use a computer?

ST2: Yes, sometimes.

Interviewer: What do you use it for?

ST2: I only use it if I type my lesson preparations and assessment tasks, but I am always struggling.

Interviewer: Oh, then it is not good.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

ST2: I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking about e-learning but does not train teachers. How do they think technology education can be successful without teachers?
Interviewer: Ok. Thanks

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?
ST2: As I indicated earlier, we do not have technology resources therefore I can say the school has no enabling structures at all.
Interviewer: I understand, thanks

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

ST2: According to me, blended learning has numerous benefits. I think it reduces teaching time and we can easily gather information using technologies. The usage of internet is really helping us a lot, especially in blended learning. We are able to provide quality teaching through blended learning.

Interviewer: Is that so?

ST2: Yes, Sir
Interviewer: Thank you.

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?
ST2: I have insufficient technology capabilities, so I encounter challenges to teach learners with computers. The Department together with the management of the school must train us to use computers.
Interviewer: Do you mean you sometimes use technologies to teach?

ST2: I sometimes do but struggle to connect the computer and projectors and this discourages me to use them.
Interviewer: Sure, you need some development.

Interviewer (Question 7): Are you currently using blended learning? Explain.

ST2: No, Sir. We are not using blended learning currently. There are no computers and internet in our school. We also do not have enough knowledge on how to use them. I think we need training in this area.

Interviewer: Who is supposed to train you?
ST2: The department.

Interviewer: Don't you think you can develop yourself through some private service providers?

ST2: Yes, I can but I don't have money for that.
Interviewer: Yah, nee.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

ST2: We only use the technology appliances when administering teaching and learning activities like tests, assessment documents. Because we do not have the ability to use the computers for teaching, we are not able to use them for teaching and learning practices. We need training for the usage of technologies in the classroom.

Interviewer: I see. Thanks.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

ST2: Sir, I think it will be good to blend the two approaches because they can complement each other. But because we lack knowledge of computers usage, this would not be possible for us to implement in our school. I think we need development in that area.

Interviewer: Oh, I agree.
Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

ST2: Sir, teachers are unfamiliar with the technologies and I think this makes them resistant to embrace it. We were not trained how to use technology in teaching during our training. I think for us to be able to use them; we must first be trained.
Interviewer: That's true.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

ST2: Yes, I think teachers need a practical usage of word; excel and power point to be able to implement blended learning. Uhm, I think they need these skills because implementation of technologies requires basic computer literacy. I think they also need to have skills on how to use internet to get the necessary information.

Interviewer: That's true. Thank you.

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

ST2: I think to ensure a successful implementation of blended learning, the DBE should organise and monitor training programmes for teacher development in technologies. In that way, the teachers will be best positioned to integrate technologies in the teaching and learning.

Interviewer: True, thank you.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?
ST2: Yah, I recommend that our school be internet connected and that enough ICT resources be made available to ensure successful implementation. I think ICT Centre also need to be built in the school.

Interviewer: Okay. Thank you. This brings us to the end of the interview. Thank you very much for your time. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma'am, if the need may arise for the interview follow up, would you be available for the interviews?

ST2: Yah, sure, certainly. Thank you, Sir.

Date: 30 June 2020
Participant: PT1

Interviewer (Question 1): What is your understanding of blended learning?

PT1: Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. So, learners learn by seeing what you are teaching them about practically.

Interviewer: Thank you Sir.

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

PT1: I cannot say it is enough, we still have a lot of room to learn, because technology is a new thing to all of us. You see, our schools are not yet ready for technology education.

Interviewer: Why are you saying schools are not yet ready?
PT1: Yes, because there are no technology resources, teachers are not trained and so forth.
Interviewer: Thank you, Sir

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?

PT1: Ok, I can say it has helped me a lot. I use my laptop and a projector in class and teach learners by demonstrating and the learners are enabled to relate theory and practical reality. In so doing my learners understand better.

Interviewer; Okay, thank you.

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

PT1: Yes, we have enough classrooms but unfortunately the school has no ICTs for teaching and learning purposes. My take is if the government can provide us with computers and develop all the teachers, then we shall be able to practice blended learning in our schools'.

Interviewer: Correct, thank you.

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PT1\: Oh! The benefits of technology include giving learners the perspectives of seeing real things than theorising them. You understand? Learners become aware of how things are done in a real situation.

Interviewer: What do think a school benefit from using bended learning?
PT1: I think it benefit because learners receive quality education and therefore the schools performance is increased.

Interviewer: Okay, thanks.
Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PT1: I think we have several difficulties to use blended learning in our school. Sometimes we have electricity challenges, like last week I failed to teach because there was no electricity in that building block and I had to relocate the learners, and this took much of my time and that of the learners.

Interviewer: Okay, thanks

Interviewer (Question 7): Are you currently using blended learning? Explain.

PT1: Yes, I use it sometimes when I want my learners to see the real situation as opposed to theoretical content in their textbooks. Otherwise, as a school we are currently not employing blended learning for teaching and learning.

Interviewer: Why do you think the school does not use blended learning?

PT1: Maybe it is because there are no technological resources and most teachers are not computer literate.

Interviewer: Okay, I see. Thanks

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

PT1: I think technology appliances are more relevant to today's type of education, it is a pity that we do not have these appliances in our school. We also lack knowledge and skills in technologies. I for one, because I am offering Technology as a subject, I often use my computer to teach some of the content. Learners really enjoy this.

Interviewer: Do you enjoy using it?
PT1: Yes, very much.
Interviewer: That's interesting.

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

PT1: I think it will be important to combine the two approaches. By using technology approaches and traditional approaches simultaneously will help because the two will boost and strengthen each other and therefore enhancing learners' performances. You see, learners like viewing things on the screen I think the blending will make them participative and interactive in the teaching and learning activities.

Interviewer: I see. Thank you.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

PT1: You see, we are impeded by so many challenges to implement blended learning, Sir. We do not have technological skills. I think if we can be developed in the technologies then we can be able to implement. It is unfortunate that we do not have some technology developmental structures in our school. The other challenge is technological resources. We don't have resources in our school, I and this constitute one of the challenges which impedes us.

Interviewer: Okay, thanks.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PT1: Yah, Nee! Technology skills…I think we lack computer application skills, usage of software and hardware. We also need to be developed on the policies which relate to ICT such as e-Education Policy and Professional Teacher Training in Digital Integration in Schools.

Interviewer: Okay, thanks

Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

PT1: Sir, I sometimes lay a blame on our SMT members for not using technologies in our school. They do not train and develop us in these technologies. I think the SMT must encourage and motivate us to employ technologies in our teaching and learning practices. The DBE as well must support schools by providing all the technological facilities needed to the school.

Interviewer: Oh, I see. Thanks.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PT1: Thank you, Sir. I recommend that all the teachers be trained in ICTs and that the DBE provide technology resources to schools. I also recommend that the SMT together with the SGB make money available to develop us in technologies.

Interviewer: Thank you very much for your time. This brings us to the end of the interview. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. Ma'am, if the need may arise for the interview follow up, would you be available for the interviews?

PT1: Yah, sure, certainly. Thank you, Sir.

Date: 03 July 2020
Participant: PT2
Interviewer (Question 1): What is your understanding of blended learning?

PT2: Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. This type of learning enables learners learn by seeing what you are teaching them about practically. Technological resources are used to supplement our usual face-to-face teaching in this type of learning.
Interviewer: Okay, thanks

Interviewer (Question 2): Do you think your level of technology knowledge is enough for administering and managing blended learning in your school?

PT2: Definitely No. I do not have any technology knowledge.
Interviewer: How do you think you can acquire technology knowledge?

PT2: I think through training and developmental workshops.
Interviewer: Who do you think should do the training?

PT2: I think the DBE should train us and the school take the responsibility of developing us.
Interviewer: Oh, I see.

Interviewer (Question 3): How has the introduction and implementation of blended learning influenced your decision to engage or not to engage in blended learning?
PT2: Oh…! As long as I can be technologically skilled, it is then that I can be able to teach learners through technologies. But at the moment we are still struggling with these technologies.

Interviewer: Why don't you develop yourself in the meantime?
PT2: No, no, Sir. I think it is the responsibility of the department to develop teachers. This needs money and we do not have it.
Interviewer: But, Sir, you are developing yourself not for the department.
PT2: As I said Sir. teachers do not have money for paying tuition themselves. The department must do this.
Interviewer: Yah, nee. Thanks

Interviewer (Question 4): Do you think that your school has enabling structures for the implementation of blended learning?

PT2: You know, we have no requisites for the teaching of blended learning. As you see these old dysfunctional computers, they are not working. Nobody uses them because we are not all being trained. I think the school is not yet ready. The department and the SMT must train us and avail the necessary technology facilities so that we can implement blended learning in our schools

Interviewer: Okay. Thanks

Interviewer (Question 5): What do you perceive to be the benefits of using blended learning in your school?

PT2 My guess is blended learning has many benefits, these include improvement of learners' understanding, improvement of teachers technology knowledge, development of communities in the usage of technological tools at

their homes. For us, teachers' technologies help us to provide quality education as well as enabling us to search and download very important information from internet.

Interviewer: Yes, thanks

Interviewer (Question 6): What is your perceived level of difficulties of using blended learning?

PT2: Yah! Our challenge is that we were not trained in these things. If we can be given training, I think we can be able to cascade the technology knowledge to our learners. Other difficulties which we experience include access to the technology devices; insufficient resources; internet connectivity and security. You see, the few laptops that are available are strictly located in the principal's office and used for administration and management activities only.
Interviewer: Oh, I see. Thank you very much

Interviewer (Question 7): Are you currently using blended learning? Explain

PT2: No, our school is currently not using blended learning. This is because we do not have resources and our teachers are also not been trained. I think it must start by training teachers and purchasing of sufficient resources.
Interviewer: Thank you.

Interviewer (Question 8): How do you find the usage of technological appliances in curriculum implementation?

PT2: You see, we are all struggling with the use of technology devices in our school. I think before we can even talk about implementation we need to be thoroughly trained. Our schools are not provided with computers for teachers and learners for teaching and learning and I think this must also be sorted out

by the department and the SMT. If the ground is adequately levelled, we are ready to implement blended learning.

Interviewer: Oh, I understand. Thanks

Interviewer (Question 9): What are your views on the blending of technological approaches and traditional ways of teaching?

PT2: Ok, I think the combination of old teaching approach and new technological approaches is good because they can strengthen each other and as a result making teaching and learning successful. We are not blending the two approaches here because we are not skilled in technologies.

Interviewer: Who is supposed to skill you in technologies?
PT2: I think the department should train us in technologies.

Interviewer: Is it not possible for you to develop yourself?
PT2: It is, but it needs money which we do not have.
Interviewer: Oh, I understand.

Interviewer (Question 10): What are your views on the challenges that impede teachers from engaging in blended learning?

PT2: Uhm, there are so many challenges. Some of them are the lack of data, lack of technology resources and lack of skills. I think if the DBE and the school can buy us data these things, maybe we can be able to implement blended learning.
Interviewer: Okay, thanks.

Interviewer (Question 11): What skills do you think teachers need to implement blended learning successfully?

PT2: Sir, I think we need basics computer skills. I mean knowing the computer parts, how to operate it and the software. Unfortunately, there are no computers in our school which we might be using to acquire skills. I think we need to be first developed so that we attain skills to implement blended learning.

Interviewer: Okay, thanks.
Interviewer (Question 12): What support do you think is needed for the teachers to implement blended learning?

PT2: You see! Teachers do not have money. I think the department can support us by buying laptops and data for us. I also think that we need some encouragement and motivation to implement blended learning.

Interviewer: Is your school internet connected?
PT2: No, Sir. Teachers are using their own data.

Interviewer: Do you have your personal computer?
PT2: No Sir.
Interviewer: Don't you think you need one?
PT2: I do, but as I have highlighted, I have money constrains. Maybe next time.

Interviewer (Question 13): What are your recommendations for the introduction and improvement of the implementation of blended learning in schools?

PT2: My recommendation is that the DBE train teachers in technologies and SGB (School Governing Body) provides a budget for the development of teachers in blended learning programmes. I also recommend that the SMT organise school-based developmental programmes for teachers so that we remain skilled in technologies. Furthermore, community involvement in the safeguarding of the school should be intensified.

Interviewer: Thank you very much for your time. This brings us to the end of the interview. As I indicated when we start, your identity and that of your school will be kept confidential and the contents of our discussions will only be used for the purpose of this study. Sir, if the need may arise for the interview follow up, would you be available for the interviews?

PT2: Yah, sure, definitely. Thank you, Sir.

APPENDIX S: SUMMARY OF PRINCIPALS' NARRATIVES

Theme 1: Teachers perceptions of blended learning in teaching and learning				
Sub-theme	**Participants responses**			
	SSP1	**SSP2**	**PSP1**	**PSP2**
Sub-theme 1: Understanding of blended leaning **Question: What is your understanding of blended?**	"Eh…, I think it is about teaching using visuals in the teaching and learning situations. Eh....it is when videos and charts but mostly slides are used by teachers to supplement their teaching together with a computer we talk of blended learning. Interviewer: Ok.	"What I understand by blended learning is that , eh… it is a form of communicating with learners, without their presence, that is remotely, and getting information from different sources such as computers, projectors, videos"	"I think blended learning is a type of learning whereby teachers use mix methods or mixed strategies, as I see this word blended. I think there is a mixture of different methods and strategies"	Oh, if is concerning the computers or the new technologies that is talked about, we have not yet started with that type of learning. Though we had some computers in our school, the problem is we do not have teachers who can use them. They were only used by an outside expert who volunteered to train our learners"
Sub-theme 2: Technological knowledge of administering and managing blended learning	"Yes, I think I have moderate technology knowledge because recently I did ICT with the University of	"I think I have enough knowledge of computers because I have used technology devices in my studies.	"No, I do not have enough technology knowledge, I only know how to type using Word and unable to use	"Not exactly, but I have basic computer skills. I am able to use a laptop to type my management and

	Limpopo …´	However, for the reason that I did not use them for teaching and learning purposes I cannot use them for teaching and learning activities"	Excel and Power-Point, So I cannot use a computer in teaching and learning situations"	administration documents, teaching and learning documents like assessment tasks and lesson preparations"
Sub-theme 3: Benefits of using blended learning	"For me I think in terms of performance it saves time for learners in activities such as classwork and also that learners are able to see real things if videos, for example, are used. Personally, this blended learning will help me as I am doing my Master of Education Degree in visualisation using technology, so I shall benefit a lot"	"The benefits of blended learning are numerous. As I said earlier, the learners like technology, so it can be used as a way of getting good results, especially Grade 12 results. It also benefits teaches a lot because they are able to obtain valuable sources through internet to supplement their teaching content".	"I think blended learning would benefits learners and teachers a lot. Learners will get better quality education and the teachers will have the opportunities to improve their ICT knowledge and skills. By employing blended learning both teachers and learners are able to get more information through internet and, hence complementing their existing contents"	"Sir, I think through blended learning learners are able to obtain more information from technologies and it helps teachers with their lesson planning, assessments tasks. I think blended learning also makes it possible for teachers and learners to contact each other any time and anyway if they need one another"

Sub-theme 4: Difficulties of using blended learning	"Yah Ne! Downloading, downloading some teaching materials is time consuming. It takes a lot of time to prepare and to connect when you are in class. This is the case because we were not trained in technologies"	"I think it will be difficult to me to use blended learning, I do not have the ability to download content from computer. Generally, I shall not be able to teach using technological devices. The department must develop us to avoid us been frustrated in front of learners"	"Oh, you know, the most difficulty we have is the protection of the few technology equipment and infrastructure that we have. We have a problem with the members of the community who are regularly vandalising our school, instead of supporting us regarding the education of their own children. We also do not have support from the parents because most of our learners stay with their grandmother who know nothing about technologies"	"Sir, if we are developed in technologies enough, I do not foresee any difficulty. Let us first be developed and also provided with resources then it will be easy to apply blended learning in our teaching"
Sub-theme 5: Challenges that impede teachers	"We would love to apply blended learning, but we	I think blended learning requires a reasonable	I think it is only a lack of teachers'	Sir, with us, I think we lack suitable

to engage in blended learning	experience some challenges such as unreliable electricity in our school and time constrains. The worse problem is that our school is not internet connected"	number of learners per classroom. With us we have large of learners per class because we do not have enough classrooms. Blended learning requires a small number of learners and therefore we will experience a challenge with accommodation. We also have a problem with the teachers because they are reluctant to adopt technologies"	interest and laziness in using technologies. For example, I have advocated these technologies in our school and lately I see most of them using the laptops on their own"	technological infrastructure and facilities. Our teachers do not have ICTs skills and also our time-table will be constrained with these technologies. These are challenges which make us fail to engage in blended learning"
Sub-theme 6: Recommendations for the introduction and implementation of blended learning	"My recommendation is that the DBE train and develop us in the technologies. They should not just provide technology devices, but they should also show us how these devices	"My recommendation to DBE is that they provide training for teachers. The ICT committees need to be established in schools to oversee implementation and workshopping of	"The DBE need to train teachers in ICTs so that teachers got developed in the technological approaches of teaching and learning"	"I recommend that the department train the teachers. For us at school level, we need to outsource technological experts train our teachers".

	function, especially in the teaching and learning environment"	teachers at school level"		
Theme 2: Connection of technology resources in blended learning				
Sub-theme	SSP1	SSP2	PSP1	PSP2
Sub-theme7: Influence of blended learning on teachers practices	"The usage of technologies in teaching and learning influences me negatively. This is because I am unable to use computers due to lack the necessary skills. I am afraid to be stranded with these technologies in front of learners. We must first be developed so that we use the technologies "	"I am positive for the implementation of blended learning in schools. The learners enjoy using ICTs and I think implementation of blended learning could boast their performances. It also saves teachers preparation and facilitation time"	Ok, I think it has influenced me positively because with this blended learning my teachers and learners and the community at large are now having more understanding of the technologies and are able to use it. It also influences learners as I see that they participate actively when taught through technologies"	"Eh…! For teaching and learning, I think it is time consuming, but when one uses the laptop and projectors learners understand better because they are able to see what they are taught about practically"
Sub-theme 8:	"Our school	"You, see! Lack	"Yes, I think we	No, Sir! We do

Enabling structures for implementation of blended learning	does not have any enabling structures for us to implement technologies. We do not have tech resources; internet connectivity and teachers are also not trained and are not supported by the department and …"	of resources and suitable accommodation for teaching blended learning is a burning issue for us. If these can be sorted out, I think we will be ready to implement blended learning"	have enough classrooms which can be converted into technology for learners, but the problem is that we do not have ICT resources. If the department can provide us with this and train our teachers, then we will be best positioned to apply blended learning in our school"	not have the necessary skills, so I think our school is not ready to implement blended learning. The department need to re-skill us in technologies in order for us to implement blended learning"
Sub-theme 9: Usage of technology appliances in schools	´I find it relevant because I teach Sciences. The usage of technology appliances in the school is good because it helps learners to visualise abstract content. Just that we are unable to take this advantage because we do not have resources. The	"You see! We have few computers in our school, but regretfully the teachers are reluctant to use them. I think when used effectively, they can improve performance of our learners"	"Oh, I think technology appliances create a positive teaching and learning environment. This was even evident lately during the Covid-19 lockdown. Schools which are advanced with technologies	"I think usage of technology appliances will help a lot in curriculum. Since I said earlier that when one is searching for more information one can obtain that from internet. Technology also assists learners to get more

	appliances help a lot because the learners are able to see reality through visualisation"		had their learners taught while they were at home while those like ours were totally dysfunctional. To a little extent, our teachers here are using the technologies. They just need development so that they fully and confidently use them"	information for their assessment tasks"
Sub-theme 10: Current implementation of blended learning in schools	"In fact, I cannot say we use computers, only few teachers make use of them sometimes, for example a Life Sciences and Accounting teachers. In essence, teachers are currently not implementing blended learning and so is the school"	"Yes, by some few teachers. Life Sciences and Mathematics teachers use technologies sometimes. Maybe, it might be because of skills to use them. I would wish that all teachers use the technology appliances in all the subjects"	"Not at all, because of lack of teachers' technology knowledge and skills. We are incompetent to use the technology resources that we presently have because of lack of knowledge and skills of using technologies"	No, the lack of teachers' technology knowledge and lack of resources make the school environment unconducive for technology learning. We are therefore, currently not practising any technology learning in our school"

Sub-theme 11: Blending technological approaches and traditional approaches	"Sir, we are experiencing problems in as far as todays education is concerned. Teachers are still hanging on traditional approaches and resist the new technological approaches. They fear technologies and sometimes they think technology is going to take their jobs and so they reject it. I think that is high time that we blend the two approaches together"	"…I personally, find the combination of the approaches good because when you combine them together, they complement each other and so teaching, and learning becomes effective and successful"	"I think combining the two approaches can bear fruits because we will be able to get reference from the two approaches and they will also strengthen each other. The learners will be able to see abstract things visually and thus, improving their understanding"	"I think combining the two approaches is good because it can improve learners' understanding. However, we are not able to do this because we lack technological know-how"
Theme 3: Teacher skills in blended learning implementation				
Sub-theme	SSP1	SSP2	PSP1	PSP2
Sub-theme 12: Teacher technology skills	"Teachers are in dire need of computer literacy skills which they do not have. For	"I think teachers need to be trained in computer literacy and the basic application of	"I think the skills that teachers need include typing skills, how to use an	"Eh…! I think teachers need to have basic computer literacy skills. They also need

	example, Word; excel and power point skills to implement blended learning. I think they also need to be motivated and encouraged to use ICTs"	word; excel and power point to enable them to apply in their teaching and learning activities"	overhead projector, usage of power-point software and how to interpret slides …"	to know how to search information in the internet. Teachers need to also develop themselves in these new technologies apart from the departmental initiatives"
Sub-theme 13: Teacher support on blended learning implementation	"Yah, I think support is important for blended learning practices. The DBE need to support schools by providing ICT infrastructure and resources as well as training teachers in technologies. I also think that if the SMT encourage and motivate the teachers to always teach by technology devices. We are trying to practice even though we have very few resources …"	"I think teachers need to be exposed to technologies by way of workshops and training by the department. Some of them think using technologies is difficult and I think exposure will make them aware that it is not difficult. The DBE must support us by providing enough ICT resource and developmental programmes for teachers"	"Eh, Yah, we have arranged some developmental meeting for the teachers here in our school. We have also arranged to purchase laptops for each of our teachers for teaching purposes and we are waiting for delivery. We have lately workshopped them on how to download documents from the laptop and hope they understood. We are really	The support that we need in our school is the provision of technological resources to the teachers and learners. If the DBE can buy each teacher and all the learners' computers or laptops, I think this would be a good support. The community as well, I think they can support the school by safeguarding its properties, especially the technological tools from

			supporting them a lot”	thieves”

APPENDIX T: SUMMARY OF HoDs' NARRATIVES

Theme 1: Teachers perceptions of blended learning in teaching and learning				
Sub-theme	**Participants responses**			
	SH1	**SH2**	**PH1**	**PH2**
Sub-theme 1: Understanding of blended learning	"…then, I think it is using computers together with face-to-face teaching in the learning environment. I think this can be good, but it requires that teacher must have technological skills"	Oh! With the technology approach, as teachers I think we will be able to get information from different sources and couple it with our usual teaching methods, so ensuring better learners' understanding. But I think the problem might be the availability of technological resources and skills of the teachers"	"Oh! Blended learning, I think is the combination of old teaching approaches with technological approaches in the teaching and learning situations. But this type of learning I think it can only be implemented by a well-resourced school in terms of technology. In our case I do not think we can manage "	"My understanding of blended learning is that it is the situation where a teacher uses normal teaching and joins it together with technologies. In this learning computers, projectors, videos and TVs are used to supplement normal teaching. I have seen it been practised by schools which have sound financial background"
Sub-theme 2: Technology knowledge of administering and managing blended learning	´Uhm, I can say I am at the moderate level as far as technology knowledge is	"Yah, my level of technology knowledge is enough because I once being trained on how	"No, I do not have enough knowledge, I still need training. Maybe, if the Department of	"Uhm, I have some knowledge, but I think I need further development in

	concerned. I use a laptop to prepare my teaching and learning activities. Unfortunately, I cannot use it for teaching and learning because I don't have the skills to do that. Maybe if I get trained, I shall use it in the classroom"	to use computers. I use laptop to prepare my lessons and for assessment tasks"	Basic Education can organise some developmental workshops, we can have sufficient technology knowledge"	technologies. The department need to develop us so that we can be able to use these technologies in the teaching and learning situations"
Sub-theme 3: Benefits of using blended learning	"You know, with blended learning the learners can grasp better, and it saves time for teachers and learners. By using blended learning, the teachers and learners are able to obtain important information by internet to complement available resources. It is	"Oh, Yes! Blended learning reduces time of getting the necessary information for teaching and learning activities. It makes teaching and learning successful. I think it benefits learners and teachers a lot because through the computers teachers are able to get more information for	"I think blended learning is beneficial to both teachers and learners. It provides quality education to the learners and also decrease teachers' workload. It also makes it easier to communicate with the outside world to get useful information. You see, by using blended learning a teacher is able	"I think blended learning makes it easier for us to communicate with the outside world to get useful information. You see, by using blended learning a teacher is able to give learners work even if they are at home. Here, in our school we are using it to communicate

	a pity that the school does not most of these resources. At any rate, we would like to use blended learning but due to the lack of resources we miss enjoying the benefits of blended learning in our school"	the learners and for themselves. The only problem is lack of technological equipment and internet connectivity"	to give learners work even if they are at home. It makes our communication with the learners' parents pertaining their schoolwork easier"	with parents pertaining their children schoolwork"
Sub-theme 4: Difficulties of using blended learning	"I think lack of laptops and knowledge to use them are some of the difficulties we experience. The other problem is that learners are not able to use the laptops. Most of the teachers cannot even just open a laptop. I think training is needed for the usage of	"Thank you, Sir. The difficult part in using blended learning, I think is that most of us are unable to use the technologies and this makes it hard for us to apply. But I think if we can be trained, we will not find it difficult to practise blended learning in our school".	"I find it difficult to use software for teaching and learning purposes. I think I need a lot of practice, but the biggest problem is the accessibility to the technologies. We do not have enough computers which we can use in the teaching and learning"	"Yah, we have many challenges, but I think the critical challenge we have is the structure to accommodate learners for technology learning. You see, if we were to implement blended learning, then we shall be expected to divide the learners into

	technological appliances".			groups, and this will need more classroom which we don't have. It will also and it will also increase teachers' workload".
Sub-theme 5: Challenges that impede teachers to engage in blended learning	"Eh, the dominant challenges as I have highlighted earlier are lack of resources and lack of teachers technological skills. I think if the department can capacitate us as HoDs in terms of developing us and providing technology resources we can be better placed to develop teachers to implement blended learning"	"You see, sometimes our teachers are part of the challenges. Some of them seem to be resistant to changes. Furthermore, there are no supportive and development structures from the SMTs and the department, and this give the teachers chances of not using technologies. I think one other challenge that we as management overlook is motivating the teachers to use	"You know, our teachers are sometimes lazy and fearful of changes. They stick to writing their teaching and learning activities freehand instead of using technologies. I think the challenge here is transformation. Our SMT also contribute to this because they do not have knowledge of policies in technology. I think if they can advocate implementation of technology policies then blended learning	"Eh, I think there are a lot of challenges that impede us to engage in blended learning. Lack of resources impose a serious challenge to almost all our schools. One other factor worth mentioning is the resistance of teachers to technologies. I think if enough resources can be available in our schools, it will be easy for teachers to engage in blended learning"

		the technologies in their daily teaching and learning activities"	can be easily implemented."	
Sub-theme 6: Recommendations for introduction and implementation of blended learning	"To the DBE I recommend that they establish training programmes for the teachers and the SMTs. I also recommend that the SMTs take it up to themselves to workshop the teachers regularly and ensure that blended learning is implemented"	"My recommendation is that intensive training of teachers be undertaken to teachers and SMTs. Not the hours, two hours or so given to teachers deemed as trainings. In addition, I think if regular school-based workshops for teachers and the parents could be done this can help successful implementation of blended learning"	"My recommendation is that intensive training be undertaken to teachers and SMTs. Not the hours, two hours or so given to teachers deemed as trainings. In addition, I think if regular school-based workshops for teachers and the parents could be done I think this can ensure a successful implementation of blended learning"	"I recommend that DBE train teachers, provide technology facilities and that the SMT monitor implementation of blended learning intensively. I also think that teachers should develop themselves instead of awaiting the government"
Theme 2: Connection of technology resources in blended learning				
Sub-theme	**Participants responses**			
	SH1	**SH2**	**PH1**	**PH2**
Sub-theme 7: Influence of blended learning	"For me, it has influenced me positively. It is	Eh…! Like I said earlier that we do not have	"Uhm, it is influencing me positively. I like it	"Eh…! Technology has never been

on teachers practices	good because it saves me time in preparing lessons and getting more information about the content. When I go to class, I just use the computer and projector to teach instead of writing on the chalkboard which is time consuming. I really enjoy using computers in my teaching activities"	resources, we queue for a laptop from the office and sometimes it is difficult to get hold of it and this influences us negatively to use technologies in our teaching and learning practices"	because it saves me time for my teaching. Through technology I am able to contact learners anyway regardless and anytime of where they are, even when they are at home. Technology makes my work simple and manageable"	a challenge to me. The problem is the implementation of the necessary resources in the classroom. One other problem is the reluctance of teachers to use the technologies. I think if there can be enough resources then we can teach using the technology"
Sub-theme 8: Enabling structures for implementation of blended learning	"Yah, Nee! With this one, I can say we are averaged. The school is not yet there. I would say we get support from our principal who always encourage us to use technology in class. He	I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking	"No; I think we do not have enabling structures because we lack enough resources for the implementation of technological learning such as blended learning. We also do not have overhead projector, and	"You, see! The problem is we are not having a training structure in technologies and the school does not have technological resources for teaching and learning purposes. As a result, I think it will be difficult

	bought us some laptops, projector and TV to be used in our teaching. Unfortunately, we don't have the likes of internet connectivity and a computer centre"	about e-learning but does not train teachers. There are no technology resources, no internet connections, no technology-skilled teachers but yet we are expected to use technologies. How do they think technology education can be successful without teachers?	internet connectivity. We have few computers that can be used for teaching. However, at the moment the principal has arranged to buy more laptops for all the teachers to be used for teaching and learning purposes"	for the school to adopt blended learning".
Sub-theme 9: Usage of technology appliances in schools	"I think is good to use technology appliances in the curriculum, although I sometimes fear that most of the educators are not able to use them, which means they would first be trained and this is a hell of work to do. I enjoy using the technologies in	Yah, I think they are user-friendly, because when using them in class you are able to give learners different task and examples visually and practically and this makes teaching and learning successful. I think the appliances enhance the	"Technology appliances makes curriculum implementation easy, but we are experiencing lack of these appliances in our school. I think if the department can provide teachers and learners with technologies, then blended learning can be implemented in	"I think is good to use technology appliances in the curriculum. Today's learners like technology so we need to teach them through what they like most so that they understand better. Unfortunately, only few teachers in our

	my teaching processes"	learners' performances"	our schools "	school can use a computer. I am struggling to use a computer myself".
Sub-theme 10: Current implementation of blended learning in schools	"Yes, I am using it. I just go to class with my laptop, play videos of my preparation for learners. I see only few of us using computers when teaching. So, I cannot say the school is currently implementing blended learning "	"Eh..., I can say no, because we only use laptops for typing our lesson preparations and assessment activities. As I said earlier, they are used for administration purposes only"	"Uhm…I can say, to an extent, Yes. I use it when I am searching information from the internet. I use my own data because the school does not buy us data. In fact, as a school we are actually not currently using computers for teaching and learning in the classroom"	"No, not at all …" We are not implementing blended learning due to lack of laptops, projectors and tablets for learners"
Sub-theme 11: Blending technological approaches and traditional approaches	"I like blending the two approaches every time when I am teaching. The two approaches if combined, support each	"Uhm, I think one of the views is that the two approaches boost each other. The weaknesses of one approach is strengthen by the strength of	"I think it is good to combine the two approaches because learners will be able to apply their theoretical knowledge practically. The combination of	"Uhm, I think if the two approaches are combined, learners' understanding of content can be enhanced and also, the teachers'

	other. The weaknesses of one approach will be boosted by the strengths of the other approach and hence a provision of quality teaching and learning. The other advantage is that the learners like the technology part and this makes them to participate actively and interactively"	the other and thus making a strong front for quality provisioning of education. However, it is saddening that most of the teachers are still hanging on the traditional teaching ways due to lack of technology resources. I think we also need training to be able to use the technology devices"	the two approaches will also boost the strengths of each approach and minimises the weaknesses. It is unfortunate that we are not able to combine these approaches because of lack of technologies and skills"	workload can be eased. It is a pity that we are not able to do this because we are incompetent to use computers. The other problem that would make the combination difficult is that the technology resources are not available in our schools"
Theme 3: Teacher skills in blended learning implementation				
Sub-theme	**Participants responses**			
	SH1	**SH2**	**PH1**	**PH2**
Sub-theme 12: Teacher technology skills	"I think teachers need computer usage skills and practical application of ICT tools. Schools should also take responsibilities to develop us through some	"Yah, I think the skills that teachers need include computer literacy, word; excel and power point. Teachers must also be encouraged and motivated to use the computers regularly"	"I think teachers need computer literacy skills. The SMT must also encourage and motivate teachers to use ICTs in their teaching practices. I think the this can assist them to	"Some of the teachers are already having basic skills of computers, I think they also need serious development in the application of the technological devices. The

	workshops. As they do not have expertise, they must outsource experts and technological service providers to develop their teachers"		get used to technologies"	school development team must put emphasis on the use of technologies in the school"
Sub-theme 13: Teacher support on blended learning implementation	"I think the department must prove schools with sufficient technological resource. DBE need also to train and develop teachers in the use of technologies. The SMT and the SGB must also support teachers to implement blended learning by making budget for technologies available	"I think teachers can be supported by training them in technologies and give them bursaries to study qualifications in technologies. The community must also play a supportive role in protecting the technology facilities. One other factor that we sometimes overlook in the supervision of usage of technologies in the classrooms. I think if this can be done, the SMT will be best positioned to	"The support teachers need is to be provided with personal computer which they can always use in their teaching practices. They also need regular development because these technologies are ever changing with time …"	"I think teachers need to be regularly workshopped in ICTs. The SMT members must monitor the implementation of blended learning regularly to ensure that teachers are given support. I think the school must also support the teachers by ensuring that internet connectivity is done in the school"

		develop the teachers”		

Table 6.2 depicts the narratives of the HoDs verbally in all the themes and sub-themes. The HoDs gave their perceptions about the three main themes of the study and their respective thirteen sub-themes as shown. The next section depicts the narratives of the teachers.

APPENDIX U: SUMMARY OF NARRATIVES OF TEACHERS

Theme 1: Teachers perceptions of blended learning in teaching and learning				
Sub-theme	**Participants responses**			
	ST1	**ST2**	**PT1**	**PT2**
Sub-theme 1: Understanding of blended learning	"First of all, I do not understand blended learning." She was clarified and then had this to say "Ah! I do not know anything about this type of learning"	"Technology knowledge! No, Sir, I was never exposed to ICTs before"	"Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. So, learners learn by seeing what you are teaching them about practically"	"Eh! I think blended learning is when you combine the different techniques in teaching and learning. It is when you use the chalkboard, books, projectors and computers to teach. This type of learning enables learners learn by seeing what you are teaching them about practically. Technological resources are used to supplement our usual face-to-face teaching in this type of learning"
Sub-theme 2: Technology knowledge of administering,	"Eh, what can I say? I have a computer certificate done	"Technology knowledge! No, Sir, I was never exposed to ICTs	"I cannot say it is enough, we still have a lot of room to	"Definitely No. I do not have any technology knowledge …"

managing and teaching blended learning	some years ago, but truly, I know nothing at the moment, especially for teaching and learning purposes. I need to be trained again so that I can use computers in the classroom"	before …"	learn, because technology is a new thing to all of us. You see, our schools are not yet ready for technology education"	
Sub-theme 3: Benefits of using blended learning	"Surely, the use of blended learning will benefit us very much. It will provide more knowledge to both teachers and learners and hence the improvement of learners' performance"	"According to me, blended learning has numerous benefits. I think it reduces teaching time and we can easily gather information using technologies. The usage of internet is really helping us a lot, especially in blended learning. We are able to provide quality teaching through blended learning"	"Oh! The benefits of this technology include giving learners the perspectives of seeing real things than theorising them. You understand? Learners become aware of how things are done in a real situation".	"My guess is blended learning has many benefits, these include improvement of learners' understanding, improvement of teachers technology knowledge, development of communities in the usage of technological tools at their homes. For us, teachers technologies help us to provide quality education as well as enabling

				us to search and download very important information from internet”
Sub-theme 4: Difficulties of using blended learning	“Yes, we experience some difficulties in using these technologies. Most of us as well as the learners are unable to use the technologies. We lack knowledge and skills to use technologies and I think we need to be trained. I think the department must take responsibilities in this regard”	“I have insufficient technology capabilities, so I encounter challenges to teach learners with computers. The Department together with the management of the school must train us to use computers”	“I think we have several difficulties to use blended learning in our school. Sometimes we have electricity challenges, like last week I failed to teach because there was no electricity in that building block and I had to relocate the learners, and this took much of my time and that of the learners”.	“Yah! Our challenge is that we were not trained in these things. If we can be given training, I think we can be able to cascade the technology knowledge to our learners. Other difficulties which we experience include access to the technology devices; insufficient resources; internet connectivity and security. You see, the few laptops that are available are strictly located in the principal’s office and used

				for administration and management activities only”
Sub-theme 5: Challenges that impede teachers to engage in blended learning	I think some of the challenges that we experience include lack of resources and teachers skills. These hinder us to use the technologies in their teaching and learning activities regardless of the fact that we force to use the few devices that we have. I also think that theft of the computers adds to the challenges that we encounter”	“Sir, teachers are unfamiliar with the technologies and I think this makes them resistant to embrace it. We were not trained how to use technology in teaching during our training. I think for us to be able to use them; we must first be trained”	“You see, we are impeded by so many challenges to implement blended learning, Sir. We do not have technological skills. I think if we can be developed in the technologies then we can be able to implement. It is unfortunate that we do not have some technology developmental structures in our school. The other challenge is technological resources. We don’t have resources in our school, I and this constitute one	“Uhm, there are so many challenges. Some of them are the lack of data, lack of technology resources and lack of skills. I think if the DBE and the school can buy us data these things, maybe we can be able to implement blended learning”

			of the challenges which impedes us"	
Sub-theme 6: Recommendations for introduction and implementation of blended learning	"I think the government must support the teachers, give them laptops and all the technology material needed. I also recommend that DBE provide schools with data and security for a successful implementation"	"Yah, I recommend that our school be internet connected and that enough ICT resources be made available to ensure successful implementation. I think ICT Centre also need to be built in the school"	"I recommend that teachers be trained in ICTs, provision of technology resources by DBE and the SMT together with the SGB make money available to develop teachers"	"My recommendation is that the DBE train teachers in technologies and SGB (School Governing Body) provides a budget for the development of teachers in blended learning programmes. I also recommend that the SMT organise school-based developmental programmes for teachers so that we remain skilled in technologies. Furthermore, community involvement in the safeguarding of the school should be intensified"
Theme 2: Connection of technology resources in blended learning				

Sub-theme	Participants responses			
	ST1	**ST2**	**PT1**	**PT2**
Sub-theme 7: Influence of blended learning on teachers practices	"I am positive to the implementation of blended learning because it saves my preparation and teaching time and it also makes learners to understand better. I am able to obtain additional information, and this makes me successful in my teaching"	"I find it challenging to teach using technologies. This is because I lack the necessary knowledge and skills. For us to be able to use blended learning we need to be trained first. The department is ever talking about e-learning but does not train teachers. How do they think technology education can be successful without teachers?"	"Ok, I can say it has helped me a lot. I use my laptop and a projector in class and teach learners by demonstrating and the learners are enabled to relate theory and practical reality. In so doing my learners understand better"	"Oh…! As long as I can be technologically skilled, it is then that I can be able to teach learners through technologies. But at the moment we are still struggling with these technologies …"
Sub-theme 8: Enabling structures for implementation of blended learning	"No, No, No the school does not have enabling structures. The are no resources; no internet connectivity; no accommodation and we are also not developed	"As I indicated earlier, we do not have technology resources therefore I can say the school has no enabling structures at all"	"Yes, we have enough classrooms but unfortunately the school has no ICTs for teaching and learning purposes. My take is if the government	"You know, we have no requisites for the teaching of blended learning. As you see these old dysfunctional computers, they are not working. Nobody uses

	enough to implement technology learning in our school"		can provide us with computers and develop all the teachers, then we shall be able to practice blended learning in our schools"	them because we are not all being trained. I think the school is not yet ready. The department and the SMT must train us and avail the necessary technology facilities so that we can implement blended learning in our schools"
Sub-theme 9: Usage of technology appliances in schools	"You see, I have some certificates in computers, but I really find it hard to use computers in the teaching and learning situations. I think I need more intensive development in technologies"	"We only use the technology appliances when administering teaching and learning activities like tests, assessment documents. Because we do not have the ability to use the computers for teaching, we are not able to use them for teaching and learning practices. We	"… Technology appliances are more relevant to be used for today's type of education, it is a pity that we do not have these appliances in our school because of lack of knowledge and skills in technologies. I for one, because I am offering Technology as a subject, I often use my	"You see, we are all struggling with the use of technology devices in our school. I think before we can even talk about implementation we need to be thoroughly trained. Our schools are not provided with computers for teachers and learners for teaching and learning and I think this must also be sorted

		need training for the usage of technologies in the classroom"	computer to teach some of the content. Learners really enjoy this"	out by the department and the SMT. If the ground is adequately levelled, we are ready to implement blended learning".
Sub-theme 10: Current implementation of blended learning in schools	"Currently, we are not implementing blended learning in our school. This is due to the fact that we do not have the necessary expertise. One other thing is there are no technological resources like computers and internet for teachers and learners"	"No, Sir. We are not using blended learning currently. There are no computers and internet in our school. We also do not have enough knowledge on how to use them. I think we need training in this area"	"I use it sometimes when I want my learners to see the real situation as opposed to theoretical content in their textbooks. Otherwise, as a school we are currently not employing blended learning for teaching and learning"	"No, our school is currently not using blended learning. This is because we do not have resources and our teachers are also not been trained. I think it must start by training teachers and purchasing of sufficient resources".
Sub-theme 11: Blending technological approaches and traditional approaches	"I think the combination can make a big difference. It can make teaching and learning active and thus,	"Currently, we are not implementing blended learning in our school. This is due to the fact that we do not	"I think it will be important to combine the two approaches. By using technology approaches	"Ok, I think the combination of old teaching approach and new technological approaches is good because

	ultimately increasing the learners' performances. However, in our case the schoolteachers are not trained in ICTs and therefore are not blending technology approaches to their teaching and learning activities"	have the necessary expertise. One other thing is there are no technological resources like computers and internet for teachers and learners "	and traditional approaches simultaneously will help because the two will boost and strengthen each other and therefore enhancing learner's performances. You see, learners like viewing things on the screen and I think the blending will make them participative and interactive in the teaching and learning activities"	they can strengthen each other and as a result making teaching and learning successful. We are not blending the two approaches here because we are not skilled in technologies"
Sub-theme	**ST1**	**ST2**	**PT1**	**PT2**
Sub-theme 12: Teachers technology skills in using technologies	"You see! Sir, we need serious development in ICT skills, I think our principal must invite technology experts to come	"Yes, I think we need a practical usage of word; excel and power point to be able to implement blended learning. Uhm, I	"Yah, Nee! Technology skills…I think we lack computer application skills, usage of software and	"Sir, I think we need basics computer skills. I mean knowing the computer parts, how to operate it and the software.

	and develop us. You know, I have a computer certificate, but I cannot teach by using them. Yah, we are really having big problems"	think they need these skills because implementation of technologies requires basic computer literacy. I think we also need to have skills on how to use internet to get the necessary information"	hardware. We also need to be developed on the policies which relate to ICT such as e-Education Policy and Professional Teacher Training in Digital Integration in Schools"	Unfortunately, there are no computers in our school which we might be using to acquire skills. I think we need to be first developed so that we attain skills to implement blended learning"
Sub-theme 13: Teachers support in using technologies	"I think DBE need to develop teachers in technologies. It must establish training and workshops programmes for teachers and members of SMT. The SMT also encourage and motivate us and the learners to make use of computers for teaching and learning regularly"	"I think to ensure a successful implementation of blended learning, the DBE should organise and monitor training programmes for teacher development in technologies. In that way, the teachers will be best positioned to integrate technologies in the teaching and learning"	"Sir, I sometimes lay a blame on our SMT members for not using technologies in our school. They do not train and develop us in these technologies. I think the SMT must encourage and motivate us to employ technologies in our teaching and learning practices. The DBE as well must support	"You see! Teachers do not have money. I think the department can support us by buying laptops and data for us. I also think that we need some encouragement and motivation to implement blended learning"

			schools by providing all the technological facilities needed to the school"	

Table 6.3 shows the narratives of the teachers, and the themes and sub-themes that emerged. The teachers gave their perceptions about the three main themes of the study and their respective thirteen sub-themes as shown.

APPENDIX X: CERTIFICATE FOR EDITING

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Date: 18th January 2021

TO WHOM IT MAY CONCERN

CERTIFICATE OF EDITING

I, Muchativugwa Liberty Hove, confirm and certify that I have read and edited the entire thesis **IMPLEMENTATION OF BLENDED LEARNING IN SEKHUKHUNE DISTRICT SCHOOLS IN LIMPOPO PROVINCE, SOUTH AFRICA, by NKADIMENG MAMPURU PHILEMON,** submitted in fulfilment of the requirements for the degree of **DOCTOR OF PHILOSOPHY IN EDUCATION (EDUCATIONAL STUDIES),** School of Education, Faculty of Humanities, University of Limpopo.

NKADIMENG MAMPURU PHILEMON was supervised by **Dr K.L. Thaba-Nkadimene** and co-supervised by **Professor J. Cronje and Dr F. Rahami.**

I hold a PhD in English Language and Literature in English and am qualified to edit such a thesis for cohesion and coherence. The views expressed herein, however, remain those of the researcher/s.

Yours sincerely

Professor M.L. Hove (PhD, MA, PGDE, PGCE, BA Honours – English)

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