

**EVALUATING THE ROLE OF ICT POLICY
IN FOSTERING
E-EDUCATION IN SOUTH AFRICA**

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**MASTER OF ARTS IN THE FIELD OF
ICT POLICY AND REGULATION**

RESEARCH REPORT

A research report submitted to the Faculty of Humanities,
University of the Witwatersrand in partial fulfilment of the
requirements for the degree of Master of Arts
in the field of ICT Policy and Regulation

Johannesburg, South Africa

23 September 2019

Abstract

The purpose of this study is to examine reasons why the e-education policy is not fully implemented as intended by the Department of Basic Education (DoBE) in South Africa. The study focuses on defining what is perceived as e-education through assessing seven gazetted policy documents, namely, (i) White Paper on e-Education, (ii) Information Society and Development Plan – ISAD Plan, (iii) National Development Plan, (iv) National Broadband Policy, (v) National Integrated ICT Policy White Paper, (vi) National e-Government Strategy and Roadmap, and (vii) National e-Strategy Digital Society South Africa. These documents were reviewed using teachers' experience, learners experience and broadband connectivity as themes. Stemming from the reviews, the study subsequently discusses eight policy challenges linked to both the literature and the research question. Deep understanding of the definition of 'digital' in the teaching environment, policy and the absence of dialogue and concretisation of policy, policy implementation among key stakeholders, including policy intention to develop learners' capacity to handle ICT connectivity in schools, are among the eight policy challenges identified by the study. In addition, the study presents the final conclusions of the research findings by partly focusing on explored and existing policy gaps from all seven policies reviewed. This is to determine and measure to what extent the White Paper on e-Education has been successful in its goal to implement e-education in schools.

DECLARATION

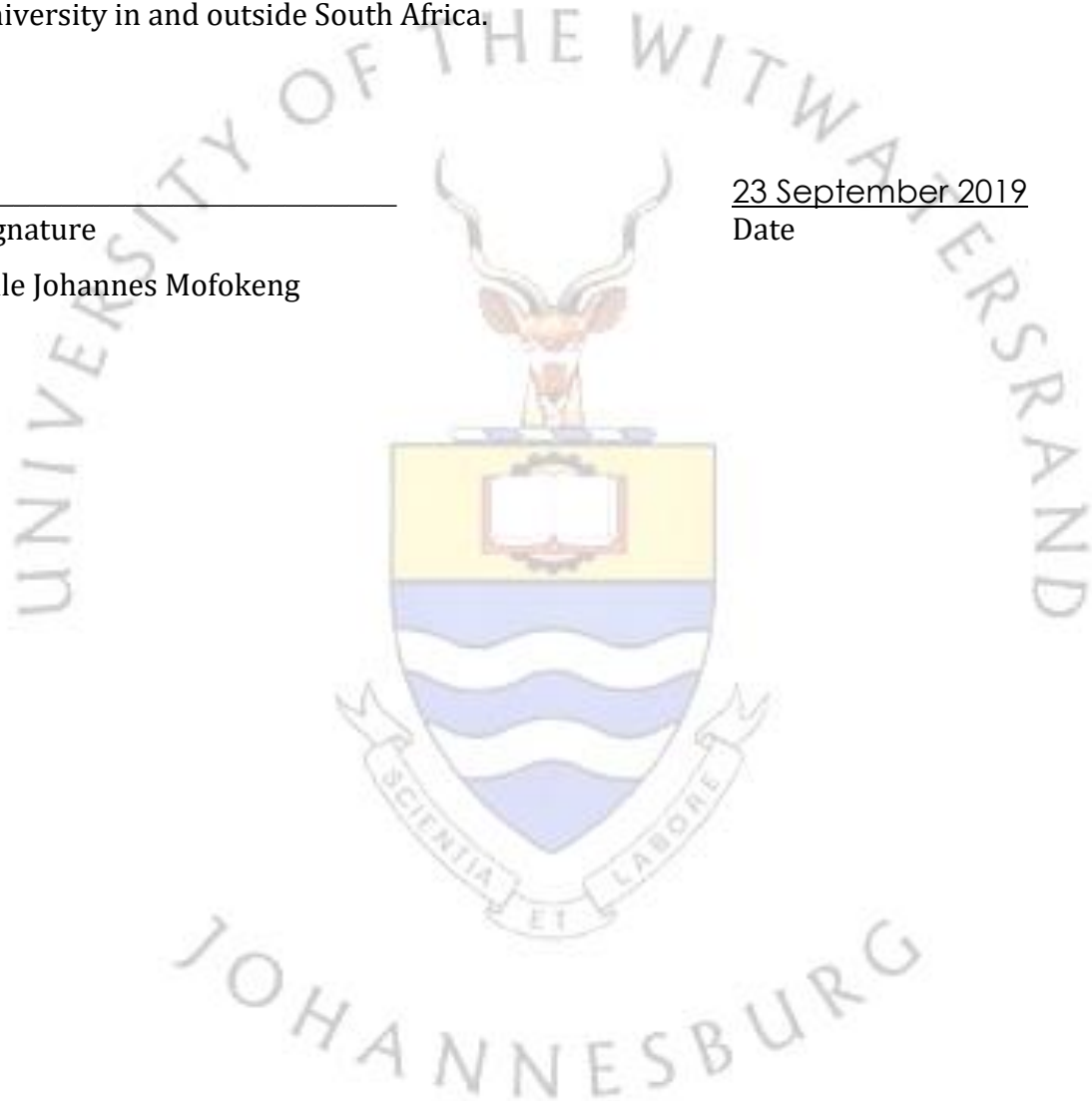
I hereby declare that 'Evaluating the Role of ICT in Policy and Regulation in South Africa' research report is my own, unassisted work. It is submitted in partial fulfilment of the requirements of the degree of Master of Arts (in the field of ICT Policy and Regulation) in the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination in any other University in and outside South Africa.

Signature

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23 September 2019

Date





University of the Witwatersrand, Johannesburg,

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SENATE PLAGIARISM POLICY

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Signature: **Pule Johannes Mofokeng**

Date: **15 March 2019**

ACKNOWLEDGEMENTS

To God the Almighty be the Glory!

To my supervisor, Dr. Lucienne Abrahams, who has provided me with direction and support over the past years; your cooperation and assistance is greatly appreciated.

To my gorgeous wife, Yanga Nandipha "*Madijana*" Mofokeng and my three (3) lovely sons "*Classic K's*" – Keoratile, Keabetswe & Keamohetse Mofokeng; thank you so much for your super love, support, prayers and understanding.

I must also convey my genuine appreciation to my lovely parents, Thabo Elias Mofokeng & Meiki Elizabeth "*Bafokeng ba ha Dijana, ba ha Mahlelehlele Pudumo ya hlaba....*" thank you so much for your support and the unrestricted love. To my siblings and other support structures, especially Sibulele Walaza, thank you so dearly.



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Acronyms

ANC	African National Congress
BECTA	British Educational Communications and Technology Agency
DHET	Department of Higher Education and Training
DoC	Department of Communications
DoBE	Department of Basic Education
DOJ&CD	Department of Justice and Constitutional Development
DPE	Department of Enterprise
DTPS	Department of Telecommunications & Postal Services
ICASA	Independent Commissions Authority of South Africa
ISADP	ISAD Plan
NBP	National Broadband Policy
NDOE	National Department of Education
NDP	National Development Plan
NeGSR	National e-Government Strategy & Roadmap
NeSDSP	National e-Strategy Digital Society South Africa
NGO	Non-Government Organisations
NICTPW	National Integrated ICT Policy White Paper
NSLA	National Strategy for Learner Attainment
NT	National Treasury
OECD	Organisation for Economic Co-operation and Development
PDOE	Provincial Department of Education
RSA	Republic of South Africa
SITA	State Information Technology Agency
SOE	State Owned Entity
SSA	Statistics South Africa
TELI	Technology Enhanced Learning Initiatives.
TIA	Technology Innovation Agency
WFE	World Economic Forum
WPeE	White Paper on e-Education

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CHAPTER 1: BACKGROUND TO e-EDUCATION, TEACHER'S & LEARNERS ICT CAPABILITIES AND INFRASTRUCTURE READINESS IN SOUTH AFRICA

1.1. Introduction

The twenty-first century has seen rapid evolution in technological development, predominantly in the use of information and communications technologies (ICTs) (DoC, 2013). This chapter focuses on the concept of e-education and policy requirements to measure its success and failures toward improving ICT teaching and learning in schools. In 2004, the then Department of Education (DoE) introduced a White Paper on e-Education: Transforming learning and teaching through ICTs. The paper discusses, among others, the concept of e-education, reviews challenges facing the education and training system and models by which e-education can be implemented. The concept of e-education is a complex concept that can be seen to include an integrated system for presenting and hosting digital educational material, electronic administration, electronic storing and sharing of information (Holzinger, Nischelwitzer & Kickmeier-Rust, 2005). Tsiakas, Stergiopoulos, Kaitsa and Tiantis (2005) describe e-education as a “tool that supports the educational process”. It is a concept that includes bringing ICTs into the classroom to revolutionise the learning experience. e-Education policy initiatives are located in different government policies and its main expression is to ensure that every learner in South Africa will be ICT capable prior to and post 2013 (DoE, 2004, p. 17). The Department of Education became the Department of Basic Education (DoBE) and the Department of Higher Education and Training (DHET) in 2009.

1.2. Research problem statement

According to the DoE (2004, p. 11), the existing digital divide does not necessarily present constraints to educational development since all “provinces are at different levels of ICT integration in education”. However, Lim and Hang (2003) argue that the education policy should not underestimate the complexity around implementing e-education and the challenges of bridging the digital divide in both developed and developing countries. Although the Department’s vision includes smart service

delivery of quality public education, to promote a vibrant citizenship for socio-economic growth and development, research is yet to examine why e-education policy is not leading to effective e-education implementation and to what extent it has been successful in augmenting teaching and learning (DoE, 2004).

1.3. Research purpose statement

The purpose of this study is to examine why e-education policy is not leading to the effective and successful implementation of e-education to improve the quality of teaching and learning in schools. Both the marginalised rural and urban communities with destitute infrastructure are not benefiting from information and communication technology (Rahman, 2007; Furlonger, 2002, p. 2). It is therefore deemed necessary to evaluate the education policy through the theoretical lens of e-education discourse analysis (Bladergroen, Chigona, Bytheway, Cox, Dumas, & van Zyl, 2012). This knowledge may, in turn, assist the DoBE to better understand all the underlying issues that prohibit policy from leading to the effective and successful implementation of e-education.

The magnitude of the task ahead of the DoBE remains in the deficiency of effective ICT policy designed to foster implementation of ICT in schools. This is in contemplation of the fact that the government spends large amounts of taxpayer's money towards the implementation of ICT to stimulate social and economic development. Furthermore, the DoBE has the responsibility to streamline e-education implementation of assisted ICT services in conjunction with other government departments. The research also evaluates teacher's readiness in utilising ICT-enabled solutions to improve teaching and learning in schools.

1.4. Research questions

The table (Table 2) below presents research questions, objectives and the methods used to gather data.

Table 1: e-Education Research Questions

e-Education Research Questions		
To what extent is the policy successful in improving e-education?		
e-Education Investigative question/s	Research Objective/s	Research Method/s
Sub question (i) What are the strengths and weaknesses in the design of e-education policy?	To understand plans designed by the Department to evaluate the level of support to effect e-learning practice.	Reviewing seven (7) distinct government policies.
Sub question (ii) To what extent does e-education policy improve teacher experience in schools?	To understand what methods the Department has used to ensure effective teacher training, explore teachers' ICT perception, ICT teaching techniques.	Reviewing seven (7) distinct government policies.
Sub-question (iii) To what extent does the present ICT infrastructure support the realisation of the envisaged e-education intentions?	To understand challenges facing infrastructure implementation.	Reviewing seven (7) distinct government policies.

1.5. Chronological history and infrastructure readiness of e-education in South Africa

Over the past two decades, rapid changes in Information and Communication Technology (ICT) and its application in organisations has become increasingly important (Stuart, Mills & Remus, 2009). Somehow, the association between ICT and education has become one of the popular approaches to transforming teaching and

learning (Isaacs, 2007). Thus, the education policy makers in South Africa have recognised the importance of formally introducing ICT in schools to improve the quality of ICT teaching, learning and performing school's administrative chores, among other capabilities (DoE, 2004). In South Africa, the introduction and implementation of e-education (occasionally referred to as ICTs or ICT connectivity) in schools is performed by different stakeholders, with some being outside the education sector. Both the public and the private sector are deemed to be the potential stakeholders to aid the Department of Basic Education (DoBE) to implement ICT connectivity, but every so often in a disjointed approach (Meyer & Gent, 2016).

Aware of this phenomenon, the DoBE conducted different educational reform researches in order to understand broadly how it needed to implement e-education in schools. The discussion ensued between various education stakeholders and what stemmed from these interactions from 1994 already was the birth of the concept e-education (DoE, 2004). The history of e-education in South Africa started around 1995. This was when the DoBE made its first attempt to establish the technology enhanced learning initiatives (TELI). The challenge with this initiative was that the DoBE was still getting used to the idea of integrating ICT in school and did not have subject experts in the field of education who understood the e-education concept including how to implement it (Isaacs, 2007).

In 1996, the Information Society and Development Conference introduced e-education as one of the proficient pillars to redress the information divide that exists in most schools. The term e-education can be described as connecting teachers and learners to access information and electronic databases through integrated technology systems to enhance their ideas, sharing, research and to promote interaction with one another by the use of an effectual blend of pedagogy and technology in support of educational transformation (DoBE, 2004; Holzinger, Nischelwitzer & Kickmeier-Rust, 2005). Mdlongwa (2012) labels e-education as connecting learners and teachers using ICT enabled platforms to enhance the quality of teaching and learning in a classroom. Its critical context is discussed broadly in chapter two (2).

e-Education is a very broad topic that consists of many facets, many elements and many interpretations, but for the purpose of this research, the focus is drawn to three (3) critical e-education components, which are; (i) e-learning practice, (ii) policy relevance and, (iii) Internet in schools and infrastructure availability. In 2003, the DoBE introduced the White Paper on e-Education Policy, which was later endorsed (gazetted) in 2004. The education budget from when the e-education was introduced had increased considerably. The budget is taking almost the third of the government's allocated funds (National Treasury [NT], 2010, p. 34). On the other hand, Spaul (2013) has advised that the quality of education in South Africa after and during the dawn of democracy, including the introduction of e-education, had not improved as expected. The change in political and economic transformation seemed to not have solved the education crisis in South Africa (Spaul, 2013).

1.6. Contextualising the e-education

While the state of education in South Africa prior 1994 persisted to focus on fostering improved education only to the minority group, post-apartheid under the new leadership the focus changed from single view to an inclusive improvement for all South Africans (Isaacs, 2007). Against this brief background, the country further introduced a concept of e-education with the goal to transform the quality of teaching and learning (DoE, 2004). South Africa remains one of the few African countries (Figure 7) that remains politically stable and has well developed economic sectors.

Figure 1: South African Map



Source: World Map, 2016

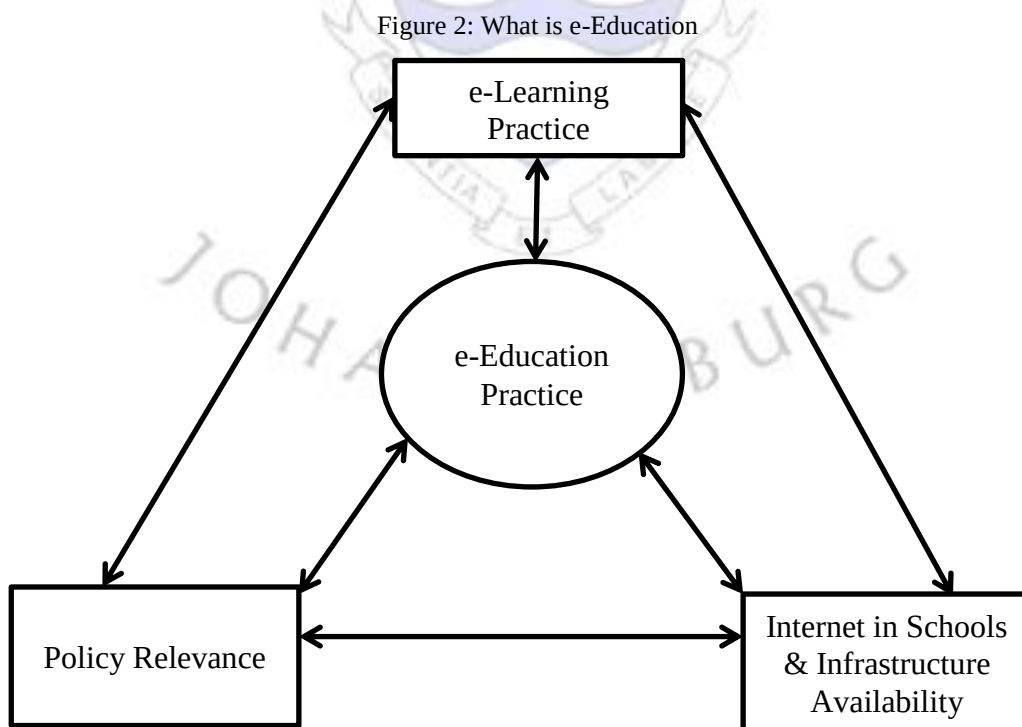
In terms of the education system and focusing on Mathematics and Science school subjects, South Africa is ranked in the “Bottom 10 Schools” out of 23 countries in the world. At position 75, the country’s basic education system appears to be among the poorest in the world. A report in 2015 by the Organisation for Economic Co-operation and Development (OECD) indicates that South Africa was listed in 137th place out of 143 countries when looking at the general quality of its education system (OECD, 2014). On the positive note, the country has been identified as having a more promising economic outlook. Admitted to the BRICS group in 2011, the country is now part of a collective “expected to overtake the major economic powers over the next few decades” (Sachs, 2001).

Similar to the OECD’s report, the World Economic Forum 2015 Global Information Technology Report ranks South Africa amongst countries in the world with poor

Network Readiness Index, which looks at the state of ICT infrastructure and overall usage of ICT. The country has slipped lower down the ranks and battling to close the gap as it is now sitting in 75th place (World Economic Forum [WEF], 2015). The rapid increase of the unemployment rate is also a serious challenge the country is facing, with nearly 55.2% of the population, which is youth aged between 15 and 34 unemployed and just about 45% of adults also unemployed (Statistics South Africa [SSA], 2015, p. 38).

1.6.1. The new education paradigm and views on e-education

The white paper on e-education introduces the concept of e-education as the basis of transforming learning in schools through the use of ICT in classrooms. The e-education is the new learning paradigm that propels traditional teaching and learning by incorporating the use of ICT to modernise education and thus eliminates the extensive use of paper in schools (Cloete, 2001). There are, however, several theoretical definitions of what is perceived as e-education (Neville, 2004). Most of the scholars often loosely use the term e-learning and e-education interchangeably, while others say e-education is simply having ICT in schools (Brown, 2005; Isaacs, 2007, p. 19; Daily Maverick, 2012).



Some scholars suggest that e-education is similar and equivalent to having the Internet in schools; some have linked it to e-learning education (Isaacs, 2007). It has become clearer that e-learning, the Internet in schools, policy relevance are all but elements of e-education in its complete form and all these elements are connected to each other (Figure 8). The e-education discussion cannot happen without having the Internet connection in schools (Cuban, 2001).

According to Noesgaard and Ørngreen (2013), the e-education takes place in a classroom setting using ICTs, whereas e-learning is the extension of ICT enabled education, but not necessarily inside a physical classroom. Moore, Dickson-Deane, and Galyen (2011), on the other hand, state that it is customary for researchers to encounter difficulties in differentiating between e-learning and e-education concepts. There seems to be a different expectation and perception of what these two concepts really mean in a learning environment.

The white paper on e-education has labelled e-learning as a distance quality learning method, which apart from providing education, focuses more on reducing administrative tasks, while e-education is about connecting learners, teachers and administrators via various technology channels (DoE, 2004, p. 15). The term e-education, according to Rbl Kail (2012), refers to the “educational process with the help of ICT, namely involving software, Internet, CD-ROM, online learning or any other”, while e-learning is for the most part about distance learning.

The e-education has been around for many years and this particular method is seen by the DoBE as the ideal model to substitute the poor delivery of education in a classroom (Greville, 2001, pp. 1-3). The e-education seems to be a complex concept that can be seen to include, among other elements, an incorporated ICT system for presenting and hosting, digital educational material, electronic administration, electronic storing and sharing of information (Holzinger, Nischelwitzer & Kickmeier-Rust, 2005).

1.6.2. Changes in the education sector in South Africa 1994 to 2016

Since 1994 the education landscape in South Africa has experienced a significant makeover in areas such as the learning method, governance and curriculum reform.

Among the reforms, the policy to introduce ICT in schools was intended to be instrumental in fostering the “framework for schools based on the concept of outcomes-based education (OBE)” (DoBE, 2004, p. 4). OBE is a “learner centred approach which considers learning as an interactive process between educators and learners, where the educator serves as both teacher and facilitator” (Isaacs, 2007, p. 2).

Most teachers consider this initiative as too ambitious and very far from the real educational challenges facing South Africa. Nonetheless, some of the Provincial Departments of Education PDOE’s have already started to introduce well-structured ICT programmes of integrating ICT into the schools environment. Northern Cape (Connectivity Project), Western Cape (Khanya) and Gauteng (Gauteng Online – GoL) are the leading provinces that have started implementing e-education components. Nonetheless, the government of South Africa is still faced with a huge challenge of slow implementation of ICT infrastructure in schools.

1.6.3. The government’s efforts toward improving the state of education

The past 13 years are marked with quite a few activities and policy initiatives to introduce e-education in South Africa. The government of South Africa has recognised the importance of introducing ICT and using it across all its socio-economic sectors through various ICT strategic initiatives, such as e-government (connected government), e-education (ICT in schools), e-health (ICT in the health-care system) and many other ICT related initiatives, the purpose being to transform among others, the education and health sectors (Dagada, 2012).

As in many other developing countries, South Africans believe strongly in the capabilities of ICT, mainly because of its demonstrated ability to transform the quality of education (Isaacs, 2007, p. 21). Then president of South Africa, Mr. Thabo Mbeki, underscored the importance of ICT to deliver improved public services (DoBE, 2004, p. 9). The government claims that it is frequently and broadly engaged in finding improved mechanisms to introduce ICT to ensure that South Africa becomes an information-driven society (DoC, 2006, p. 22).

Mohanan (2005) states that between 1999 and 2005 the introduction of ICT has become a critical tool used to complement contemporary educational practice. Detailed discussions on whether ICT is important in schools or not will be dealt with in the following chapter (Chapter Two). Telecommunication prices in South Africa remain relatively high compared to other developing and developed countries (RIA, 2015, p. 36). But the government of South Africa has committed itself to intervene by challenging predatory pricing of broadband services against consumers, particularly the ones in the marginalised areas (DoC, 2013, p. 17). The country is still among countries with wide education and economic gaps, inequality, and segregation of services, unemployment, crime and the digital divide (Bhorat, Van der Westhuizen & Jacobs, 2009). Impoverished areas in South Africa, mostly rural areas, are still without adequate broadband infrastructure compared to the so-called “digital cities” of the country (i.e. Gauteng, Western Cape and Northern Cape) (Bhorat, Van der Westhuizen & Jacobs, 2009).

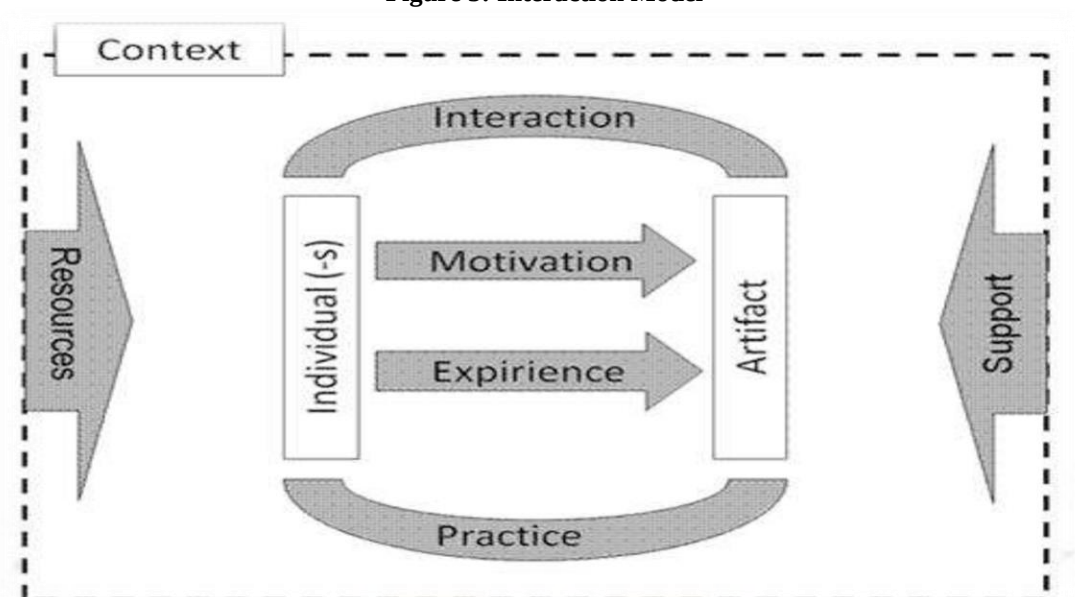
1.7. e-Learning practice in South Africa

Over at least two (2) decades, many scholars in and outside South Africa have reasoned that e-learning has the potential to transform how education is currently practiced worldwide (Ng’ambi, Brown, Bozalek, Gachago, & Wood, 2016). The DoBE describes e-learning as the method in which learning is conducted using ICT resources, applications and tools “and focusing on interaction among teachers, learners, and the online environment and on collaborative learning” (DoBE, 2004, p. 17). Noesgaard and Ørngreen (2013) agreed with the DoBE and presented a view that the introduction of ICT and having computers with Internet connection in schools has enabled effective digital learning. Arkorful and Abaidoo (2014) further confirmed that the introduction of the Internet has helped to foster digital collaboration between teachers and learners.

The diagram (Figure 1) below exemplifies strategic factors (marked in gray) that effects the success of e-learning in the event they are used efficiently. Still from the diagram, a well-supported curriculum (context) and resources enable real interaction and practice between instructors (teachers) and learners. This technique presents

infinite learning prospects, but it should be noted that to effect this model, proper education stakeholder engagement has to happen in order to influence the integration of ICTs in schools.

Figure 3: Interaction Model



Source: DoBE (2011)

In South Africa, the concept of e-learning and its implementation in schools is monitored by the DoBE and chapter two (2) discusses the state of e-learning broadly. Nevertheless, the DoBE has acknowledged that there are new educational challenges ranging from the curriculum development of ICT training and development programmes for teachers (DoBE, 2004, p. 6). One of the major challenges is the lack of ICT infrastructure readiness, low rate of the integration of the ICT connectivity in schools and the ICT teaching methods (DoBE, 2004, p. 8). Bladergroen, Chigona, Bytheway, Cox, Dumas, & van Zyl (2012) state, that an ineffective utilisation of ICT technology in schools is largely because the practice of e-learning is not yet fully understood not by instructors (teachers) only, both by the policy makers. Likewise, Ford and Botha (2010, p. 1) agree that the method to implement e-learning has been but a failure.

1.7.1. Teachers' role in the development of the electronic content resources and the distribution

The White Paper on e-Education underlines ICT teacher training and development programme as a critical component in promoting the pervasive education. The DoBE has highlighted the importance for teachers to understand the complexities of implementing the e-education in schools. ICT teacher training and development programmes were designed among other proficiencies, to increase the ICT uptake by teachers performing their daily chores. This is also because teachers' confidence in the use of ICT is very important to enabling successful implementation of the e-education (OFSTED, 2001). Prior the 19th century, the traditional delivery of teaching and learning in a classroom setting was the most popular and deemed reliable method to render learning (Cuban, 2001).

The DoBE had prepared "11 teacher development module for introducing ICTs into school", SchoolNet SA project aimed at providing teachers with online, mentor-based training for teachers on how to integrate ICT into the curriculum and INTEL (Teach to the Future) programme for developing teachers' ICT capability (DoE, 2004, p. 11). But out of 413,067 teachers, only 132,883 had received moderate ICT training between 2009 and 2011 (BusinessTech, 2014). The number grew over the years as the DoBE partnered with the non-governmental organisations (NGOs), parastatals and private sector to bridge the ICT knowledge divide.

The DoBE views ICT infused curriculum (digital learning) development as another critical factor to improve the quality of education and has underlined teachers as the main drivers of the e-education implementation in schools (DoBE, 2004, p. 13). Part of ensuring that the implementation of e-education succeeds is through the Department developing and managing a comprehensive "teacher development module for introducing ICT into schools" (DoBE, 2004, p. 11).

The purpose of this development is to provide teachers with knowledge on how to operate ICT technologies and be able to facilitate ICT related topics in classrooms. The DoBE has identified the Sector Education and Training Authority (SETA) as the

strategic partner to improve the quality of ICT teacher training and development programme on the use of ICT in schools. The aim of the plan is to produce more ICT capable teachers to strengthen the innovative use of ICT in schools. It is hoped that the initiative by the DoBE to distribute the standardised version of an electronic content once developed will assist the Department in closing some of the existing curriculum gaps (DoBE, 2004).

1.8. The policy intentions to develop learners' capacity to handle ICTs

The white paper on e-education focuses on how to reconstruct and sustainably improve the quality of education levels in South Africa (DoBE, 2004). The paper embodies the response from the government to challenges facing the education sector, and it lays the foundation for ICT initiatives to improve the quality of teaching and learning.

The instant intent of the e-education policy is to support life-long learning as well as presenting new prospects for realising social development and learner's personal growth (DoBE, 2004, p. 3). The DoBE was one of the first few government departments to introduce a public policy framework for incorporating ICT in schools to transform teaching and learning. The policy (DoBE, 2004, p. 17) states:

Every South African learner in the general and further education and training bands will be ICT capable (that is, use ICT 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.

The e-education policy goal is supported by the ISAD Plan, National Development Plan (NDP), Broadband Policy, National Integrated ICT Policy White Paper, National e-strategy Digital South Africa and National e-government Strategy & Roadmap policies. In 2001, the Department of Communications (DoC) and the DoBE together released a strategy for integrating ICT in schools, which also laid a solid groundwork for e-education. Part of the intervention by DoC was to focus on two (2) central targets for e-education (DoC, 2006, p. 58), which states:

- All schools in all nine (9) provinces of South Africa to be connected to broadband services and using ICT to improve teaching and learning.
- Each province is to have its own separate budget allocated for e-education implementation.

The DoBE has suggested that its policy framework for implementing e-education was relatively comprehensive and in line with the government's strategic objective of improving education (DoBE, 2004). The policy is not strategically implemented across other government departments as expected, which has weakened the chances for effective implementation of the policy.

1.8.1. The policy alignment of the National Strategy for Learner Attainment (NSLA) in South Africa in 2004.

The white paper on e-education offers more guideline on implementing the strategic objectives of the policy. The policy supports the activities and the alignment of the National Strategy for Learner Attainment (NSLA) to the Department of Basic Education's action plan (Meyer & Gent, 2016). The Department had introduced four (4) main plan outcomes and outputs, which serve as focus areas to effect the implementation and they are:

- (1) Implementation and on-going support of e-education is coordinated.
- (2) Electronic multimedia resources are developed and distributed.
- (3) A nationwide Teacher Laptop Initiative (TLI) is implemented.
- (4) The Proof of Concept (PoC) initiative is implemented to its completion (DoBE, 2004).

1.8.2. The ever-growing demand for the use of ICT to improve learners

South Africa, like many other developing countries is gradually increasing the level of e-education. Mdlongwa (2012) states that at the heart of ICT evolvement stems enriched socio-economic developments. The ever-growing demand for the use of ICT in schools has demonstrated the potential to improve the quality of education. Castells (2002) equates the true impact of utilising ICT as that of having incessant access to water and electricity to improve human conditions.

Jaffer, Ng'ambi and Czerniewicz (2007) state that in South Africa, the contextualisation of teaching and learning requires a tightrope walk between basic education imperatives and social-cultural context of the educational landscape. According to the DoBE many schools are beginning to exploit the benefits of ICT to enhance the quality of teaching and learning. Most learners, however, are still failing to become proficient in ICT basic learning functions. Simply put, there are serious learning hitches experienced when learners attempt to use ICTs for learning purposes which includes collaborating with either other learners or teachers (Amory, 2015).

1.9. The e-education ICT infrastructure challenges and the composition of education structures in South Africa

As early as in 1994, South Africa had realised the importance of establishing a centralised national education structure, which is managed by the National Department of Education (NDOE). All nine (9) Provincial Department of Education (PDOE) rely on the NDOE for services such as providing strategies, governance, operational and implementation plans to assist provinces in realising their strategic policy goals (Allais, 2003). Leading to the development of the e-education policy and dealing with the policy dialogue of implementing ICT in schools, the DoBE had introduced the following strategies and policies to effect the modernisation of teaching and learning in schools (Amory, 2015):

- National Policy Act (27/1996) – a policy framework aimed at enabling and upgrading teacher development mechanisms.
- White Paper on e-Education (1896/2004) – a policy framework aimed at transforming learning and teaching through the means of ICT.
- Action plan to 2019 – a policy initiative aligned to the National Development Plan (NDP) to start a dialogue on the education reform. This has to do with the future outlook towards realisation of schooling in 2030 and beyond.
- Strategy for Information Technology in Education (DoBE, 2001) – a policy dealing with connectivity activities and the education leadership vision.

But for the purposes of this study the focus and emphasis is generally centred on the e-education policy framework. Other details are to provide a brief context on how the DoBE has attempted to align its strategies in line with other government's policies such as the ISAD Plan, National Broadband Plan and National Development Plan, among other policies.

1.9.1. South Africa's socio economic setup and ICT profile

South Africa (SA) became a democratic country in 1994. The country is the southernmost country in Africa. It has eleven (11) official languages, a population estimation of ZAR58, 150, 250 million in 2019 with the GDP of over ZAR300 billion. More than 63% of the total population lives in urban areas, but more rural area people are fast relocating to urban areas in search of better economic opportunities since there is a lack of economic opportunities and proper infrastructure. The country has the second largest economy in Africa after Nigeria, has a large income per capita among from the middle-income class (InfoDev, 2012, p. 13; The World Bank [WB], 2018).

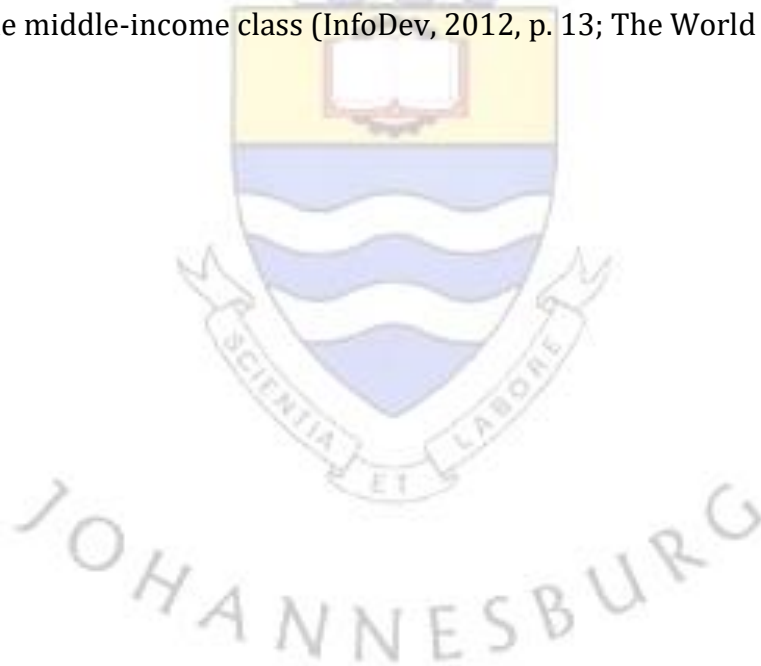


Table 2: South Africa, country indicators

Indicator Name		2015	2016	2017	2018
Total Population		55 386 367	56 203 654	57 000 451	57 779 622
Urban population	Urban population (% of total population)	64,828	65,341	65,85	66,355
	Urban population	35 905 874	36 724 030	37 534 797	38 339 668
	Urban population growth (annual %)	2,328062523	2,253040591	2,183711354	2,121665549
Rural population	Rural population (% of total population)	35,172	34,659	34,15	33,645
	Rural population growth (annual %)	0,072509046	-0,004460972	-0,071741692	0,132114649
	Rural population	19 480 493	19 479 624	19 465 654	19 439 954
Number of learners in both Primary and Secondary Schools		.....	12 932 565	12 892 273	12 819 542
High-technology	High-technology exports (% of manufactured exports)	6,161609023	5,292055504	4,644822421	.....
	High-technology exports (current US\$)	23 614 545 17	19 060 535 25	18 172 590 54	.....
Investment in ICT	Investment in ICT with private participation (current US\$)	.....	229820000	.....	.....
	ICT service exports (% of service exports, BoP)	3,798964167	4,008308258	4,215985372	.....
	ICT goods exports (% of total goods exports)	1,4235473343	1,396223112	1,094236016	.....
	Individuals using the Internet (% of population)	51,91911572	54	56,16739447	.....
Fixed telephone & Mobile cellular subscriptions	Fixed telephone subscriptions (per 100 people)	7,471447775	8,074286903	8,480809581	.....
	Mobile cellular subscriptions (per 100 people)	159,1563435	147,1252059	156,0332292	.....
GDP	Government expenditure on education, total (% of GDP)	5,956190109	5,940589905	6,125349998	.....
	Government expenditure per student, secondary (% of GDP per capita)	19,08177947	.....	19,5394001	.....
	Government expenditure per student, primary (% of GDP per capita)	.....	.....	17,6255703	.....
	Tax revenue (% of GDP)	27,33240572	27,16008042	26,97646778	.....

	Revenue, excluding grants (% of GDP)	31,69694807	31,25183207	30,89320932	.....
	Gross savings (% of GDP)	16,56435323	16,3558526	15,8155558	14,45274091
	Net lending (+) / net borrowing (-) (% of GDP)	-4,7974560920	-3,657214478	-4,168779158	.....
	Net incurrence of liabilities, total (% of GDP)	5,08694335	5,512366743	5,973583693	.....
	Gross domestic savings (% of GDP)	19,8748975	19,7528527	19,63908398	18,37647868
	GDP per capita growth (annual %)	-0,257162858	-0,897028821	-0,099540045	-0,734836068
	GDP growth (annual %)	1,279549281	0,565344944	1,31674486	0,622074898
	Gross capital formation (% of GDP)	20,97968054	19,35307393	18,60187488	18,03093235
	Investment in energy with private participation (current US\$)	3932350000	779400000	.....	4313240000
	Life expectancy at birth, total (years)	61,981	62,774	63,404	
	Unemployment, total (% of total labour force) (national estimate)	25,15600013	26,55069923	27,07110023	26,92000008
	Gross capital formation (annual % growth)	5,448641281	-8,057576793	1,61974408	-1,877233618
Agricultural	Agricultural land (% of land area)	79,83002085	79,83002086	.....	.....
	Agricultural raw materials exports (% of merchandise exports)	2,1683868	2,347824707	2,336061362	.....

Source: The World Bank (2019)

Its education is administered by two (2) distinct national departments with different roles and responsibilities, namely the Department of Higher Education and Training (DHET) which is responsible for higher education and professional training and the Department of Basic Education (DoBE), which oversees both the primary and secondary schools. The two (2) departments prior to 2009 were administered under a single Department referred to as the DoBE.

The government spending in the ICT sector was approximately ZAR 10.25 billion in 2010 and over ZAR11 billion in 2015, which 3.93% of funding was directed to building the ICT infrastructure (Amory, 2015). The ICT sector is fast developing in South Africa and is estimated to have created over 400 000 jobs between 2010 and 2013 (DoC, 2013, pp. 13 - 14).

1.9.1.1. Education infrastructure discussion as of 2016

As of 2016, South Africa had 24 060 ordinary schools and 1 681 ordinary independent (private) schools (Figure 2), with 390 608 educators in ordinary schools and 34 382 in private and a total of 12 655 436 learners across all 9 provinces both in ordinary and private schools (DoBE, 2016, p. 13)

Figure 4: Number of Learners, Educators, and Schools by Province, in 2014

Province	Learners		Educators		Schools		Indicators		
	Number	As % of National Total	Number	As % of National Total	Number	As % of National Total	LER	LSR	ESR
Eastern Cape	1 946 885	15.4	64 258	15.1	5 732	22.3	30.3	340	11.2
Free State	672 290	5.3	24 552	5.8	1 376	5.3	27.4	489	17.8
Gauteng	2 191 475	17.3	77 265	18.2	2 721	10.6	28.4	805	28.4
KwaZulu-Natal	2 901 697	22.9	95 560	22.5	6 151	23.9	30.4	472	15.5
Limpopo	1 720 585	13.6	57 256	13.5	4 076	15.8	30.1	422	14.0
Mpumalanga	1 057 788	8.4	35 000	8.2	1 867	7.3	30.2	567	18.7
Northern Cape	289 004	2.3	9 182	2.2	577	2.2	31.5	501	15.9
North West	800 316	6.3	26 086	6.1	1 570	6.1	30.7	510	16.6
Western Cape	1 075 396	8.5	35 931	8.5	1 671	6.5	29.9	644	21.5
South Africa	12 655 436	100.0	425 090	100.0	25 741	100.0	29.8	492	16.5

Source: 2014 SNAP Survey.

In the financial year 2013/14, South Africa spent ZAR 227 billion on education, 19.7% of the country's government expenditure, which is equivalent to 6.5% of GDP. About 57.7% in the same financial year was allocated to both primary and secondary schools, which was managed by the provinces. The percentage allocation has since increased to 57.9% in 2016/17 financial year (Figure 3).

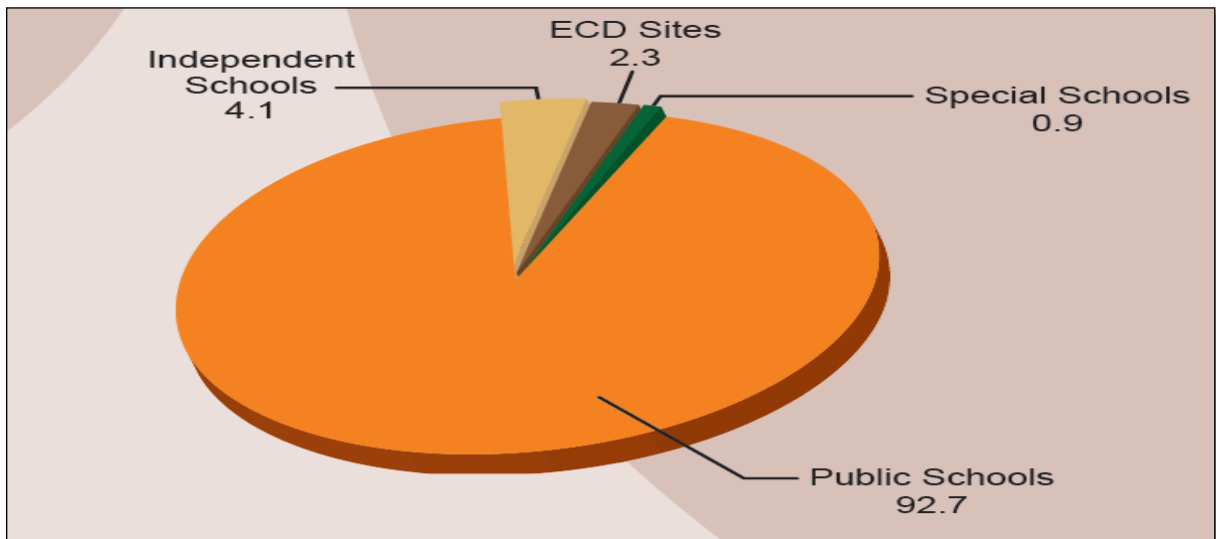
Figure 5: Education components and shares in South Africa, 2010/11 – 2016/17

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
R million	Outcome			Outcome	Medium-term estimates		
Education	170 743	197 763	212 634	226 873	242 694	261 645	267 532
of which							
Higher education and training	23 752	28 282	31 582	34 328	36 867	39 650	41 783
Primary and secondary school education	104 324	115 033	122 371	130 979	137 681	147 049	154 940
Further education and training	3 727	4 689	4 947	2 532	2 734	2 928	3 105
Adult basic education and training	1 223	1 413	1 536	1 578	1 714	1 780	1 881
Early childhood development	1 959	2 076	2 236	2 658	3 448	4 160	4 399
Percentage share of total education							
Higher education and training	13.9%	14.3%	14.9%	15.1%	15.2%	15.2%	15.6%
Primary and secondary school education	61.1%	58.2%	57.5%	57.7%	56.7%	56.2%	57.9%
Further education and training	2.2%	2.4%	2.3%	1.1%	1.1%	1.1%	1.2%
Adult basic education and training	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Early childhood development	1.1%	1.0%	1.1%	1.2%	1.4%	1.6%	1.6%
GDP (R billion)	2 750	2 982	3 198	3 465	3 790	4 151	4 553
Education total as % of GDP	6.2%	6.6%	6.6%	6.5%	6.4%	6.3%	5.9%

Source: National Treasury, National and Provincial databases

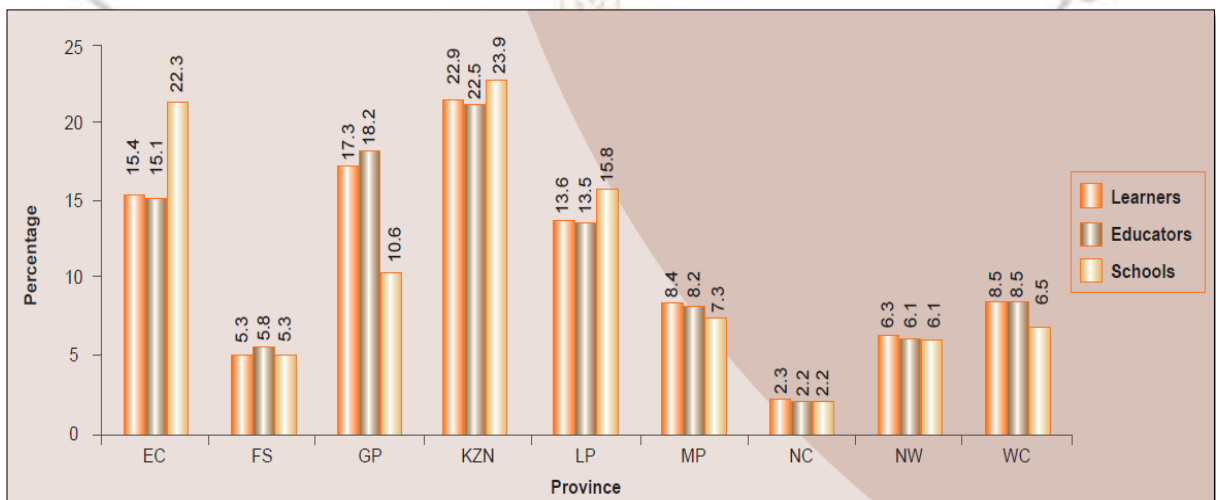
Of all the ordinary schools, approximately 61 242 are secondary schools (Grade 8 – 12) and the remaining are primary (Grade 0 – 6). The country's enrolment ratio in 2014 stood at 92.7% of public schools and 4.1% were the private schools (Figure 4)

Figure 6: Percentage distribution of learners in the education system in 2014



Source: (DoBE, 2016, p. 2)

Figure 7: Percentage distribution of learners, educators, and schools in ordinary schools, by province, in 2014



Source: (DoBE, 2016, p. 4)

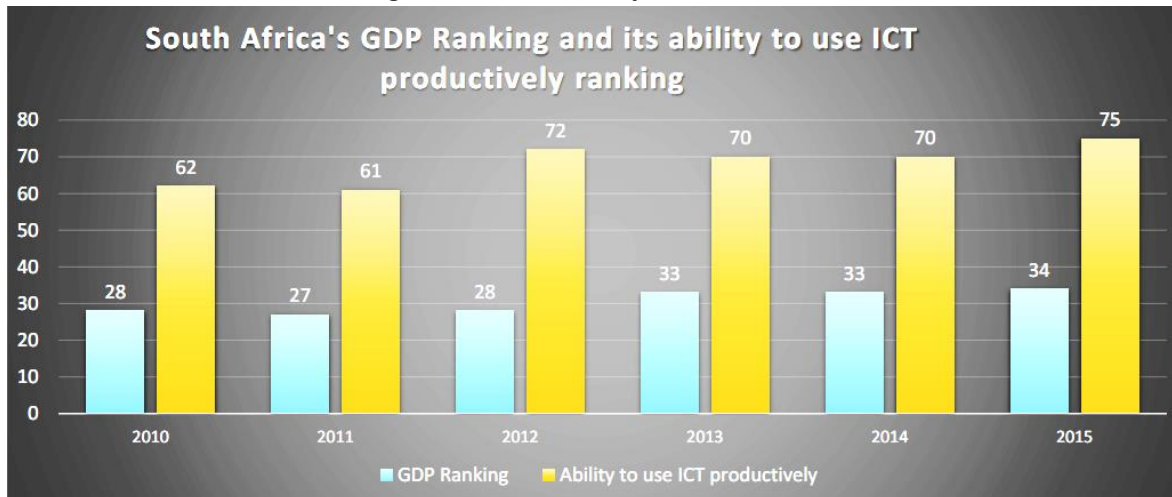
In 2014, most of the rural areas such as the Eastern Cape Province (EC) had a big number of schools, but with few learners enrolled, while most developed province such as Gauteng had 10.6% of schools (Figure 5).

1.9.2. Internet in schools and policy direction

In the emergence of a digital and information epoch, South Africa is still faced with a huge divide regarding the implementation and use of ICT among its public and the

private sectors (Rahman, 2007). There seems to be a great potential of using ICT productively, but a large percentage of South Africans have not fully embraced this opportunity (Figure 6).

Figure 8: ICT Availability versus utilisation



South Africa's Broadband Policy was developed with the objective to create an information society and knowledge economy. The policy sets a tone and expression of the government's vision in the National Development Plan (NDP) "of a seamless information infrastructure by 2030 that will underpin a dynamic and connected vibrant information society and a knowledge economy that is more inclusive, equitable and prosperous" (DoC, 2013, p. 2). The policy provides a comprehensive framework to enable South Africa's set goal of increasing the penetration of broadband. It is believed that an increase in broadband penetration will have a direct impact in broadening of educational opportunities (DoC, 2013, pp. 2 - 3). The broadband policy is structured around the 4 themes of a digital strategy introduced in the policy which are:

- Digital Readiness
- Digital Development
- Digital Future
- Digital Opportunity

The National Broadband Policy identifies the importance of having an effective ICT implementation in schools in South Africa. The DoBE has recognised the need for schools to start using digital technologies to:

- Broaden access to educational opportunities and to minimise socio-economic divide by providing access at cheaper rates.
- Provide adequate teaching and learning environments to improve learning.
- Provide and increase learning opportunities beyond the prescribed schooling system, and
- Rationalise the general administration for teachers “and administrators and enable assessment and data collection” (DoC, 2013, p. 3).

1.9.2.1. Broadband connectivity initiative in schools

The National Integrated ICT policy draft 2013 states that as early as 1996, there was already a Telecommunications Act No. 103 to foster the integration of ICT in schools and to effectively link schools through the education network (EduNet). Four years after 2013, another Telecommunications Act, No. 64 introduced a new pricing method (e-rate) with the intent to facilitate broadband connectivity rates in schools. The e-rate was only discussed during 2005, when Ms. Dina Pule, then Minister of Communications confirmed a 50% discount on the connectivity of the Internet in schools (DoC, 2014, p. 50). According to that Department of Telecommunications and Postal Services (DTPS), most of the broadband related initiatives underway seem to be more fragmented as there is no central planning framework to lead to a successful implementation of broadband particularly in schools (DTPS, 2014, p. 189). It appears that the 50% discount confirmed has not been used optimally, since there are fragmented ICT initiatives, inadequate ICT infrastructure and low penetration of broadband.

1.9.2.2. The role of ICT in developing digital participation and improving education

ICT has a large influence on almost every single feature of our lives and it is effective in stimulating and advancing social development, which in turn yields positive economic growth (Isaacs, 2007, p. 21). Its role has the potential to improve digital participation, thereby building an information society bridging the existing digital divide in South Africa. The DTPS is tasked with the responsibility of providing the ICT infrastructure across all nine (9) provinces. Once this is achieved, there will be an increase in ICT learning opportunities, particularly in deserted rural areas. The introduction of ICT in schools is important as it has the capability to improve the quality of education. It is important to entrench the ICT use at the primary school phase as it can produce real ICT capable learners and teachers (Tinio, 2002).

1.9.2.3. The government investment in ICT implementation to enable improved education

The DoBE has tried to improve the uptake of ICT and to bridge the digital divide in schools. The exercise included looking at challenging the costs of accessing broadband services as this remains a mammoth challenge. The DoBE's central policy objective to expand ICT capability in schools is aimed at attracting service providers to partner with the government to provide ICT services at cheaper prices, which will increase chances of the country of achieving an inclusive e-education (Sibanda, 2012, p. 2).

The government of South Africa has, however, acknowledged that the fiscal constraints are affecting the implementation of e-education in schools. The DoBE strongly believes in the development of sustainable funding models and procurement mechanisms to cover the ongoing costs of providing access to broadband services. These funding models should focus largely on economies of scale (Steyn & De Villiers, 2007, p. 30).

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

In recent times, both knowledge and information have become the integral components in transforming education and although the introduction of ICT often comes with technical interruptions. There has been a noticeable interest of the academic community to research both e-education and e-learning concepts (Brown, 2005, p. 1). In South Africa, e-education policy is located across several government structures, drawing all kinds of relationships between the departments, teachers, learners, schools and the business (service providers) (Sibanda, 2012).

e-Education remains a diverse subject as it has many facets, many elements and many relationships with other government organs. Nonetheless, the concept of Internet use in the education sector is not a new phenomenon. Both historical education and ICT researches have underlined the importance of this concept and cited that the concept is yet to be contested against other government policies (Hawkins, 2002, p. 2).

The purpose of this chapter is to examine the literature in order to determine whether the policy has been successful or not and what are the other key policy initiatives that still require DoBE's attention. The chapter is divided into four (4) parts: the discussions on e-education, teachers and learners experience, infrastructure readiness and concludes by chapter summary.

2.2. Effective policy making to effect quality teaching and learning in schools using ICTs

The government of South Africa views the discussions of e-education important as this concept has been identified as an integral education element to stimulate meaningful ICT teaching and learning in schools (DoBE, 2004, p. 7; Isaacs, 2007). The same discussions have forced the government to review its policy objectives to determine its state of readiness to address concerns on managing the ever-changing nature of ICT and its use in schools (Isaacs, 2007).

West (2012) argues that the prevailing silence regarding how well-structured the education system should be has had a negative impact on the delivery of quality education. The wealth of in-depth research analysis and the evidence from the literature has revealed that the present state of education coerces policymakers to focus on, among other things, researching on ICT potential to improve the delivery of quality education in South Africa (Dagada, 2010). Nonetheless, different opinions exist on what principles constitute quality education. These opinions cannot be deemed valid at all times and it is for these purpose policymakers can no longer overlook or postpone the need to review, re-engineer and re-align policy making, particularly on “quantitative aspects of educational policy” (West, 2012).

Although the policy goal, according to DoBE is for every learner to be ICT capable by 2013, Cuban (2007) believes that the educational foundation of today’s society is repeatedly compromised by unapprised policy decision-making structures. This is because of a large percentage of public education officials that are still criticised and blamed for the low performance in schools. The existing assumption is that most of these public education officials are not knowledgeable as expected and some even do not have solid teaching experience (Barber & Mourshed, 2007).

2.3. Understanding the distinctions between e-learning, internet in schools and e-education

The terms e-education, e-learning and the Internet in schools are often used interchangeably. The use of these terms and concepts are seen to mean one thing as they all share an element of accessing education using ICT-enabled platforms (Wild, 2015). Whilst e-learning is often referred to as the use of ICT abilities to improve and support teaching and learning, it does not quite mean e-education. The fundamental distinction between the two is that e-education is a method of delivering education using technology applications within the limitations of a classroom setting, whereas e-learning is the actual physical divide between learners, teachers, and the physical learning facilities (Cuban, 2001). However, e-learning, is perceived as an essential educational tool to facilitate online teaching and learning compared to e-education (Isaacs, 2007, p. 19). The white paper on e-education, on the other hand, describes e-

learning as a new learning method which uses ICT resources to facilitate access to information, collaborative learning and interaction between learners and teachers through the use of the Internet, which focuses largely on curriculum delivery over web-based applications (DoBE, 2004, p. 15).

It can somewhat argued that infusing of ICTs in schools, a term loosely referred to as e-education stems from e-learning. For this reason, Hawkins (2002) has stated that it should be noted that before discussing the e-education, discussions should first be around e-learning. Furthermore, in examining e-education, it is necessary to cite and study the ISAD Plan, National Development Plan (NDP), National Broadband Policy, National Integrated ICT Policy White Paper, National e-Government Strategy & Roadmap and National e-Strategy Digital Society South Africa policies. These policies facilitate some of the key discussions on the availability and accessibility of broadband services to the wider communities regardless of their geographical location (DoE, 2004).

2.4. Teachers readiness to enable improved teaching and learning using ICTs inside the classrooms

Although the use of modern technology in schools has the potential to enhance the quality of education, teachers' willingness to facilitate teaching and learning using ICTs in the classrooms remains critical (Cuban, 2001, p. 164). In his research on the underuse of computers in schools, Cuban is presenting a balanced study which evaluates the importance of having computers in school, and at the same time asking a question on whether the investment in ICT is worth it or not. Wild (2015) also reasoned that the presence of ICT in schools, and having teachers and learner connected via ICT platforms, does not guarantee any form of improved educational outcomes.

2.4.1. Teachers suggested recruitment process change to realise the effective implementation of e-education in schools

According to Kozma (2008) the introduction of ICT in schools does not have the propensity to produce value on its own, except it is ingeniously utilised by teachers in

their day to day teaching in the classroom. Notwithstanding the work ICT-enabled technologies have yielded, there is still an enormous pressure for teachers to embrace the use of ICT in all teaching processes (Rogers, 2008). Furthermore, Kozma (2008) encourages teachers to repetitively develop their ICT skills to minimise the technology gap that exists, particularly in public schools and for the DoBE to explore methods of recruiting more ICT capable teachers. For example, just outside South Africa, the teacher recruitment procedures in Turkey have changed subsequent to the introduction of ICT in schools. Their ministry of education was overwhelmed by the level of transformation and competence the e-education promised. As a result, their teachers are now assessed also on the level of knowledge in ICT as prime recruitment prerequisite (Tezci, 2009).

Furthermore, the assessment is designed to determine whether the teacher's attitude toward ICT is fitting and to assess their willingness to deal with the ever changing nature of ICT as it unfolds (Tezci, 2009). Historically, the quality of education was associated with the number of teachers having high-degrees (Noor-Ul-Amin, 2007). But in the modern times, the argument is whether the type of the degree is good enough to assist the teacher in imparting ICT knowledge in schools. Stack (2008) has argued that the newly qualified teachers are more likely to effectively use ICTs in schools.

2.4.2. Technology disruptions teachers face in schools

The introduction of ICTs in schools has led to cell phones and smartphones becoming ubiquitous among most learners. Many have started accessing the Internet through their smartphones and thus became adept at using Internet applications, including navigating Internet sites (Kaka, 2008). Teachers, on the other hand, are still struggling to embrace the use of ICT in schools. In his work, Arkorful and Abaidoo (2014) claims that while learners have developed an interest in ICT and its use to modernise education, most of the teachers are still left behind. The report further suggests that many teachers are still battling to conduct effective ICT learning since they are digital illiterate; a term used to describe the lack of knowledge in ICT. Most teachers are facing challenges in facilitating teaching and learning using ICT as most do not possess

adequate ICT skills (DoE, 2004, p.9). The DoBE has identified the prevailing gap in the capacity of teachers to effectively use ICT to access diverse content and high quality digital educational material (DoE, 2004, p.13). Furthermore, this gap is exposing the teachers' lack of ICT competency to learners who appears to be far ahead their teachers regarding ICT learning, thereby weakening teachers' confidence in the use of ICTs in a classroom setting (DoE, 2004, pp. 38 – 39).

Though the use of ICTs stimulates education efficacies, teachers are still struggling to perform simple tasks using ICTs. For example, typing subjects question papers or communicating with learners using a computer has proved to be a mammoth chore to most teachers (Ndlovu & Lawrence, 2012, pp. 2 - 3). The common challenge in many schools across South Africa is that many schools have deserted computer equipment deserted in their computer labs (Cuban, 2001). Further, it has been discovered that the same computers are not connected to school network or the Internet, no single point of security, no educational software's installed and no training. As a result, the availability of ICT equipment in these schools is considered useless (Dagada, 2010).

The role of a teacher is fast becoming more important and strategic in improving the quality of learning through increased ICT uptake in schools (Drent & Meelissen, 2008). Although the introduction and use of ICT have brought a great excitement in the education sector, Cuban (2001) is unyielding on the fact that the availability of computers in the classroom does not mean anything. Cuban is trying to prove that while ICT seems to be the next big thing in schools, there are many schools that are still doing exceptionally well in all areas they are measured in, without any connectivity to the Internet. Condie and Munro (2007) had argued that a well-constructed policy can and should reveal hidden education benefits of utilising ICT technologies in schools.

Sibanda (2012) presents a view that e-education funding should be considered a long-term policy initiative both at the national and provincial levels. It is likewise important for the DoBE to note that funding does not only affect learners but teachers also. The

general expectation is that teachers need to also be refreshed through appropriate ICT training, which will enable them to impart ICT knowledge efficiently. As stated by Cuban, teacher and learner behaviour plays a fundamental role in the implementation of ICT in schools.

2.5. Learners' ICT experience and challenges

The rapid growth of the Internet has compelled educators to approach the method of education differently, and to a large extent, commercialised e-learning and e-education. Cuban (2001, p. 277) noted:

The limits of educational reform, evident in the "apparent uniformity of instruction over time" and "the apparent invulnerability of classrooms to change"

The key observation to be noted from Cuban's assertion is that, the method of modern teaching and learning is directly propelled by the evolution of technology (referred also as ICT). The white paper on e-education (DoE, 2004, p. 14) states:

In the South African context, the concept of e-education revolves around the use of ICTs to accelerate the achievement of national education goals. e-Education is about connecting learners and teachers to each other and to professional support services, and providing platforms for learning.

The use of ICT in education is prevalent and the demand to transform the method of teaching and learning is persistently growing. Oye, Iahad, Madar and Rahim (2012) have argued that e-education is essential in delivering knowledge in the digital age as it has the ability to expand learners' ICT skills. Generally, it is believed that the implementation of ICT in schools will lead to the empowerment of both teachers and learners by increasing digital access to a number of electronic educational materials (Meenakshi, 2013).

2.5.1. Learners benefit realisation for using ICTs in a classroom

The DoBE believes that the introduction of ICT in schools through effective joint relationship between teachers and learners will yield better-quality education

outcomes (DoE, 2004, p. 16). Isaacs (2007) had reasoned that over 500, 000 learners are already reaping benefits of having ICTs in schools with over 16, 000 teachers being trained. But Meenakshi (2013) challenges Isaacs's assertion by stating that having ICTs in schools should not be deemed as the perfect solution to fix educational problems that exists in South Africa. Besides, Rosenberg (2002) had already warned that the use of ICTs in schools has its pros and cons. Meenakshi's view finds its expression from Rosenberg's study as the author suggests that there is a gap between methods prescribed and methods teachers prefer in classrooms. Aware of the role ICT can hypothetically play in improving the quality of education, Kaka (2008) had also argued that the method of implementing ICT in schools should be supported primarily by teachers. Notwithstanding Kaka's leading consent, many teachers are reluctant to use ICT as it presents manifold challenges in as far as the skill set is concerned (Isaacs, 2007).

2.5.2. Comparison of traditional learning versus ICT modern learning and learner's benefit realisation

Neville describes e-education as a switch from a traditional learning to a digitised learning platform which has the potential to stimulate passive learning (Neville, 2004, pp. 146 -153). Cuban had stated that because traditional learning is nowadays subject to a lot of criticism and often categorised as dysfunctional when compared to ICT-infused learning, modern ICT learning addresses deficiencies of the old-style classroom learning (Cuban, 2001). ICT-infused learning often referred to as electronic learning offers a wide spectrum of learning opportunities and solutions to stimulate the knowledge-based economy (Rugbeer, 2005). In a table (Table 2), OECD (2008) provides a summary of the distinction that exist between traditional and e-education.

Table 3: Comparison of Traditional learning and e-learning

	Traditional Learning	e-Learning / e-Education
Delivery	Teacher determines when the learner will learn.	The learner is in control of the learning process.
Responsiveness	Presumes to know what that learner ought to learn.	Lets the learner see the agenda and solve his own learning problems.

Access	Moves sequentially, like studying from a text or script.	Allows the learner to set the order and agenda.
Symmetry	Remains physically and mentally separated from work experience.	Helps make learning part of the work or task.
Modality	Requires a clearly defined, beginning, middle and end.	Takes place whenever, however, In just the right amounts.
Authority	Places content responsibility on the educator or administrator.	Allows the learners and educators determine collaboratively.
Personalisation	Conveys little, if any, sense of relationship between the learner and the material.	Intensely targets the individual learner.
Adaptability	Remains fixed in time and space until the training stops and new materials replace the old.	Places the learner at the centre of the learning process, giving him control over both content and process.

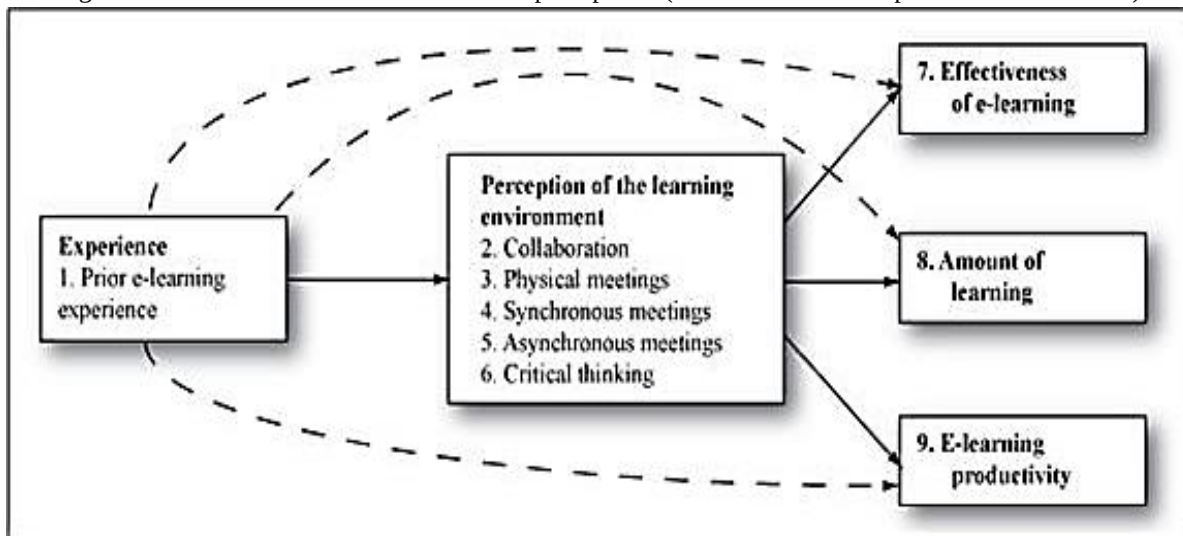
Source: OECD (2008)

The advantage of modern education (e-education) is that learners are placed at the centre of teaching and learning, providing them with full control over both the process or learning and the actual educational content. Rogers (2008) argues that whilst e-education is essentially centred on learners, the desired curriculum reform requires full involvement of teachers as the main drivers. Spillane and Thompson (1997) state that in order to realise education policy outcomes, there has to be an investment in teachers ICT training including policy implementation plan.

2.5.3. Learners participations and ICT use in education through the e-education method

According to Biggs and Moore (1993) the model to evaluate the effective use of e-learning and its relationships (Figure 9) in and outside the classroom setting is to be based on the learner's performance and not the throughput of ICTs. ICT alone can never advance the course of education if teachers and learners are not willing to embrace the change in how education is practiced. Franklin and Peat (2001) state that the model by Biggs and Moore has helped researchers, particularly in the field of education, to define and categorise education elements that influence student learning outcomes.

Figure 9: The Modified 3P model of student perceptions (dotted lines indicate potential direct effects)



Source: Biggs and Moore, 1993

Oye, Iahad, Madar and Ab.Rahim (2012) had confirmed that e-education method is never enough and cannot be seen to contribute towards improving the performance of teaching and learning. Studies have proved that interactive learning is still by far the most preferred method, and has, over the years improved the quality of education significantly (Rogers, 2008).

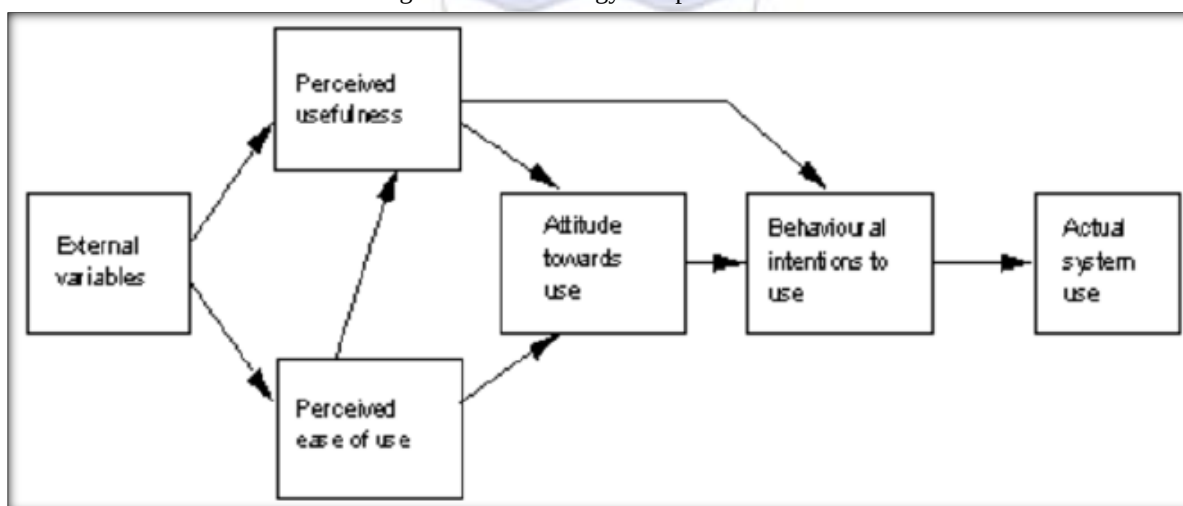
2.5.4. ICT infrastructure challenges affecting the performance of learners

Over the past decade, South Africa has witnessed a startling decline in a number of schools with computers connected to broadband services (Bladergroen, Chigona, Bytheway, Cox, Dumas & van Zyl, 2012). The decline came as a surprise for the reason that the government had promised over twelve (12) years ago that every learner in South Africa, regardless of their geographic location, would be more ICT capable not later than 2013 (DoE, 2004, p. 17). Five (5) years after 2013 and South Africa still has a high number of schools that are without the desired ICT infrastructure. Instead of focusing on strengthening either the implementation plan or the policy amendment and enforcement, the government has yet again made another promise that in 2016 learners across all regions in South Africa will have access ICT web applications (mybroadband, 2014).

Davis, Bagozzi and Warshaw (1989) state that, there are a lot of internal and external factors influencing the ICT uptake in schools. Even though ICT implementation in schools provides new opportunities for teaching and learning, the external factors (variables) impeding this development are much greater. Teachers are still not sure of their core responsibilities, and often cannot deal with the pressure coming from the learners and parents (Cuban, 2001). School policies on the use of ICT are still not clearly defined; there is no national curriculum or guidelines in terms of ICT acceptable curriculum format (Ayanso, Cho & Lertwachara, 2010).

The illustration below (Figure 10) shows the response learners have towards the use of ICT. It is interesting to note that “teachers interact with the range of beliefs and attitudes they have about teaching and learning” (Cuban, 2001, p. 175). The model was tested with most of the professionals across different sectors and what stands out is the fact that the attitude element remains the driving force of acceptance. The attitude is paired with the behaviour and therefore it is very important to understand that the use of ICT in any given setting is relying on the user’s attitude (Davis, Bagozzi & Warshaw, 1989).

Figure 10: Technology acceptance model



Source: Davis, Bagozzi and Warshaw (1989).

While the DoBE has tried so to own up for their failure of non-delivery, the challenges of learners adapting to the use of ICTs are growing every day. Cuban (2001) had explained that from the 52% of teachers who have received ICT training, less than 10%

will go back to impart the knowledge gained back to learners. Furthermore, Mdlongwa (2012) had reasoned that nearly 50% of the computer equipment delivered to schools have not been connected to the Internet, let alone been utilised at all. On the other hand, Cox, Preston and Cox (1999) had presented their view that, teachers who are resisting change are not necessarily against the use of ICT, but are worried about whether the introduction of ICT will be sustainable and who, in the long term, would manage this development. The prerequisite pedagogical shift requires strong ICT technical skills to integrate learning, and it is not clear yet how the DoBE is planning to replace the current traditional learning.

2.6. Underlying and prevailing educational infrastructure

Prior to the birth of democracy in South Africa, most socio economic policies of the apartheid government inspired separation between racial groups (Cox, Preston, & Cox, 1999). In 1953, the education for black people was brought under the apartheid government sovereignty to strengthen racial and topographical segregation. During the 1970s, there was a political turmoil, learners demanding an educational reform. All black schools were left destitute, excluded from the forward-thinking infrastructure planning and subjected to all kinds of harassment (DoE, 2005, p. 1). Black people also referred to as Africans were the beneficiaries of poor quality education while other racial groups received a better quality education. Between 1990 and 1994, the apartheid government together with the African National Congress (ANC) entered into negotiations to resolve the political stalemate which putrefied the economic growth including the education (OECD, 2008). According to Kalantzis and Cope (no date), education policies formation during the apartheid era had at least three (3) objectives; to suppress the majority of the population, safeguard against international best practices that could have introduced changes, and to enforce segregation between racial lines.

In 1994, the first elected democratic government resulted in the political makeover of South Africa. The transformation dialogue encompassed most, if not all, facets of society, including education (Vestberg, 2013). Education was identified as one of the

strategic sectors to play a pivotal role in transforming even the economy of the country (Cowen, 1996). As a result, the 1995 White Paper's focus was largely on a policy to transition from isolated educational policies, which serviced the white minority, to all-encompassing policies, which were non-racial (DoE, 1995). The introduction and use of ICT in schools has always been in the policy agenda since 1995 (DoE, 1996). In 2004, the White Paper on e-Education was endorsed by the Parliament of South Africa.

2.6.1. ICT infrastructure investments in schools

The DoBE has an annual budget of about ZAR186.1 billion and 10% of the funding is allocated to ICT enabled education programmes (Maringe & Prew, 2014). Over 400 000 teachers require extensive ICT training in order to improve ICT-infused teaching and learning in schools (Fin24, 2015). Khanya Project, GoL, and many others are only focusing on providing ICT in schools, and no emphasis made on teacher training (Isaacs, 2007). It is a shocking revelation that over ZAR1 billion has been used in running these failed projects. Nonetheless, there is a claim that from the ZAR1 billion, 27 000 teachers were fully trained in ICT. Gauteng online was by far the most expensive investment ever made. The overspill of investment in ICT does not mean anything when improved education is not realised. The main focus should be dedicated to evaluating both the ICT use and user attitude to determine whether the investment was worth it or not (Cuban, 2001, p. 207). ICT in the environment of education (teaching and learning) does not have the aptitude to produce value on its own, except it is ingeniously utilised by teachers in their day-to-day teaching inside a classroom (Kozma, 2008, p. 7).

2.7. ICT infrastructure funding models

The White Paper on e-education and many other policies, such as the ICT policy are still silent on the acceptable use of these ICT tools in the learning environment as well as funding. Whilst the envisioned policy outcome for e-education is to produce well-educated learners, there is still a lack of ICT competent teachers skilled enough to even contribute to socio-economic development (DoE, 2004, p. 17; Sibanda, 2012).

Nonetheless, the DoBE believes that the government cannot be expected to be the sole stakeholder to carry the burden of securing funding for ICT infrastructure

developments. The Department argues that “the private sector should also be identified as a potential donor to accelerate the plans to advance the level of e-education” (DoE, 2004, p. 11).

Sibanda (2012) encourages the DoBE to frequently engage the business communities for private funding towards the development of quality education, by implementing ICT in schools in a quest to assist the Department in realising its policy goals. South Africa compared to some of other developing countries seems to be doing fairly well with regards to ICT uptake. Grönqvist and Hall (2013) believe that policy considerations should, among other things, focus on ICT policy enforcement procedures to improve broadband access in schools. It is still possible for South Africa to accelerate the implementation of ICT in their schools. In 2015, ICT was implemented in seven (7) schools in Gauteng as part of fast-tracking the implementation and adoption of ICT. Learners walked into the new teaching environment where their classrooms were fully digitised and the use of paper has lessened drastically (Isaacs, 2007).

2.7.1. Government collaborate in e-education policy

Still on the subject of having ICT in schools, Dagada (2010) states that the arrival of a democratic administration in South Africa has stimulated the government’s focus on the role and capabilities of ICT in developing its socio-economic sectors. There have also been a growing number of local municipalities taking the initiative to assist the government toward realising its ICT goals by implementing the desired ICT infrastructure, both in the local and provincial departments (Chan & Welebir, 2003). The move to participate in what is often termed as business led-IT, which simply means a non-IT business unit taking a decision to play a leading role in introducing and driving ICT initiatives. This initiative has seen normal citizens appreciating the efforts made, but then again, as Cuban had raised a question, Vestberg (2013) argues that the immediate access to broadband services will give the teacher and learner access to a diversity of academic materials, such as journal articles, academic essays,

lecture notes, electronic books (e-books) and electronic databases (e-databases) to improve the quality of learning.

2.7.2. Private sector intervention in ICT implemented in schools

The availability of uninterrupted broadband services improves the quality of education and to a large degree boosts the economic development of the country (Vestberg, 2013). According to the report issued by ITWeb (2016), South Africa is among few developing countries that have seen an improvement in their economy as a result of the tactical implementation and use of ICT in some of its strategic sectors. Learners in school where ICT is implemented have started to show some reasonable improvement in their school grades (Wild, 2015). Engelbrecht (2012) states that the primary intent of the private sectors joining forces with the DoBE in executing its ICT initiative was to reach at least 1 555 schools with an estimation of approximately 60 000 learners across all nine (9) provinces. It is also believed that this particular initiative will improve the quality of teaching and learning as well as provide just about 3 820 teachers with improved ICT training.

It is, however, a known fact that the DoBE has struggled to live up to its commitment of having all learners ICT capable before 2013. Despite this setback, some private sector companies like Vodacom have recognised the need to play a defining role in supporting the government's ICT initiatives. In 2012, Vodacom had opened a computer centre in Gauteng with at least 50 computer terminals connected to the Internet set aside for educational programmes and training (Engelbrecht, 2012).

Apart from the big-budget DoBE is running, non-profit organisations such as the Association Distributors of Educational Suppliers in South Africa (ADESSA), which is independent of government and funded privately is also addressing the issues of e-education by implementing ICT in schools (e4africa, 2016). IT Schools Innovation (ITSI) organisation, also independent of the government, has given both public and private schools across all nine (9) provinces access to ICT. This includes implementing the right ICT Wi-Fi infrastructure in schools, and also proving mobile application to improve teaching and learning. The organisation has reached approximately 14 000

learners in all provinces, and the plan is to grow this number to 100 000 pending the negotiation with other schools (ITWeb, 2014).

2.8. The policy framework interpretations according to DoBE

Apart from the recent achievements that came with the new policy regime, Roux (2002) believes that factors such as the shift in demographics and the uncertainty of South Africa's economic state have a momentous contribution to changing the policy formulation landscape. Moreover, policy change requires a higher order of thinking and vigorous engagement from policymakers and this is in view of the fact that the change could hypothetically create a new and provoking paradigm.

As part of ensuring that main policy goals are achieved, the ISAD Plan, together with the DoBE, had gone on a new venture which later made an attempt in publishing an 'inclusive' e-education policy framework. This framework is believed to sketch the Departments' strategic approach as well as the implementation plan which is also believed to be in conjunction with the national policy. Nonetheless, the ISAD Plan is sensible about the non-existent of the ICT infrastructure in most of the schools and "to date, the backlog in infrastructure in terms of classrooms, electricity and connectivity still prevails in the country" (DoC, 2006, p. 65).

Barber and Mourshed (2007) argue that it is not so much about the presence of the ICT infrastructure in schools that can improve the quality of teaching and learning, but selflessness and preparedness from the teachers are two (2) important elements that supersede the availability of ICT in schools. For example, South Korea has reached a resolution, which is also a policy position to employ only teachers with degree qualifications as they believe "the quality of an education system cannot exceed the quality of its teachers" (OECD, 2008).

According to Roux (2002), one of the most practical criteria for determining whether the policy is successful or not, is by first understanding in detail, the objectives of the policy before the formulation phase; requirements gathering is very important.

Similarly, the first-prize question should be whether policymakers actually understand

the policy formulation processes as well as the readiness to handle the policy evaluation methods.

2.8.1. Policy development and regulatory of the ICT sector in South Africa

In South Africa, policy formulation and regulations development are not managed by one government structure, but by structures within the domain of the national executive. The Development and the Presidential International Advisory Council on Information Society and Development (PIAC on ISAD) and the Presidential National Commission of Information Society and Development (PNC on ISAD) councils were formed with the intention to advise the government on ICT developments relating to, among others, the digital divide, access to broadband to increase digital participation in the knowledge economy as well as the implementation of the ICT policy (DoC, 2006, p. 11).

Telecommunications policy, which “deals with universal service, market structure, and the role of an independent regulator”, was established in 1996, while the convergence policy which focuses mainly on the overall developments in ICT, was established in 1998, to also facilitate the integration of the telecommunications and the broadcasting policies (Dagada, 2010, p. 2).

2.8.2. Problems, challenges and some of the benefits that come with e-education initiatives

The implementation of ICT in schools is set not only to improve teaching and learning but to also build a promising foundation for future learners. However, there seems to be a huge concern around the overall governance as well as the issuing and management of these must-have ICT devices in schools. According to BusinessTech (2016), in Gauteng alone, around 7 000 government tablets each costing nearly ZAR3 500 each have not been returned by the Grade 12 learners who finished matric in 2015. The MEC of Education in Gauteng, Panyasa Lesufi has continued issuing ICT devices ranging from smart boards, tablets, and projectors regardless of the aforementioned disturbing findings. On May 2015, still in Gauteng, 3 000 tables were reported stolen and 12 000 out of 64 000 tablets, were not accounted for and there is

over a ZAR1 million in damage of schools equipment reported over the last financial year (BusinessTech, 2016).

Sibanda (2012) in his research on the investment committed to ensuring affordable access to schools argues that the performance of many learners has dropped between 2009 and 2012. According to the report issued by the OECD, the introduction of ICT in schools has not yielded significant results as it was expected. In terms of digital ratings, the “OECD has just given the world an ‘F’ when it comes to using computers to improve educational outcomes in schools” (TechCentral, 2015).

While Gauteng is fast becoming a popular province for rolling out ICT in schools despite the few reports attributing the improvement to the rollout, meanwhile, learners in some schools in the Eastern Cape Province are forced to share a single tablet, which must cater for at least three learners. For example, the Mvuso Junior Secondary School in the Eastern Cape has over 376 learners, nine (9) teachers, but only 150 tablets. What is remarkable though is that since the introduction of ICT at this school, and despite constraints as a result of sharing, the pass rate increased from 70% to 97% (Wild, 2015). The prevalent accessibility of e-education has made it possible for learning to be easier than before, and it is a testament that the use of ICT in education can improve the quality of teaching and learning (Tsiakas, Stergiopoulos, Kaitsa & Triantis, 2005).

Mouza (2003) describes the implementation of ICT development in schools as the next big thing that has ever happened in the history of education reform. Most of the schools have shown a significant improvement post the implementation of ICT in schools, but Becker and Ravitz (2001) argue that there are still instances where ICT does not have the capability of fixing historical education problems. Mdlongwa (2012) also argues that the political interruptions in implementing e-education in South Africa, coupled with a lack of strong policy making structures, have robbed the country of an opportunity to compete with developed countries.

The involvement of the DoBE in reducing ICT implementation bottleneck has started with the Department focusing on two (2) of the nine (9) provinces in South Africa which have demonstrated a remarkable improvement in ICT development. But Sibanda (2004) still asserts that the Department does not have a well-defined policy roadmap to implementing e-education. It is easy to deduce from Sibanda's research that the level of ICT implementation in schools is not receiving the attention it deserves.

2.8.3. The need for quality policy and regulation

Melody (1997) states, policymakers and regulators are confronted with the challenge of staying abreast amidst the rapid ICT developments. Constant changes in technology have placed a great demand for ICT policy reviews. These changes, if not embraced with due diligence, may directly impede on the delivery of quality education (Baqir, Palvia & Nemati, 2009). Apart from policymakers focusing their attention broadly on the quality aspect of education, Barber and Mourshed (2007, p. 29) argues that there is an expectation for policymakers to start classifying and dealing with the complex and inherent educational policies that failed to stimulate quality education.

While the policy goal prescribed by the DoBE is for every learner to be ICT capable not later than 2013, Cuban (2001, p. 187) believes that a sizeable percentage of the teaching and learning society consist of unapprised policy decision-making structures. This is also in view of the fact that, a large percentage of the public officials are still criticised, and to a certain extent, blamed for the low performance of learners in schools (Cox, Preston & Cox, 1999; DoE, 2004). The hypothesis is that most of the public officials, including teachers, are not as ICT capable as expected, and lack fundamental information relating to the education sector (Barber & Mourshed, 2007, p. 11).

2.8.4. Evaluating supposition that South Africa has benefited from the investment made in ICT

South Africa has over the years accumulated extensive experience from a wide spectrum of "projects and programmes" across different industries. It is through the e-

education policy intentions that South Africa has witnessed more than 22% of Internet penetration in most of the public schools. As a result, the Department has begun to improve policy making structures to ensure “the promotion of enhanced learning through optimal usage of the technologies” (Isaacs, 2007, pp. 2-4).

Although, the general supposition is that the availability and integration of ICT in schools influences teaching practice, Tondeur, van-Keer, van-Braak and Valcke (2008) argue that the research is yet to demonstrate the education benefit realisation of using ICT in schools. Cuban (2001, p. 3) has a view that “few highly motivated teachers would make innovative use of computers while most, at best, would adapt computers to their existing classroom practice”. Cuban asserts that the provisioning of education through digital channels does not guarantee any kind of transformation in how education is practiced.

2.8.5. Evaluating supposition that procurement of ICTs in schools is a possible corruption vehicle

The introduction of ICT equipment in schools is happening at a rapid speed. The cost of implementing ICT in schools proved to be an expensive exercise and as a result, corruption is evident in the absence of strict governance. The State Information Technology Agency (SITA) has been under audit for irregularities relating to ICT related tenders for at least the past 10 years and this is despite the poor delivery of ICT services. The Technology Innovation Agency (TIA) and SITA have constantly changed their executive management teams, including board directors, for reasons ranging from non-performance to corruption (BusinessTech, 2013).

CHAPTER THREE: RESEARCH METHODOLOGY

3. Introduction

This chapter presents details of the preferred methodology adopted by the author. The chapter commences with the synopsis of the research technique that will be used. Details on research design are also covered in this chapter, including the discussion around the method of collecting data and the use of research instruments as well as how data is analysed. The initial focus is based on the case study approach, which explains in detail the objective of the research and also seeks to justify the choice of the research approach. The research design discusses briefly the processes of identifying key participants and data sampling. The overall research limitations are also discussed and lastly, the researcher analysis academic discussions on the data collection methodology.

3.1. Research design and research methodology

Both the research design and research methodology are often used interchangeably, which can in most research instances create confusion. It is sensible for the researcher to understand the underlying assumption of these two research elements. The primary function of the research design is to focus largely on the outcome (end product), while research methodology emphases are in the overall research process, which can include the type of events and tools to be used (TerreBlanche, Durrheim, & Painter, 1999).

Rajasekar, Philominathan and Chinnathambi (2006) explicitly state that it is imperative to note the differences between the research design and research methodology. The research methodology is a seamless process of solving a particular research problem, whereas the research design involves, in most instances, the application of numerous algorithms in a study. However, these algorithms need to be planned, mostly because they can enable the researcher to collect a meaningful data.

3.2. The importance of e-education study

The problem of e-education remains ambiguous in South Africa as it does not solely depend on the DoBE to deliver the implementation of ICTs in schools. Adding to this

policy challenge is that this goal is interdependent on other government organs (departments) such as the Department of Communications (DoC), the Department of Telecommunications and Postal Services (DTPS), the State Information Technology Agency (SITA) and many others. All of the abovementioned government departments are mandated, among others, to ensure the provision of the uninterrupted quality broadband services. On the other hand, there is no trace of an unswerving study that has investigated the policy differences between the government departments to establish what measures are used to determine whether a policy is a success or failure. McConnell (2010) describes a policy review as a complex exercise. It is lamentable that many types of researchers still underestimate the fact that policy can present manifold dimensions.

3.3. Problem statement

The improvements in ICTs have stimulated great expectations for the DoBE to review the state of e-education policy. The white paper on e-education suggests that every learner in South Africa will be ICT capable by 2013. The paper also makes a bold statement that it has a well-defined policy implementation plan to foster e-education in schools. The primary objective is to introduce and integrate the Internet in schools to kindle innovative thinking, increasing the ICT skills capabilities, improve the learning experience and effective ICT administration processes in schools.

One of the critical policy objectives of e-education is to enable learners to participate in the knowledge economy. The Department is still unwavering in its belief that the policy implementation is the appropriate vehicle for improving the quality of teaching and learning in schools. Bassi (2011) had reasoned that all identified government policies enabling the e-education initiative should be more responsive toward the development of ICT in order to create more value-add in the education system (Bassi, 2011). According to the DoE (2004), the existing digital divide does not necessarily present constraints to educational development since all “provinces are at different levels of ICT integration in education”. However, Lim and Hang (2003) had argued that

the education policy should not underestimate the complexity around implementing e-education and the challenges of bridging the digital divide.

3.4. Purpose statement

The purpose of this study is to explore why e-education policy is not leading to the effective and successful implementation to improve the quality of teaching and learning in schools. Both the marginalised rural and urban communities with destitute infrastructure are not benefiting from ICTs (Rahman, 2007; Furlonger, 2002, p. 2). It is, therefore, deemed necessary to evaluate the education policy through the theoretical lens of e-education discourse analysis (Bladergroen, Chigona, Bytheway, Cox, Dumas & van Zyl, 2012). This knowledge may, in turn, assist the DoBE to better understand all the underlying issues that prohibit the policy from leading to the effective and successful implementation of e-education.

The magnitude of the task ahead of the Department remains in the deficiency of effective ICT policy designed to foster implementation of ICTs in schools. This is in contemplation of the fact that the government spends large amounts of taxpayer's money towards the implementation of ICT to stimulate social and economic development. Furthermore, the DoBE has the responsibility to streamline e-education implementation of assisted ICT services in conjunction with other government departments. The research also evaluates teachers, learners and the overall infrastructure readiness in utilising ICT-enabled solutions to improve teaching and learning in schools.

3.4.1. The objective of the study

The study has the following aims:

- 1) To provide a better understanding of how successful implementation of ICT policy can improve the state of education in schools.
- 2) To establish the educational benefit of having an effective e-education implemented in schools.

- 3) To evaluate commitments made by the DoBE on the white paper on e-education.

3.4.2. Main research question

The main research question is:

To what extent is the policy successful in improving e-education?

3.4.2.1. Sub-questions

Subsequent to the main question, the following sub-questions are also asked:

- 1) What are the strengths and weaknesses in the design of e-education policy?
- 2) To what extent does e-education policy improve teacher experience in schools?
- 3) To what extent does the present ICT infrastructure support the realisation of the envisaged e-education intentions?

3.5. Research paradigms

The original settings of the case study methodology in most cases remain indistinct (Shek, Tang & Han, 2005). The reason of having the above-mentioned set of questions is to justify the author's choice of selecting a qualitative study approach that is purely founded upon a case study. The qualitative research method is largely preferred, particularly when reviewing distinct approaches and techniques with the intention to evaluate envisioned set of standards and rationality (Baxter & Jack, 2008).

The attempt to understand the level of policy intervention in fostering e-education is done through a case study model. This model is perceived to be important as it has the know-how of conducting a research as well as offering guidance on in-depth analysis. This capability also provides a researcher with a solid first-hand evidence to examine "a contemporary phenomenon within its real life context, in which the boundaries between the phenomenon and its context are not clearly evident" (Wimmer & Dominick, 1997).

Baxter and Jack (2008), both stated that it is critical to treat the case study approach with vigour and in-depth investigation as it includes reviewing multiple research elements. The advantage of this approach is that it presents multiple facets

considerations, in particular, the ones that a researcher is trying to understand and how they directly impact the multilevel social system.

Yin (2003) had prescribed the key design principles in a case study that the researcher needs to apply when selecting the qualitative research approach, as principles that should, among other things, address the following concerns:

- a) The primary role and the importance of conceptualisation in the case study.
- b) The significance of having an in-depth description with a well-constructed detailed research background.
- c) The importance of depending on different, but related sources of data in particular that ones that relates to the research topic.
- d) The unique strategic approach to planning and filtering data in case study approach (Yin, 2003).

3.6. Research method: A qualitative case study approach

The objective of the research is to establish the level and extent to which all identified policies (6 policies mentioned later) and e-education policy have been successful in implementing e-education in schools. For the aforementioned reason, the research study proposes to use a qualitative case study approach. The choice of this approach is to enable the researcher to explore possible prospects or illustrate a phenomenon such as e-education policy development process in its natural setting or “context using a variety of data sources” (Baxter & Jack, 2008).

The case study approach is repeatedly perceived to be qualitative in nature and this study will utilise a qualitative methodology. The approach is best suited when assessing the ICT policies development, including the status of e-education because of its flexibility. Baxter and Jack (2008) argue that a case study approach should be considered when:

- a) The focus of the study is to answer “how” and “why” questions.
- b) When the behaviour of those involved in the study cannot be manipulated.

- c) It is very important that background conditions and issues are covered as they are pertinent to the phenomenon under study.
- d) The limits are not clear between the phenomenon and the context (Baxter & Jack, 2008).

According to the white paper on e-education, most of the country's educational leaders have not fully explored the benefits of having the Internet access in their schools. It for this particular reason the research is geared towards understanding the underlying policy challenges deterring the implementation of e-education. The method relies on an ongoing comparison of data and theory beginning with data collection (Huberman & Miles, 2002).

The case study is repetitively criticised due to the role the researcher undertakes in the gathering, analysing and interpreting the data. Yin (2003) had stated that the method the researcher undertakes is secondary, but what is important is the individual perspective. Yin's claims are founded on the theory of a social structure of reality that human beings are imperfect and they cannot be detached from their own way of thinking when scrutinising any phenomenon.

The case includes:

- a) Investigation of e-education policy formulation and the interpretation by the Department of Basic Education.
- b) Review the primary objective (access to broadband to schools) mentioned in the white paper on e-education to establish whether the policy processes were feasible or not.

3.7. Research archetypes

According to TerreBlanche, Durrheim and Painter (1999) the research development has three (3) distinct dimensions; namely (i) methodology, (ii) ontology and (iii) epistemology. The hypothesis in the event of trying to solve a research problem or to establish potential constraints should be evaluated against the underlying research archetype which focuses generally on the ethical paradigms.

The epistemological and ontological components are often referred to as what is believed to be a “person’s worldview” which in most instances may lead to influencing other viewpoints. TerreBlanche, Durrheim and Painter also believe that the paradigm is an inclusive and pervasive process that describes the nature of the research question.

Kuhn (1977) explains the concept of paradigm as “an integrated cluster of substantive concepts, variables, and problems attached with corresponding methodological approaches and tools...” The paradigm is also referred to as structured pattern and algorithm, assumptions and values. Lather (1986) had described the paradigm as a view entrenched and reflected in our belief about the current and future world. These explanations slightly underpin the underlying theories that exist in the research communities which elevate research culture with a set of viewpoints and standards.

3.8. The research approach used to collect data

For the purpose of this research, a manifold method approach to data collection is selected to enable triangulation of results. Although data collection can be done through many channels, Maxwell (2006) had stated that the primary elements of qualitative research approach should include, among other things, interviews, observation, and questionnaires. Similarly, the principal data collection is done through reviewing at least a minimum of seven (7) gazette policy documents.

Since e-education research problem has many facets, many components, many elements, and for the purpose of this research, it was sensible for the researcher as stated to select the itemised minimum number of 7 gazette policy documents in order to manage data gathering resourcefully. The criterion is to focus largely on gazette policy documents that were endorsed by the South African parliament, including other key documents that seek to address the issues around the implementation of e-education in schools.

According to Sarantakos (2005), the method of collecting data and conducting interviews involves the researcher visiting the participants to ask questions. Since the

study proposes a qualitative case study approach, the collection of data also includes reviewing data obtained from various sources such as written literature, academic journals as well as the white paper on e-education. The key research methods in the qualitative approach normally consist of well-structured interviews, surveys, case study and in-depth review of the literature (Savenye & Robinson, 2003).

The literature review is largely used to identify a range of factors that could potentially play a role in the ICT policy implementation to enable effective e-education. Therefore, the research design also reviews indispensable social factors that could hypothetically increase and the accelerate chances of having an effectiveness and success use of ICT to stimulate e-education. These factors can range from the readiness, availability of Internet access, uptake, and the impact of ICT technologies to transform the learning experience.

Yin (2003) had stated that the researcher needs to be more knowledgeable in the subject area in order to give effect to questions which aim to understand the research problem better; this is also to ensure the research does not deviate from the established research objective.

3.8.1. Sampling methodology

The research will be conducted by reviewing at least 7 gazette South African policies between the DoBE, DoC and the DTPS. The criteria will be to focus on policy documents that particularly deal with policy lifecycle development, implementation, and enforcement. Farzanfar (2005) had highlighted the importance of purposeful sampling as relevant to the study of e-education as it necessitates the researcher to wisely select information-rich cases that have an in-depth study material.

The researcher is not required to obtain, validate some of the claims with various departments, except to deal with claims reviewing or referencing policy documents. Merriam (2001) had also confirmed that purposeful sampling should always happen at a point when the researcher is getting ready to select study material ready to be learned. Part of the exercise is to collect and assess data to further understand the level at which teachers and learners can embrace ICT, and the benefit to be realised should the DoBE choose to accelerate ICT implementation in schools. This will, to some

extent, assist the researcher to understand in detail the genuine policy constraints and possible gaps. For the aforesaid reasons, Patton (2002) concludes by reiterating the importance of sampling since he strongly believes effective sampling can assist the researcher to identify the common themes and patterns during the course of study which can also assist to avert unnecessary duplications.

Table 4: Sampling approach

Data Source	Data Collection Tool	Unit of Analysis	Unit of Observation
Literature	Reading & Analysis	Books, Journal, Internet	- Methodology - ICT policy theories & approaches - e-learning, e-education, infrastructure availability and readiness - Policy reforms, ICT developments in provinces - Private sector involvement, e-education funding models
Department of Basic Education	Reading & Analysis	Gazette policy document: Department of Basic Education	Analyse the White Paper on e-education policy document
Department of Communications	Reading & Analysis	Gazette policy document: Department of Communications	Analyse the ISAD Plan document
Department of Communications	Reading & Analysis	Gazette policy document: Department of Communications	Analyse the National Development Plan (NDP) document
Department of Communications	Reading & Analysis	Gazette policy document: Department of Communications	Analyse the Broadband Policy document

Department of Telecommunications and Postal Services	Reading & Analysis	Gazette policy document: Department of Telecommunications and Postal Services	Analyse the National Integrated ICT Policy White Paper document
Department of Telecommunications and Postal Services	Reading & Analysis	Gazette policy document: Department of Telecommunications and Postal Services	Analyse the National e-strategy Digital South Africa
Department of Telecommunications and Postal Services	Reading & Analysis	Gazette policy document: Department of Telecommunications and Postal Services	Analyse the National e-government Strategy & Roadmap

The sampling approach (Table 3) has a minimum of four (4) event areas (teachers, learners, infrastructure availability and readiness and policy implementation strategy) that affect the process. The important areas are those where ICT policy is captured as the primary policy enabler to foster the implementation of e-education.

3.8.2. Document reviewing magnitude

The aspect of providing an in-depth reviewing of policy documents begins with the researcher developing the ability to function like a “naturalistic investigator”, and being open to new procedures of addressing and understanding the research topic. Understanding means not dwelling too much on only one dimension, but focus on being practical and willing to explore other facets of the research question (TerreBlanche, Durrheim & Painter, 1999).

Baxter and Jack (2008) had explained that reviewing policies should include well-defined structure for data gathering. In addition, Maxwell (2006) also confirms that well-structured reviews are highly useful, especially when the researcher needs to filter data to get optimal results in a short space of time. According to Welman (2001),

the approach to semi-structured interviews may require a certain level of adoption from the interviewer to craft questionnaire in a manner that will guide and ensure research themes are still in line with the research topic. Moreover, the questionnaires should not compromise the flow of discussion or gather wrong data.

3.8.3. Research instrument

Partially structured qualitative interview will be conducted by reviewing gazette policy documents between the DoBE, the DoC, and the DTPS. Further, the researcher examines the white paper on e-education document. The review also consists of pertinent academic journals and policy reviews. All these policy documents and documented reports will be utilised as data collection instruments.

3.9. Data analysis

The proposed study will use a qualitative research data analysis method. The following content analysis approach will be used:

Summary – data reduction in an attempt to conserve its essential content and produce a convenient body of data

Explication – broad context analysis and a final paraphrasing with reference to the total context.

Structuring – the material is often appraised firstly to identify the location of specific data and to extract and process the information. The categories may need amendment based on the information emerging from the analysis, which in turn requires review of the material.

3.10. Document analysis

A total of seven (7) government policy documents, namely, (i) White Paper on e-Education [WPee], (ii) ISAD Plan [ISADP], (iii) NDP, (iv) National Broadband Policy [NBP], and (v) National Integrated ICT Policy White Paper [NIICPW], (vi) National e-Government Strategy & Roadmap [NeGSR], and (vii) National e-Strategy Digital Society South Africa [NeSDSP] were reviewed using teachers experience, learners experience and broadband connectivity as the three (3) research dimensions. However, not all these 7 policy documents have discussed each of the three mentioned dimensions extensively. For example, the NBP is focused only on connectivity initiatives and does

not discuss both teachers and leaders experiences. There are pockets of data extracts from these policies depending on what dimension is being discussed.

The approach the researcher took when gathering data was through widespread document examination and observations. Maxwell (2006) had shared the same views and is particularly concerned with the level of data and records accuracy the researcher needs to be careful of. The problem experienced in some research areas is the mismanagement of the collected data which can compromise the authenticity of a research report. The e-education research involved the researcher looking at multiple sources, even outside the government space to ascertain whether the policy is leading to success or failure of implementing e-education in schools. The process of reviewing these policy documents consisted of fundamental pragmatic steps in order to understand the complexity of implementing e-education.

3.11. Benefits review process

Benefits review is largely defined as the method by which the success of the planned project is compared to the benefit delivery. During and after the project, all possible future opportunities are identified, “lessons learned and opportunities for improvement in future projects” are also identified, and documented. Benefits review process is regarded as an ideal opportunity for the organisation to learn from these shortfalls in order for them to succeed in the realisation of benefits over a period of time (Furlonger, 2002).

3.12. Research ethics

It is important for the researcher to reflect on research ethics to differentiate between right and wrong, in a quest to ensure the sound code of professionalism conduct when building the overall research study. Although ethical norms may appear to be more ambiguous, with many variations in interpretation, Resnik (2010) strongly believes that the researcher needs to uphold good ethics and high moral standards to be able to deal with issues ranging from religious beliefs, cultures, peer groups, etc.

Velasquez (1998) had stated that:

The ultimate aim of ethics is to develop a body of moral standards that we feel are reasonable to hold, the standards that we have thought about carefully and have decided are justified standards for us to accept and apply to the choices in our lives.

Ethical matters should, among other things, seek to establish a balance between two or more conflicting views (if any) without necessarily compromising either view of the two (2) parties, but to find a common ground which will be tolerable to both parties. According to Velasquez (1998), there is an ethical dimension to every researcher's conduct, but more emphasis should be on the researcher's characteristics to ensure mutual understanding and respect. When reviewing the literature, the researcher explored the case of an ethical approach to establishing a suitable framework to facilitate informed decision making. This was also to sensitise the researcher to acknowledge the work committed by other authors, including listing all accessed study materials.

3.13. Research methodology (summary)

This chapter outlines in detail the data collection process. The researcher used the white paper on e-education as the base to scrutinise the literature to understand the underlying policy concepts to foster e-education.

CHAPTER FOUR: REPORTING ON DATA FINDINGS ON EVALUATING THE ROLE OF ICT POLICY IN FOSTERING e-EDUCATION IN SOUTH AFRICA

4. Introduction

This chapter presents the research findings on e-education as it is formulated in a range of policy documents. The findings are directly linked to the research questions that directed the study. Quotations from the policy documents are used to show the exact words from the original source. The highlighting method is used on quotations that have two (2) or more denotations and offering different contexts. It is, thus, important to highlight quotations that are pertinent to the data discussed. The **yellow colour** or no colour are direct quotations, most pertinent (main focus) and the **grey colour** is the additional data (secondary focus), but also important data.

A total of seven (7) government policy documents, namely, (i) White Paper on e-Education [WPeE], (ii) ISAD Plan [ISADP], (iii) NDP, (iv) National Broadband Policy [NBP], and (v) National Integrated ICT Policy White Paper [NICTPW], (vi) National e-Government Strategy & Roadmap [NeGSR], and (vii) National e-Strategy Digital Society South Africa [NeSDSP] were reviewed using teachers experience, learners experience and broadband connectivity as the three (3) research dimensions. However, not all these 7 policy documents have discussed each of the three mentioned dimensions extensively. For example, the NBP is focused only on connectivity initiatives and does not discuss both teachers and learners experiences. There are pockets of data extracts from these policies depending on what dimension is being discussed.

4.1. Teachers' ICT experience to transform teaching and learning dimensions

This section discusses, among others, the experience of teachers, and their views on ICT integration, how ICT can effectively assist teachers' with their administrative chores, how teachers need to impart the ICT knowledge to learners. The DoBE has broadly reasoned that for teachers and learners to function competently with digital teaching and learning, connectivity to ICTs remains important (DoE, 2004, p. 17). Further, the documents believe that once teachers are able to step outside the ICT teaching challenges and culture, they

will be able to enhance teaching and learning. The ISADP gives an expression to the 'teacher transformation' idea discussed in the WPpE.

The document states that each school should identify key ICT teachers and provide further training (DoC, 2006, p. 56). However, the document has suggested that the implementation measures to support ICT skills should be reviewed. For example, for teachers to successfully incorporate ICTs in their teaching they need to be connected to proper ICT infrastructure (DoC, 2006, pp. 57 – 58). Although the NDP (NPC, 2012) discusses schooling in detail, the policy is very general on the subject of ICT access for teachers in schools. It should be noted, however, that the policy did discuss in lengths the importance of having the proper ICT infrastructure in schools (more discussed are under the connectivity section of this research report); there are no considerable ICT teacher discussion contained in the NBP, NIICTPW, NeGSR and NeSDSP.

4.1.1. Teacher training and development programme dimension

According to the WPpE (DoE, 2004, p. 25), most teachers in South Africa require further ICT training and development to be proficient users of ICT devices, to assist learners to efficiently use and manage ICTs in schools. The learner's capacity to get access to and understating to electronic (digital) set of courses is subject to teachers' preparedness to contentedly use ICT devices in the classroom (DoE, 2004, p. 11). This is because teaches' are easily intimidated by using ICT devices in front of ICT competent learners and would as a result revert back to traditional teaching and learning (DoE, 2004, p. 16). The introduction of ICTs in schools can assist to transform the quality of education which effects teaching and learning experience (DoE, 2004, p. 23). As a result, teacher training remains critical. The policy has underlined the need for teachers to be trained in the best way in order to navigate ICT tools. The policy (DoE, 2004, p. 25) states that:

Over the last five years, Government, the private sector, parastatals, and non-governmental organisations have responded positively to the challenge of bridging the digital divide. Efforts include, amongst others, the following:

- SCOPE (Finnish Development Support), SchoolNet SA and the South African Institute for Distance Education have developed 11 Teacher Development Modules for introducing ICTs into schools;
- SchoolNet SA provides online, mentor-based in-service training for teachers on introducing ICTs into the curriculum and management; and
- INTEL "Teach to the Future" Teacher Development Programme provides teacher training in ICT integration into teaching and learning.
- INTEL "Teach to the Future" Teacher Development Programme Provides teacher training in ICT integration into teaching and learning.

Since 1997, the SchoolNet has been and still is developing teacher professional training and development programs including implementation strategies to integrate ICT in education processes (DoE, 2004, p. 11; Strategic Review of SchoolNet SA, [SRSSA], 2011). This initiative was designed outside the national educational framework and before the development of the WPpE. The SchoolNetSA initiative is also aligned with teachers' training and development initiatives such as SCOPE, INTEL and Thintana. But there is nowhere in the policy we find a solid link between these initiatives (as mentioned in the WPpE) and the DoBE. It is not clear what role the DoBE is playing and how the ICT teacher training and development work by the non-government organisations (NGOs), private sector and state owned entities (SOEs) is integrated back to the control of the DoBE (as the custodian of basic education developments).

There is, therefore, no substantial first hand policy evidence to confirm partnership (between mentioned initiative and the DoBE) neither is there a proper guide to explain the relationship between these entities, nor do we find any direction set by the policy on how it plans to function alongside the existing developments without re-inventing the wheel. Later on, the policy (DoE, 2004, p. 22) contradicts itself by stating that:

A programme that urgently addresses the competencies of teachers to use ICTs for their personal work, in their classrooms, must be developed. This will require extensive staff development and support. Thus, ICTs will be central to the pre-service training of recruits and the ongoing professional development of practicing teachers

The policy had 'claimed' already that for the past five years (1999 – 2004) the DoBE had 'successfully' worked with the NGOs, SOEs and private sector to respond to the challenge of bridging the digital divide that existed between schools, learners and teachers (DoE, 2004, p. 11). There has never been a proof of policy from the DoBE that urgently looked at addressing the competencies of teachers, except it is noted that to date it still relies largely on the private sector, NGOs and SOEs undertake the responsibility of seeking radical strategies of providing better-quality ICT teacher training programmes. In 2003, Microsoft and SchoolNet had already developed three (3) additional teacher detailed ICT modules (ICT Skills for Teachers, ICT Skills for Principals and ICT Leadership for Educational Managers); yet again the policy had failed to incorporate the work that had already been developed (SRSSA, 2011).

The low quality of teacher's ICT development programs by the DoBE in South Africa has negatively affected the capacity to develop skilled teachers (DoE, 2004, p. 8). It has limited the propensity to create effective education value and to ensure an improved teaching and learning experience in a classroom setting. The state of the basic education system requires massive interventions to address the shortage of ICT skilled teachers in schools. This is because South Africa does not have an all-inclusive lifelong learning development programme for teachers (DoE, 2004, p. 17). Most teachers are still restricted to traditional teaching; hence, they have limited access to new ICT knowledge to effect the change in the curriculum as well as the ability to deliver education using ICT tools. As a result, teachers' development opportunities are restricted and not enabling them to thrive using ICTs. The NPC (2012, p. 315) has also stated that:

Teacher development should include training on curriculum pacing and the subject content that teachers find difficult to teach. Given the large numbers of teachers, ICT should be used as one of the ways of delivering teacher development.

While the NDP has tried to underscore the significance in investing on a lifelong teacher training and development programme, the link between the WPtE and NDP (8 years later) with respect to teacher training and development is still unclear. The document does not

provide extensive guidance on how it plans to ensure effective training on curriculum development.

4.1.2. Teacher culture that integrates e-education to improve the quality of education dimension

The introduction and integration of electronic, visual media and ICT tools in the educational practice and the right teacher culture can and will provide a suitable platform for increased access to infinite knowledge for both learners and teachers (DoE, 2004, p. 15). This consists of unrestricted access to online education material, access to online libraries and download of curriculum content (DoE, 2004, p. 27).

Devices such as tablets and e-books can and will enable knowledge sharing between learners and teachers. They are considered to be the real game changers as they have the potential to transform the quality of education and bridging both knowledge and digital divide (DoE, 2004, p. 22; Gray, 2011). The DoBE states that the introduction and use of ICTs in the classroom has helped to facilitate effective teaching and learning, further the policy (DoE, 2004, pp. 16 – 17) states that:

The cultural dimension involves stepping into the culture that supports the practice of using ICTs for educational purposes, regardless of one's level of expertise. This requires teachers to move beyond a purely instrumental role that views ICTs as an educational add-on, to regarding technology as something that poses interesting and important questions for administration, curricula and pedagogy.

The policy sets an expression that a way of improving the quality of education for teachers is through increased ICT knowledge, which creates a new platform for teachers to explore contemporary teaching approaches to better the experience of teaching and learning. Further, it suggests that improved ICT teaching and learning is still achievable. However, the policy did not deal with some of the potential challenges that prevent teachers from leapfrogging to a cultural dimension where effective ICT teaching becomes instinctive as well as the use ICTs in their daily chores. For example, nowhere in the policy do we find a comprehensive section that focusses broadly with how the Department plans to achieve

stimulate the right teachers culture in schools. There is a lot of repetition on highlighting challenges around the cultural setting of teachers with no provision of possible answers or policy initiatives to not only provide clarifications but to introduce remedial policy actions.

One of the main targets set out in the WPeE was to ensure all schools were connected and using ICTs to effect teaching and learning experience. The policy groundwork for integrating ICTs into schools gives the impression that it is slightly comprehensive as it is also located in quite a few components of the government's policy mechanisms (DoE, 2004, p. 40). The policy (DoE, 2004, p. 22) further states that:

Any ICT integration requires that teachers engage in rethinking and reshaping their engagement with the curriculum. Many teachers have grown up in environments with limited electronic technology, and thus find the adaptation to working with ICTs more difficult than their learners do.

Though teachers are uniquely placed at the point where the e-education policy meets practice, the realisation of the implementation depends on their understanding of the role they need to play (DoE, 2004, p. 20). In addition, the policy seems to have underestimated the concealed ICT technical complications teachers encounter during the process of implementing ICT in schools. The policy has no record of teachers' involvement reflected, yet there is anticipation by the WPeE that teachers should independently search for innovative instruments to use toward transforming the quality of education.

The WPeE policy document (DoE, 2004) together with the guidelines for teacher ICT training and development (DoE, 2007) were the first policy documents that framed and illustrated the benefit realisation of having ICT infused into the school's curriculum. Later, the ISADP (DoC, 2006, p. 55) had reasoned that the introduction of ICTs in schools, paired with effective teacher training and development programmes can enrich teaching and learning experiences.

Although both the WPeE and ISADP made repetitive references to the importance of having effective teachers' training and development programme, both policies had fallen short of describing the guideline for integrating ICT training through proper change management

programmes that involves teachers, school administrators and learners. Both policies were disingenuous to have created an expectation that teachers' ICT competency levels will improve. The very same policies had failed to provide the in-depth teacher's ICT skills training and development support programme.

Many scholars referenced in chapter two have echoed in different ways the need for the DoBE to provide additional training to teachers at each school to understand, for example, how to prepare for lessons using ICTs (Cox, Preston & Cox, 1999). Thus, it is critical that the purported 'modern teachers' receive excellent ICT skills on how to integrate and operate ICTs in a classroom to facilitate an effective learning experience. DoBE has also acknowledged that the education remodelling is possible through the persistent use of ICT at the centre of teaching and learning (DoE, 2004, p. 8). Similar to the DoBE, the ISADP (DoC, 2006, pp. 58 – 59) states that:

Inadequate preparation for teachers is often a major constraint that impacts negatively on their ability to integrate ICTs into the curriculum. In addition, limited ICT awareness and literacy is a constraint to the effective management of ICT rollout at the institutional level.

The ISADP had purposed that by the end of the financial year 2011/12, teachers would not only have basic ICT training, but access to free teacher training on how to integrate ICT into the curriculum (DoC, 2006, pp. 58 – 59). Teachers' ICT training remains a critical component to effectively manage the provision of the curriculum using ICT tools. The ability to manage and cope with changing demands is also a huge challenge among teachers. On issues relating to the challenges facing teachers in schools, the DoBE has noted the importance of reviewing the pre-service and in-service teachers, ICT training programme to address among others, the ICT barriers, including enabling teachers to understand the use of ICT fittingly (DoE, 2004, p.25). However, it is a fact that, the limitations affecting the realisation of having ICT skilled teachers' is negatively impacting the modern teaching and learning methods, thus a lot of teachers' are still performing poorly as they battle with the integration of ICT in schools.

4.1.3. Teachers' views of changes in their pedagogical practices dimension

The straightforward principle of the WPpE implies that through ICTs the quality of teaching and learning would be transformed and teachers will be empowered to revise their teaching technique in order to augment the learning experience (DoE, 2004). The document highlights the need for teachers to have access to ICT training guide to learn more about integrating ICTs as well as keeping learners connected to educational digital platforms (DoE, 2004, p. 26). Further, the policy (DoE, 2004, p.13) suggested the need for ICT training programmes to be restructured in order to support the education reform as it strongly believes that:

e-Education will connect learners and teachers to better information, ideas and one another via effective combinations of pedagogy and technology in support of educational reform. It supports larger systematic, pedagogical, curricular and assessment reforms that will facilitate improved education and improved use of educational resources such as ICT.

The policy seems to have assumed that having computer laboratories, connected to broadband services and using ICT tools such as tablets and white boards in schools will inevitably revolutionise teachers practice and new pedagogical practice would be instinctive. Recent developments in the educational practice have resulted in discrepancies between what the policy had envisioned (ICT teaching and learning) and the current state of the teachers' practice (traditional teaching and learning). The policy improvement is less likely to impact positively on pedagogy, particularly in a classroom setting. Teachers will miss opportunities to learn in order to change their teaching approach.

Financing of the WPpE policy initiative has been left to the preference of provinces and districts in charge of the educational development function (DoE, 2004, p. 30). The DoBE is yet to introduce a comprehensive, detailed and high-level financing framework for financing the implementation of e-education in schools (DoE, 2012). Notwithstanding the indecisiveness shown by the department, it was confirmed that the WPpE initiatives would be funded using the Medium Term Expenditure Framework (MTEF) which is hoped to fast-track the implementation (DoE, 2004, p. 35).

In the meantime, teachers seem to still be without proper ICT training centres. The other challenge facing the funding of the WPeE policy initiative is because funds are largely directed to teaching instead of being evenly distributed to all aspects of the integration. In line with the strategic objectives of the WPeE, the OECD (2008) had submitted there are at least three (3) major challenges facing e-education which are (a) pricing and costing model, (b) justifiable funding, and (c) strategic policy implementers. The funding policy goal of the WPeE (DoE, 2004, p. 35) states:

The ongoing costs of providing access to technology, including teacher development (capacity and skills building), pedagogical and technical support, digital content and telecommunication charges, as well as maintenance, upgrades and repairs are enormous.

In the instance of pricing and costing, the Department has not clearly defined what aspects of e-education need funding neither has it gaged whether there has been a study, nor a proof of concept that discussed ICT education pricing and costing models it could adopt. The policy has expressed a view to institutionalise the strategic development plans to integrate ICT development plans (including the maintenance) to address the cost of accessing ICT broadband services (DoE, 2004, p. 26). However, it failed to present a far-reaching plan to support ICT related initiatives such as ICT teachers' development plan, digital content integration plan, and how it planned to manage the shift from traditional teaching and learning to digital without disrupting the curriculum.

The ISADP, on the other hand, had reasoned that though the government has interacted with several departments to pursue intervention of regulating the cost of accessing broadband services in schools, it has admitted that there is not even a single common policy vision and framework that guides the method of implementing e-education (DoC, 2006, p. 3). Therefore, the policy had reasoned that in the absence of a well-defined costing model, it would be impractical to have the real revolution to effect ICT teaching and learning (DoC, 2006, p. 17). The policy (DoC, 2006, p. 55) states that:

The e-Education policy intends to use ICTs to extend and enrich educational experiences across the curriculum. It further describes the enrichment of the learning environment using ICTs as a continuum, moving from teachers and learners 'learning about ICTs' to 'learning with ICTs' and then 'learning through the use of ICTs'.

The document has not discussed factors affecting the success or failure of ensuring the realisation of effective learning through ICTs. The WPeE has already discussed its intention to transform education, but did not provide a clear implementation plan. Three (3) years after the policy endorsement, the ISADP also describes its intention to augment teaching and learning experience, but again, and like other policies it is too general and not proposing any feasible plan. Furthermore, in the midst of the government of South Africa trying to make efforts to support the implementation of ICTs in schools, the NDP has cautioned the DoBE to:

Avoid disruptive changes to the curriculum. Keeping curriculum changes to a minimum will enable teachers to develop the core skills and competence to deliver the curriculum (NPC, 2012, p. 304)

Earlier, ICT integration projects such as Khaya and Gauteng Online (GoL) had somewhat failed to stand the test of time, which means connecting teachers, learners, and modifying the curriculum to improve the ICT experience in schools remains a serious policy challenge. But unlike the WPeE policy and ISADP, the NDP seems to have understood the importance of consultation and change management process to integrate ICTs in schools.

The NDP has cautioned against drastic or intense change in curriculum. The plan had reasoned that simple changes with little developments to effect the incorporation of ICT. Changing the curriculum has its own advantages and disadvantages and the policy has not presented the convincing mitigation plan in the event the policy implementation is not successful. It is not clear if, for example, what the DoBE plans to do should teachers decline the use of ICTs in schools arguing they require adequate training.

4.1.4. Teachers administrative routines dimension

The applying ICTs in schools focus on changing teacher, learners and school administrators' experiences. Using ICT in schools will assist teachers and learners to be proficient in the use of ICT as well as to enable them to handle digital developments in schools. The introduction of ICT has opened many teaching and learning opportunities, and the WPeE (DoE, 2004, p. 19) has submitted that teachers need to take advantage of ICTs to assist them with administrative chores

While e-Learning will not replace teachers, it will enhance the quality and reach of their teaching and reduce the time spent on administrative chores. In introducing e-Learning, we must make sure that we balance it with other teaching and learning methods.

The WPeE under the section of the operational dimension has revealed that teachers will be supported and encouraged to adopt the use of ICTs to improve the quality of teaching and learning, but does not deny there are ICT challenges that could be easily be misinterpreted (DoE, 2004, p. 17). Hence, it is clarified that the presence of ICT will not replace teachers (DoE, 2004, pp. 17 – 18). While it is noted that ICTs will reduce the time spend on administrative chores, technology is not necessarily an answer to teachers' problems, but rather, a powerful tool which must be tactically merged into both the running of schools and to improve teaching and learning experience.

Most scholars and industry experts have reasoned that in introducing ICT in schools should be balanced with fitting ICT teacher training and development programmes to improve their teaching approaches (Lau & Sim, 2008). The DoBE has admitted that teachers who do not have the adequate ICT training will not be confident to integrate ICT in their pedagogy (DoE, 2004, p. 17). Notwithstanding the ICT teacher training challenges discussed, the WPeE (DoE, 2004, p. 25) had stated that:

Each school will have a dedicated teacher outside the normal staffing ratio to manage ICT facilities and champion the use of ICTs in the school community. This teacher will receive the necessary training and support in learner focused approaches to learning and ICT in an outcomes-based paradigm. Support in the

form of incentives will encourage teachers, managers and administrators to integrate technology into their daily activities and areas of responsibility.

This extract implies the need for massive teacher capability building and training which the Department should consider evaluating its investment toward the teacher development plan. A large percentage of teachers are not comfortable with the use of ICTs inside a classroom not only because they are 'compute-phobic', but there is no empirical evidence to suggest that they get the required support from the Department (DoE, 2004, p. 17). The lack of support is proving to be instrumental in demotivating teachers from using ICTs, particular in the presence of learners and this is to avoid being embarrassed.

The ISADP is not evocative on which method or approach to be used when rolling out ICT in schools and how this change will impact the experience of teachers and learners (DoC, 2006, pp. 47 – 48). There are too many direct citations dragged straight from the WPeE, pasted in the policy with very little context provided. Simply put, it is repetitions without significance and as a result, the policy when it comes to the issues of teaching and learning has not really contributed much.

4.2. Learners' ICT experience dimensions

The DoBE intended to implement e-education policy to transform the quality of education in South Africa. The Department had to go through essential education renovations in order to get used to the fourth industrial revolution. Under the policy framework, the Department aimed at empowering educators and learners; train them to effectively respond to emerging digital teaching and learning methodologies (DoE, 2004, p. 45).

In conjunction with preparing learners for the contemporary digital era through the implementation of e-education in schools, the WPeE has identified teachers as the main players to impact the implementation of the e-education and using ICTs in their everyday teachings (DoE, 2004, p. 6). Hence the policy emphasis (DoE, 2004, p. 17) has been to integrate ICT in schools to enhance the quality of education with the focus to enable:

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.

Although the WPeE policy goal is supported by the other six listed policies, the 2013 due date has come and gone. Fifteen years have passed from when the WPeE was first published (2004); many policy undertakings are still not fulfilled. For example, most schools still have the poorest infrastructure, no electricity; simply put, teachers and learner are not connected as the policy had suggested. The question outstanding is to what extent has the policy been successful or is the WPeE a 'ghost policy' as it has been discussed in Chapter 2. The policy has failed to consider the bottlenecks build by the apartheid government to implement educational transformation programmes that would have enabled teachers and learners to be connected even before the target year.

4.2.1. Learner's ICT utilisation in a classroom to enhance educational experience dimension

The WPeE had suggested that teachers and learners need to acquire and be in full command of ICT use in order to stimulate effective and meaningful ICT interactions in a classroom setting (DoE, 2004, p. 140). The policy has left the responsibility of managing learners' ICT training and development in the control of both the provinces and districts (DoE, 2004, p. 29). This is precisely why the Department is confronted with so many serious challenges of implementing ICT in schools. Until both the district and provinces have a common understanding to appropriate the e-education policy to stimulate effective learner ICT experience, they will not be any real learning transformation inside a classroom.

ICTs, when successfully integrated into teaching and learning, can ensure the meaningful interaction of learners with information. ICTs can advance high order thinking skills such as comprehension, reasoning, problem solving and creative thinking and enhance employability.

The policy seems to have missed the importance of separating the learners' educational needs as well as evaluating their ICT skill levels. Nowhere in the policy do we find training programmes designed for learners. It is mostly if not only teachers, managers, officials and

administrators that according to the policy require ICT training (DoE, 2004, p. 27). For example, the DoC (2006, p. 89) also did not pay much attention to the needs of learners'; the only time it mentions learners was stating that:

Over time, effort should shift towards more outwardly directed programs, like:

- Ensure that school learners make use of ICTs during the course of their education.

This is a clear indication that there was and is no special attention given to learners, no policy intervention that seeks to address learners' possible ICT learning challenges and therefore, the policy can be considered to be ineffective and inconsistent. Kozma (2008) had reasoned that not all learners will be able to comprehend ICT teaching and learning. As a result, the Department has failed to re-examine their approach to ensure no discrimination existed between the so-called 'ordinary learners' and learners with special needs (slow learners) concerning ICT teaching and learning. The use of ICT in classrooms by learners also mean double the rate of learners study time simply because ICT is but another set of skill; learner's need an extra time just to learn how to use ICTs. But none of the policies paid attention to understanding the complexities surrounding the introductions of ICT to learners in a classroom setting.

However, unlike teachers, learners seem to appreciate the value of the having ICT connection in schools more as it gives them an opportunity to reflect on their ability to adapt to changes including learning (Cuban, 2001; DoE, 2004, p. 15). None of these policies, including the NDP had established like they did with teachers that learners were to receive the satisfactory exposure essential for either the incorporation of ICTs to improve teaching and learning or ICT literacy. Instead, the only time the NDP (NPC, 2012, p. 304) referred to learner's exposure is when it mentioned the education history and the heritage, and nothing about learners been exposed to ICT in a classroom and how among others, will propel them to becoming skilled in ICT tools.

4.2.2. The influence of ICTs on learners' and policy failure to enable learners' dimension

The DoBE has reasoned that traditional teaching approaches only prepare learners to replicate what is being taught in a classroom instead of enabling them to be productive and innovative (DoE, 2004, p. 19). The policy states that its intention is not only to build the required ICT infrastructure and skills, but to ensure that the introduction of ICT technologies in schools enriches the educational experience as well as producing well skilled learners that could potentially participate in the development of South African society (DoE, 2004, p. 27). Furthermore, the policy (DoE, 2004, p. 13) has noted that:

Beyond the issue of access, there is a gap in the ability of learners and teachers to use these technologies effectively, to access high-quality and diverse content.....with increased access to ICT resources for teaching and learning.

This extract gives an impression that the WPeE had underemphasised the importance and need for learners' ICT training and development programme. Nowhere in all the 7 policies do we find learners discussed without mentioning teachers in the same sentences, neither is there a single section that focuses on learners' distinct educational needs. The policy has, however, reasoned that learners will be able to effectively use ICTs to enhance both the interaction between learners and teachers, and "high order thinking skills such as comprehension, reasoning, problem solving and creative thinking and enhance employability" (DoE, 2004, p. 14).

Though it has been reasoned in chapter two (2) that the introduction of ICTs in schools has the propensity to transform the quality of education and to aid learners to effectively learn through the use of ICT technologies, none of the policies seem to have provided a meaningful policy solution on how to address challenges between the teacher and learner, and learner and learner relationships concerning the ICT connectivity in a classroom.

It was later, between 2015 and 2019, that the DoBE released two 'learner enabling policies' namely, (i) the 2015 national strategy for the learners' attainment and (ii) the section wide action plan 2019 toward the realisation of schooling 2030, with the intent to address the poor learners' performance and to intervene on the barriers experienced by the learners'

(DoBE, 2015). But not even one of these 'recent policies' seem to understand the underlying ICT challenges a that learner face and the importance of separating learners' challenges from teachers' challenges because they both have different dynamics. At the school level teachers' have ICT knowledge to worry about, whereas learners are confronted with first learning the set of courses (curriculum) then learning the ICT and its use, which is a double learning effort for them (DoE, 2004, p. 27). For example the section wide action plan 2019 toward the realisation of schooling 2030 (DoBE, 2015, p. 91) states, among other goals that:

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 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.

All these strategic goals are not geared toward influencing an improved learner performance. They seem to be founded upon the strength of a teacher being able to unbridle the potential of learners to learn using ICT technologies. But the police seem to have failed to focus more on understanding essential challenges that learners face when using ICT technologies and to help them to know how to relate to teachers.

4.2.3. Learners' access to ICT varies from school to school dimension

In 2001, the government's response to the introduction of ICTs in public schools in South Africa followed after the president of the Republic addressed the Imbizo for African Youth (2001). Mr. Thabo Mbeki then president had accentuated the importance of learners having access to ICT connectivity as it has the aptitude to transfigure the quality of education (DoE, 2004, p. 10). But, it should be noted that access to ICT connectivity varies from province to province, district to district and school to school (DoE, 2004, p. 39). The WPeE (DoE, 2004, p. 31) states that an increased access to ICT will redress

The education network will be designed to serve the goal of universal access for every e-school. The education network will provide high-speed access for learning, teaching and administration.

In South Africa, most public schools are still in different educational maturity stages of accepting the ICT technology use, and have different skills set and attitude concerning access to technology solutions (DoE, 2004, p. 39). The policy believes that having computers installed in schools and the availability of the ICT connectivity at high-speed will effectively improve the learning experience, among other aspects of education (DoBE, 2004, p. 38). But the policy seemed to have overlooked and insufficiently discussed challenges facing the learners, particularly in underdeveloped areas (i.e. rural areas) as they stand not to realise the ICT connectivity benefits outlined by the WPeE. Therefore, the marginalisation of learners from accessing ICT technologies in schools due to the lack of the connectivity is broadening the existing digital gap, not only between schools but between learners (DoE, 2004, p. 11). Notwithstanding the existing digital gap concerns, the DoC (2006, p. 55), three years post the WPeE, was still optimistic and unyielding that all learners were still going to be ICT capable in 2013. Again, the policy had overlooked the learners' ICT development challenges that surfaced after the introduction of WPeE by reiterating that:

The main goal of the policy is to ensure that every learner in general and further education and training will be ICT capable by 2013. In addition to that, an implementation plan was developed to give guidance on how to implement the national policy. Provincial Departments have developed business plans which include roll-out strategies and funding mechanisms for ICT implementation. There is however, still a great need for aggressive intervention in assisting the provinces to ensure that the national implementation plan targets are met.

According to the 2012/13 financial year report by the DoBE, approximately 4195 out of 24 453 schools were connected to ICT for the purposes of teaching and learning (DoBE, 2012). As mentioned earlier, the DoBE had already missed the 2013 policy goal of having "every South African learner in the general and further education and training bands to be

ICT capable” (DoE, 2004, p. 17). The DoBE had tentatively admitted that the implementation goals set out by the WPeE were not achieved (DoBE, 2015, p. 17). The action plan for 2019 reveals that the DoBE has noticeably conceded that the implementation and uptake of ICT connectivity in schools has not really enabled learners to be ICT capable. Cuban (2001) in chapter 2 has reasoned that the presence of ICT in school can only be effective when put to good use by skilled teachers.

Access to ICT connectivity among learners has plunged as it is estimated that less than 40% of learners are still without computer labs and do not have access to ICT connectivity (DoBE, 2015). The DoBE has highlighted the importance of having the flexible funding models, frameworks and strategies to foster successful implementation of the WPeE (DoE, 2004, pp. 35 – 36). None of the policies even after the WPeE seem to have correctly diagnosed the underlying challenges facing learners’ ICT integration and none have defined the type of pedagogy or ICT technologies to be merged in the curriculum.

It is, therefore, not clear where this aggressive intervention was to come from because for the past 14 years from when the WPeE was published, the pace of the ICT connectivity implementation in schools was or is either slow or non-existing. The ISADP gives expression to the WPeE, yet there is still clear evidence that learners were excluded from engagements between the identified departments (DoBE and DoC) as well as the researchers. It appears that learners’ never had the freedom to register their concerns, neither were they afforded an opportunity to provide input during and after the process of constructing the WPeE. Nineteen (19) years later, the NDP came, but like other policies, it provided little contribution on the subject of ICT developments in schools concerning learners.

4.3. Schools’ connectivity experience dimensions

The DoBE has recognised the importance of the role of the technology infrastructure in facilitating ICT connectivity in schools. The WPeE has reasoned that challenges of implementing the ICT infrastructure have delayed the DoBE from realising its policy goal of having every learner and teachers connected to ICT technologies (DoE, 2004, p. 13). As a result, the lack of a well-developed technology infrastructure is broadening the digital gap

that exists between provinces (DoE, 2004, p. 9). Nonetheless, the ISADP had stated that provinces from the year 2007 had already started implementing their own ICT connectivity solutions including initiating their own ICT provincial networks (DoC, 2006, p. 56). The NDP, on the other hand, had reasoned that a target of 100% schools ICT connectivity would be achieved in 2020 (NPC, 2012, p. 195).

A year later, the NBP had intended to have 25% of schools connected to ICT by 2013, 50% by 2016, and 100% between 2020 and 2030 (DoC, 2013, p. 19). This was also to bridge the digital divide to further stimulate ICT skills development in schools. Similar to the NBP, the NIICTPW intended to address all hanging policy issues and approaches concerning the implementation of the infrastructure, including the availability and accessibility of the spectrum (DoC, 2016, p.79). The document explores interventions to streamline the rapid deployment of ICT infrastructure and focuses also in addressing demand-side concerns to facilitate all-encompassing digital transformation across all provinces in South Africa (DoC, 2016, p. 125). The government's nine point plan (deployment of infrastructure) is set to boost the economic expansion as well as boosting schools by enabling the implantation of e-education (DoC, 2016, p. 10).

4.3.1. Infrastructure availability to stimulate teachers and learners experience dimension

Stemming from the WPpE, this policy had intended to improve the quality of education through the use of the ICT innovative technologies. The introduction of ICT connectivity as discussed requires a vigorous teacher training programme, but all these depend on the availability of adequate technology infrastructure (DoE, 2004, p. 12). The WPpE has underlined the need for government to work closely with the private sector, non-government organisations (NGOs) and state owned entities (SOEs) in resolving challenges ranging from the bridging of the digital divide to implementing fitting infrastructure in schools (DoE, 2004, p. 11). The WPpE (DoE, 2004, p. 22) has further stated that:

The impact and effectiveness of ICTs rest on the extent to which end-users (learners, teachers, managers and administrators) have access to hardware,

software and connectivity. For e-Learning to be successful, learners must have regular access to reliable infrastructure.

The policy has reasoned that schools with appropriate technology infrastructure and ICT connectivity are more likely to achieve better teaching and learning experience results than the ones devoid of the infrastructure (DoE, 2004, p. 23). There is, nonetheless, no proof of learners' extraordinary performance neither is there a proof that teachers' using or planning to use ICTs are convinced improved achievements of learners is due to the presence of the ICT connectivity. Having access to ICT connectivity has little bearing on improving the performance of both teachers and learners. On the other hand, most learners' consider the presence of ICT connectivity very helpful as it enables them to have access to educational materials from a pool of electronic libraries, which stimulates effective participation between them and teachers (DoE, 2004, p. 28).

4.3.2. Policy attempt to have schools in different provinces connected dimension

The DoBE has highlighted the importance of ensuring every teacher and learner in all schools across all nine (9) provinces to have 'uninterrupted' access to ICT infrastructure (DoE, 2004, p. 29). The ISADP (DoC, 2006, p. 58) agrees with the WPpE and submitted that in March 2013, all schools in all nine provinces would be connected to broadband services and able to freely use ICT connectivity for both teaching and learning. The WPpE (DoE, 2004, p. 6) has further reasoned that, the infrastructure accessibility in schools for teaching and learning was progressively increasing.

The policy also had claimed that "many schools are exploiting the benefits of ICTs to enhance the quality of teaching and learning" (DoE, 2004, p. 6). This is apart from the established fact (discussed broadly in chapter 2) that only a smaller number of schools could truly afford the costs associated with accessing the ICT connectivity (NPC, 2012, p. 31). Notwithstanding the ICT connectivity and ICT skills challenges caused by the poor or 'non-existent' technology infrastructure in schools, the WPpE had reasoned that teachers are not certain of their roles when it comes to integrating ICT into schools' curriculum (DoE, 2004, p. 9; DoBE, 2015). As previously discussed under the teacher experience dimension, the WPpE had explained that the inaccessibility of ICT connectivity has

hindered the plan of having effective teacher training (DoE, 2004, p. 31). The policy (DoE, 2004, p. 29) states:

Every teacher and learner in General and Further Education and Training must have access to ICT infrastructure

The implementation of the WPeE has always been depended on the contribution and the preparedness of the Provincial Department of Education (PDOEs). Provinces such as Gauteng (Gauteng Online), Western Cape (Khaya) and Northern Cape (Connectivity Project) have decided on their own to introduce customised province-wide implementation programmes to integrate ICT technology in their schools (DoE, 2004, p. 11). It is also important to note that these initiatives happened even before the formalisation of the WPeE. It appears that the rest of the provinces are still busy finalising their ICT implementation plans (DoBE, 2015).

Nonetheless, the state of ICT connectivity in schools remains very poor. There seems to be a misdiagnose by the DoBE as at the provincial level, the plan focuses on building the required infrastructure, while at the national level, the aim is to build infrastructure only according to 'current' (meaning at the time of implementation) educational needs and objectives. This could spell serious catastrophe as there is no standardisation, both plans are actioned disjointedly, which the split forces clumsy implementation limitations. On the other hand, the ISADP (DoC, 2006, p. 57) suggests:

Infrastructure backlogs that include physical buildings, facilities and other resources in schools have a significant impact on the ability of schools to roll out learning using ICTs. There is also a lack of funding to address these backlogs (DoC, 2006, p. 57).

This extract implies that at the heart of the e-education implementation is the concern of appropriate ICT infrastructure development. The WPeE had stated that it was working on establishing a long-term planning framework linked to funding (DoE, 2004, p. 34). The DoBE believed that both the strategic planning and effective procurement processes were going to enable successful implementation of ICT infrastructure (DoE, 2004, p. 35). But 4

years afterwards, the ISADP had stated that the overall infrastructure in schools was not enabling any form of educational innovation to take root (DoC, 2006, pp. 57 – 58). The problem of funding was and is a known issue which the WPeE had already underlined. There is no suggestion of attempts by the ISADP in providing input or any form of resolution, either than repeating what has been discussed by the WPeE.

Subsequently, the NDP (NPC, 2012, p. 49), eight years later, stated that “compared with the best international standards, South Africa’s ICT infrastructure is abysmal”. It is interesting to note, for example, that all three policies, the WPeE, ISADP and NDP echoes different views concerning the ICT infrastructure development and funding models as well as suggesting which frameworks can be used. Thus, it is not clear if the ISADP and NDP policies had attentively reviewed findings from the WPeE before setting their policy position. The NDP, however, intended to be a policy that congregates all these other policies under its wings. The policy (NPC, 2012, p. 313) further suggests that:

The Department of Education, Department of Communications, Department of Public Enterprises and INFRACO must draw up a joint plan to roll out broadband ICT infrastructure to schools.

While the DoBE has already underlined and expressed the need to have the appropriate funding model to effect the implementation of e-education in schools, the NDP seemed to discount the importance of associating planning and implementing the ICT infrastructure with the appropriate funding model and frameworks (DoE, 2004, pp. 35 – 37). Further, the plan seems to have assumed (in the context of e-education) that rolling out infrastructure depends predominantly on appropriate coordination and not necessarily funding as the first policy aspect to be considered. The NDP appears to be a sophisticated plan, which pursues to play a leading role of coordinating the existing planning from other government organs, to ensure cohesive e-strategy implementation (NPC, 2012, p. 196).

The NDP had reasoned that there are at least three challenges that affect the implementation of ICT connectivity in schools. The indecisive regulatory administration, broadband price predatory and the highly contested infrastructure apportionment are the

key enabling factors the policy believes the government needs to focus on The policy furthers states that failure to mitigate the problem as highlighted will result in perpetual digital divide (DoC, 2016, pp. 66 – 67).

4.3.3. The overall challenges facing the ICT rollout dimension

The government of South Africa through the development of the WPpE was determined to ensure that all schools in South Africa have equitable access to technology infrastructure in order to facilitate effective ICT teaching and learning (DoE, 2004). Although it appears that a few number of schools in South Africa have the capacity to effectively implement e-education, the WPpE (DoE, 2004, p. 10) states that:

The challenge is to roll out ICT infrastructure that is specifically suited to Africa. Through appropriate technologies, it is hoped that South Africa will leapfrog into the new century, bypassing the unnecessary adoption cycle, and implement a solution that works now, and has the capacity to handle future developments (DoE, 2004, p. 10).

In the face of little pockets of understanding some of the challenges concerning the infrastructure to enable the implementation of ICT platforms, what is more concerning about this extract is observing the failure from the DoBE to articulate their policy position appropriately. For example, South Africa cannot and will not leapfrog into new dimensions of ICT teaching and learning technologies without an in-depth research and analysis (including feasibility study). This is deemed imperative in order to provide the right diagnosis on the ICT maturity level of schools, broadband pricing and how other policies will lead to the realisation of the DoBE policy goals. There seem a lot of ambiguity enclosed in the WPpE document which can mean the Department never had adequate time to reflect on realities facing the country.

The NDP (NPC, 2012, p, 190) had reasoned that the successful implementation of the ICT connectivity in schools will underpin the development of an improved ICT teaching and learning experience. The plan had envisioned that by 2030, all South African schools would have vibrant and accessible technology infrastructure. However, the policy did admit earlier that the idea of the accessibility of the ICT infrastructure is not possible without the

participation of the private sector, including other strategic arms of the government of South Africa (NPC, 2012, pp. 190 – 191) in schools. Further, the policy (NPC, 2012, p. 303) also intended to:

Ensure that all schools meet minimum standards for infrastructure and commit to progressively upgrading each school's infrastructure to meet optimum standards

The policy intended to ensure that access to ICT connectivity objective in schools is realised. Nevertheless, the task to standardise the ICT infrastructure in schools appears to be a gigantic task for the DoBE. This is considering the basic challenges the Department is at present facing. For example, most schools in the Eastern Cape are without the necessary infrastructure, such as the structural building, water and electricity. These factors are more likely to impede on the implementation of ICT infrastructure not to mention the issue of standardisation raised by the NDP. Therefore, until South Africa gets to a point in time where all schools across all nine (9) provinces will have the adequate overall infrastructure, the standardisation objective will not be achieved.

The DoC has been tasked by the government of South Africa to resolve among others, challenges surrounding the implementation of ICT infrastructure and connectivity in sectors, such as the education, health and other strategic sectors (DoC, 2013, p. 37). The policy has emphasised on the need to strengthen the policy structures that are responsible for the coordination of ICT infrastructure procurement, the plan (DoC, 2013, p. 37) further states:

The network requirements that will be served as part of the digital development strategy of this policy are:

- dedicated connectivity for all schools to be used by teachers, learners, school administrators and other support staff for administrative and teaching and learning purposes, is aimed at harnessing the vast potential that broadband has to:

- extend access to educational opportunities regardless of gender, geographic location, socio-economic or ethnic background, illness or disability, or any other circumstance that would normally hinder access;

This extract from the NBP suggests that, in order to improve the digital development and the rate at which the infrastructure is rolled out, the procurement of the network requirements should be prioritised. However, the word funding and procurement when used interchangeably can create serious policy confusion. Both words have different meaning, which in most cases creates policy conflict that can lead to open interpretations. Funding is the process of sourcing for funds, this can be either from the government (as the funder) or the private sector (as the strategic partner), and while procurement gives an impression that the Department has funds and the capacity to purchase network services. Against this background, it is still not clear how the policies to work passed the misperception between the two mentioned terms. Also, the policy is not providing substantial guide on how this dedicated connectivity for schools will be achieved, neither does it provide details on the process of procurement ICT infrastructure.

Still on the topic of coordination, the NeGSR (Doc, 2017b, p. 8) has stated that:

The need for greater coordination of strategies and implementation of digital policies across government requires that central structure be established to drive a whole of government approach and develop a national e-Government policy strategy. This will assist in aligning various initiatives across government and in ensuring accountability. The Department is well positioned to drive the required coordination (DoC, 2017b, p. 8)

This extract implies that the lack of seamless policy coordination is leading to policy failure. However, the same policy is silent on suggesting how the government of South Africa should structure their approach to ensure proper alignment between all these important policies. Since technology is evolving and the world going through rapid ICT transformation, it is crucial for the NeGSR to speed up among the arms of the South African government Department the implementation of ICT connectivity in schools.

4.4. Chapter summary

The government of South Africa had constantly tried to bridge the existing divide through several dynamic policies. One of the biggest concerns is that the digital divide can result in the divide in social and economic exclusion which disconnects the less affording in acquiring network information capital. It is extremely difficult to affirm the conception of infusing ICT into schools when South Africa faces a serious peril of dragging behind the global information society if they do not attend to policy gaps discussed. There is a lack of harmonisation in approach toward digital revolution initiatives, and this imprecision has created policy duplication which has resulted in policy misunderstandings. There is no devoted committee to oversee the achievement of policy, funding goals, and there is no sign of collaboration between departments to eliminate policy overlaps.

The WPpE laid the foundation and while there are pockets of excellence presented, the policy has not been successful. Therefore, all these other policies that came after should have studied the document in details and not just extract section to build from. This is because the same ambiguity seen in the first document is re-emerging in almost all other 6 reviewed policies. It is not clear for an example if ISADP understood its role and expectations on the subject of the implementation of e-education, because nowhere in the document do we find a new dialogue where ISAD is reviewing and resubmitting to the WPpE a way forward. There is little said about the infrastructure in the ISADP and the expectation was for the NBP to reemphasis the importance of having the appropriate infrastructure.

As a result of the prevalent policy confusions, it is not clear whether the WPpE, ISADP, NDP, NBP, NIICTPW, NeGSR and NeSDSP policies understood the real educational dynamics that determines the success or failure of the overall implementation of ICTs in schools.

CHAPTER FIVE: DIAGNOSTIC REVIEW OF FINDINGS ON THE ROLE OF ICT POLICY IN FOSTERING e-EDUCATION IN SOUTH AFRICA

5. Introduction

In this chapter, the researcher examines the crucial findings presented in Chapter four (4). A total of seven (7) gazetted policy documents, namely, (i) White Paper on e-Education [WPeE], (ii) ISAD Plan [ISADP], (iii) NDP, (iv) National Broadband Policy [NBP], and (v) National Integrated ICT Policy White Paper [NIICTPW], (vi) National e-Government Strategy & Roadmap [NeGSR], and (vii) National e-Strategy Digital Society South Africa [NeSDSP] were reviewed using teachers' experience, learners experience and broadband connectivity reviews. Stemming from the reviews, this chapter subsequently discusses eight (8) policy challenges as well as linking them back to both the literature and research question. The method of data analysis process embraced in this research has brought logic, arrangement, direction and insight from the data collected. With respect to implementing e-education in schools, it has emerged that the private sector has decided to play a lead role not only by financing the procurement of the schools' ICT infrastructure, but by implementing ICT fostered education.

5.1. Theme A: Analysis of policies from the perspective of teachers' experience in schools

5.1.1. Policy challenge 1: Deep understanding of the definition of 'digital' in the teaching environment

According to the WPeE (DoE, 2004, p. 11), the DoBE has provided teachers with reasonable and ground-breaking programmes to aid them in developing their ICT skills as well as teaching them on how to integrate ICT in schools. But none of the 7 policies seemed to comprehend the importance of first conducting an in-depth research on the teachers' teaching preference method (traditional or digital) and how they viewed the introduction of ICT connectivity in schools. The involvement of teachers' remains critical as it would have provided them a platform to influence the policy making. In the literature, Mumtaz (2000) had described the process of introducing ICT in schools as ineffective and lacking teacher involvement. This is precisely what had happened during the policy making of the

WPeE, ISADP and NDP. Further, Cuban (2001) had reasoned that the involvement of teachers' when integrating ICT technologies in schools is critical.

The ISADP (DoC, 2006, p. 56), developed three years after the development of the WPeE had suggested that although teachers were still to undergo ICT training, the WPeE had already identified two (2) strategic pillars (e-learning and e-administration) upon which the policy had placed its emphasis on (DoC, 2006, p. 55). Although these 2 pillars seemed to have been properly structured, teachers' experience and related themes are not fully addressed. The e-learning pillar is too general and not focusing on any critical ICT details that affect the teachers' training and development programmes to stimulate better ICT experience. The e-administration deals primarily with digitising (automating manual to electronic processes) administrative chores and not digital teaching or learning.

5.1.1.1. Teachers' interpretation of what digital education means

Most teachers in South Africa are yet to fully grasp what digital education is and what it means for their classrooms. Moreover, in the absence of fitting ICT teacher programmes, teachers are more likely to have different interpretations. Evidently, all 7 policies, discussed in Chapter Four (4), do not seem to understand what digital education is, as they fail to classify and explain distinctions in the types of ICT technology that will be used and how they will be incorporated into teaching the national curriculum. The lack of clarity from these policies, as well as teachers' own understanding of how the varied technologies function, is the main influence in the sluggish acceptance of ICTs in a classroom setting. While the 2015 teacher action plan (DoBE, 2015), sought to bring more clarity with its focus on four (4) critical teacher improvement milestones, namely, (i) linking ICT uptake to teaching and learning goals, (ii) evaluating collaboration effort with stakeholders, (iii) reviewing suitable technologies and (iv) analysing the status of the implementation of e-education, the DoBE is still seeking further research to be conducted to determine, among other factors, the classification of ICT technology and how they ought to be integrated successfully.

The WPeE and the other six policy documents have missed the opportunity of addressing the widening gap in the ability of teachers to collaborate to infuse ICT technology in the

teaching and learning environment. Instead of giving direction, the WPeE had suggested that it needed teachers not only to support the use of ICT technologies in schools, but to view themselves as instrumental in transfiguring the curricula and pedagogy (DoE, 2004, pp. 16 – 17). But Cuban (2001) had argued that the development of ICT in schools and its use by teachers has little impact in transforming the pedagogy except if ICT ‘customised’ teacher training was prioritised. On the other hand, the WPeE (DoE, 2004, p. 22) seemed to have also misinterpreted the introduction of the digital devices such as e-books, e-boards and tablets as part of closing the gap, without attending to effective customised teacher training.

5.1.1.2. The gap in the ability of teachers to collaborate and integrate ICT into the teaching environment

The WPeE appears to have slightly understood the significance of integrating ICT connectivity in schools using the ICT teacher training programmes as one of the implementation strategies. Becta (2004) had reasoned that the blend between the lack of teachers’ ICT knowledge gap in schools and teachers’ lack of self-assurance was catastrophic in the teaching and learning environment. There is no centralisation of the management of teachers’ ICT skills knowledge and collaboration developments found in any of the 7 policies reviewed in Chapter Four (4). Since 1997, programmes such as SchoolNet, SCOPE, INTEL and Thintana never stopped developing teachers’ professional programmes, which the DoBE had failed to centralised developments stemming from these ‘unsynchronised’ initiatives in order to bridge the ICT training divide among teachers.

The WPeE (DoE, 2004, p.17) stated that teachers need to step into the new culture of using ICTs in schools, while the ISAP (2007, p. 58) had suggested that the implementation of ICT technologies in schools needed to be reviewed against the background ICT knowledge of teachers’ in schools. The WPeE spelled out its policy objective of having teachers as key implementers of the e-education but at the very basic level. The approach (basic level approach) thus exposed the DoBE as ambiguous in its policies relating to e-education. This is also because the DoBE had acknowledged that different teachers in different schools were at different levels of understanding, yet its approach remained basic and not in search of bridging the digital divide. Nkula and Krauss (2014) have reasoned that most teachers

lack self-efficacy. This is one of the reasons why teachers have not been engaging the integration of ICT technologies in schools as expected. The research has discovered that practical ICT training of teachers' enforcement by the DoBE is lacking or non-existent in most schools, particularly the ones in the Eastern Cape and Limpopo provinces. These are some of the provinces where, for example, schools do not have the basic infrastructure and thus, teachers' ICT training programmes or any ICT related programmes are not fundamentally urgent priorities.

5.1.1.3. The lack of proper policy understanding regarding what constitutes effective ICT teacher programme

As identified in the literature analysis (Chapter 2), the WPpE policy appears to be weak as analysed by various scholars (Harkins, 2010). The policy is located across few strategic government departments to strengthen and increase chances of successful implementation of e-education in school. Nonetheless, across all 7 policies discussed, the issue of ICT teacher training and development programmes is misconstrued. There is still no empirical evidence to suggest that teachers have been to these 'ICT training and development programmes'. The study has discovered that the DoBE is absolutely not in control of the training. Training is shifted to the NGOs, parastatals, SOEs and private business entities to decide upon, and hence, the DoBE cannot claim to have enabled teachers' ICT training when it is apparent the Department is not conversant of developments around the subject. Out of all six policies, the ISADP and NDP are the only two policies that discussed ICT teacher training and development initiatives to some extent. However, neither of them seemed to have understood the complexities faced by teachers during and in the aftermath the so-called 'ICT teacher training and development programme', which was really an introduction to e-education. Nieuwoud (2015) had reasoned that attempts from the DoBE to develop a guideline for teachers ICT training were misguided and lacked proper structural approach.

The DoBE in 2007 had released a sub-policy titled *Guidelines for teacher training and professional development in ICT* [GTT&PD] (DoE, 2007). Although the plan seemed to be somewhat comprehensive, it was conceded in the very same guide that the national

framework for teachers' development in ICT still had to be developed (DoE, 2007, p. 1). This suggests that even four years post the WPpE, the DoBE was still unclear on how to manage the interrelationships between different elements of ICT teacher training and development. du Plessis and Webb (2012, pp. 46 – 47) had reasoned that the teachers' guideline was too ambiguous, as it provided little constructive information on how teachers should incorporate ICT in the teaching and learning environment. Furthermore, the GTT&PD is still not clear on whether it is feasible or not to roll out ICT, which relies on connectivity, against the well-known poor ICT infrastructure challenges in disadvantaged schools.

The ICT teacher training and development programmes defined by the WPpE (DoE, 2004) depended on the aid of NGOs and the private sector, which was evidence that the DoBE would not be driving the implementation of its objectives. As a result, both NGOs and the private sector have been left to speculate and decide upon what components of ICT and education should constitute an effective teacher training guide without the steering of the DoBE. Expectedly, the DoBE subsequently conceded that digital learning was still in its early state and yet to advance in South Africa as the WPpE had envisioned (DoBE, 2015). This deduction is clear evidence that ICT teacher training was not fully understood at the time WPpE was developed. There was noticeable inconsistency between the DoBE's policy expectations and the practice of teachers in schools.

The research has revealed that, although most of the policies mentioned in Chapter Four express their standpoints concerning ICT teacher training and their experience, nearly all of them were unsuccessful in discussing exhaustively how technology was going to be integrated into schools and what was expected from teachers. The role of teachers and their ability to integrate ICT in their pedagogy is still not clear as none of these policies have demonstrated solid understanding of matters relating to the introduction of ICT in the classroom. Furthermore, none of them have exhibited how teachers should use ICT connectivity to bridge the broadening gap between principles and best practices in developing new ICT teacher training and development programmes.

5.1.1.4. Teachers' adoption to new ICT tools inside a classroom challenges

This section is built on the reasoning and evaluating the ICT integration in schools to determine whether it has been meaningful and significant to teachers. The policy (DoE, 2004, p. 15) had reasoned that, the ICT connectivity in schools will provide both teachers and learners the platform for increased digital access to a variety of unlimited study materials. The principle set by the WPeE implies that once teachers have access to ICT connectivity, they will be able to effectively impart ICT knowledge to learners. It also suggested that every teacher "has the means to obtain a personal computer for personal use" (DoE, 2004, p.39). The statement by the DoBE was very clear that the Department was evading the responsibility of procuring and distributing computers to teachers. In another study, Cuban (2010) suggested that teachers should strive to have the ICT connectivity in their homes to privately experiment ICT technology solutions instead of learning ICT use in a classroom which can be troublesome and embarrassing for them. Both positions are necessary to emphasise as they demonstrate that adoption is driven by access to technologies.

The exclusion of teachers' involvement in decision making (deciding on ICT technologies and ICT tools) has a huge impact on how e-education is practiced. Not all teachers are ICT incompetent and certainly not all are unfamiliar with policy-making developments. The ISAP (2007, 57) had acknowledged that in most school computers were used for information processing (e.g. typing letters) and as such are totally underutilised. One of the optimal control measures to address the concern raised by the policy is schools should start to enforce the acceptable computer use policy. This will allow teachers to use computers efficiently and optimally. But then again, the DoBE has to review their GTT&PD in line with realities in schools. The DoBE should take full ownership of providing intensive pedagogic training for teachers, as opposed to only training them on the use of ICT tools. As discussed earlier, though the introduction of ICT connectivity in schools has the potential to empower teachers to perform their teaching and administrative chores, the DoBE has a momentous task of training teachers on how making the right technology decision including addressing the question of integrating ICT in classrooms.

5.1.2. Policy challenge 2: The absence of dialogue and concretisation of policy and policy implementation among key stakeholders

Studies have shown that most recently qualified teachers have competence and confidence using ICT technologies in the classroom setting, but are not in a position to make optimal use of ICT connectivity benefits because they lack the support from DoBE as well as the time to effectively transition from traditional to digital teaching and learning (Al-Alwani, 2005; Schoepp, 2005). The development and finalisation of the WPeE is understood to have happened between consultants (researchers) and the DoBE, eliminating teachers' participation. This effectively reduced the document to a highly technical, advisory document, which hardly considered teachers and learners' realities.

5.1.2.1. Lack of policy coordination and proper stakeholder engagement

The only component where the DoBE tried to reach out to teachers is where the document encourages teachers to step into the culture of involving themselves in set guides and support the practice of using ICT technologies in schools (DoE, 2004, 17). Even in this section, it is evident that the consultation was in fact, between the researchers and the DoBE.

Further, in the policy document, there is a clear contradiction in that it states that researchers and teachers should have a critical dialogue on issues relating to the implementation of ICT connectivity in school. There is, however, no evidence of developments and the dialogues that would have taken place between researchers and teachers. This study has discovered that there has been a lack of proper coordination between all these policies and the absence of suitable communication networks between stakeholders (the DoBE, teachers and researchers) has deprived the government from realising its e-education implementation goal. Hence, the government needs to consider centralising its e-education policy making to one Department only. Dealing with the educational challenges and the implementation of the ICT connectivity in schools has proved to be a compound task for the DoBE. While the e-schools initiatives read very well and possibly easy to comprehend, the DoBE is hesitant to play the lead role and being fully accountable for directing the dialogue that should have taken place between teachers and researchers. The ISADP (DoC, 2006, p. 53) had conceded that the study of ICT connectivity

in schools and a dialogue with teachers is fragmented and needs intensive research engagement. The plan has agreed that in order to implement ICT connectivity in schools successfully, the strategic approach and the engagement model should not discount teachers (DoC, 2006, p. 55).

5.2. Theme B: Analysis of policies from the perspective of learners' experience in schools

The DoBE intended to implement the e-education policy in an attempt to transform the quality of education in South Africa. The WPpE stated that the objective was that every learner in all nine (9) provinces would be ICT capable by 2013 (DoE, 2004, p. 17). In support of the goal, Mdlongwa (2012) made the point that implementing ICT connectivity in schools should be the main concern for the DoBE as connecting learners to ICT platforms has the potential to enhance the quality and experience of the digital learning. In his writings, Arkorful (2014) also confirmed the potential ICT connectivity has to improve collaboration between teachers and learners, including improving information access and exchange, which is made easier using ICT platforms.

5.2.1. Policy challenge 3: The policy intention to develop learners' capacity to handle ICT connectivity in schools

The WPpE focused on modernising and sustaining the quality of education in South Africa (DoE, 2004). The paper exemplifies responses from the government as well as challenges facing the education sector. The main theme of this policy is centred on learners, yet nowhere in the policy did the study find a section that discussed in detail the learners' ICT development programmes in schools. The WPpE referred to the importance of lifelong learning and the claim that the DoBE was the first Department to have conceived the ideal of implementing ICTs in schools. In the same year of the release of the WPpE, the DoBE released the National Strategy for Learner Attainment (NSLA) in South Africa. The plan had discussed four outputs listed in Chapter One. But none of the 4 outputs were directly linked to improving learners' ICT experience, except where the document had opportunistically discussed factors affecting teachers.

On the other hand, the ISADP has also undervalued the importance of reviewing the WPpE to examine whether or not learners' capability to use ICT was understood and well-addressed. None of the policies had clarified the meaning and relevance of integrating ICT in schools to improve the learners' ability to learn using ICT tools. Eze, Adu and Ruramayi (2013) had reasoned that the introduction of ICT connectivity in schools had enabled collaborative learning amongst learners, access to digital school content and has improved learner learning efficacy. Furthermore, the study has discovered that ISADP compared to the WPpE and NDP did not understand how ICT implementation is affecting learners in as much as it affects teachers.

5.2.1.1. The policy initiative to improve both the ICT utilisation and learners participation in a classroom

This study has revealed that the WPpE did not consider overseeing learners' ICT training and development to districts and provinces (DoE, 2004, p. 29). This lack of implementation of the policy is the reason the country still has the overwhelming digital divide amongst learners and schools. The study has discovered that provinces such as Gauteng, Northern Cape and Western Cape have spearheaded very promising ICT integration programmes compared to the Eastern Cape and Limpopo and the reason is that different provinces are at different levels of understanding the importance of ICT in schools. The DoBE has thus indirectly denied learners the benefit of having ICT connectivity in schools by leaving this role to provinces to implement. Cuban (2001) had argued that even teachers are not capacitated to handle socio-economic pressures faced by learners in their classrooms and that introducing the subject of ICT in school may create even more complexities, as both teacher and learner have limited understanding. The absence of a dialogue among researchers', teachers and learners regarding the implementation of ICT integration has robbed learners the rights to voice their concerns regarding the integration and the use of ICT in inside a classroom.

The study has also underlined that the gap in teachers' ICT skills knowledge is affecting the ability of learners to use ICT technologies effectively. As a result, learners are excluded from not only participating in digital learning, but cannot interact with teachers and other learners in ICT platforms to improve their level of engagement and understanding of

certain subjects. The subsequent NDP has repeated the same statements contained in the WPeE, on the digital divide, and has provided no meaningful contribution to capacitate learners. The policy is generic and does not focus on ICT integration in school as well as how learners stand to benefit or not. Generally, all 6 policies had failed to separate learner ICT challenges from teachers' ICT challenges.

5.2.1.2. Learners' adaptability to ICT connectivity and challenges

This study has made the point that a transition from the traditional classroom to digital (computer-based) makes learning experiences different for learners. The WPeE noted that the transition from traditional to digital requires a pervasive change management control process (DoE, 2004, p. 16). In most instances, the change management process is not necessarily an easy process. It is a process that can be met by resistance from learners, which hinders them from adapting to digital learning in a classroom. This study has established that none of the 6 policies had reflected on the importance of involving learners' participation before and after policy developments. As a result, none of the policies have suggested a fitting course management system and methods to deliver digital learning and how learners are to relate to this new modern change.

The study has also discovered that the introduction of digital learning means that learners will for example; take class notes using ICT tablets, may need to record the teachers during lessons and transcribe notes at the comfort of their time. But none of the policies seemed to have understood that such a revolution needs proper engagement between all stakeholders as it can never be a one size fits all approach. There are different levels of competencies between learners and different attitudes. Cuban (2001) had reasoned that learners with the traditional mindset are more likely to find it difficult to adjust to digital learning, but he has cautioned that for learners to easily adjust to modern ways of learning, teachers and policy makers ought to have open minds when dealing with this subject. The WPeE stated that traditional learning only prepares learners to repeat what they have been taught without being innovative (DoE, 2004, p. 19). But the same policy has failed to introduce the change management system process (switching from traditional to digital) in schools to ensure the transition does not affect the capacity to learn.

5.2.2. Policy challenge 4: The impact of digital learning and learners' ability to have regular access to ICT connectivity

This study has also revealed that the introduction of digital learning requires time management as it will be almost impractical for learners experiencing ICT for the first time in a classroom setting to keep up with defined lesson time schedules. The WPeE (DoE, 2004, p. 22) had correctly noted that the success of the implementation of e-education depends on learners' regular access to ICT connectivity. But the DoE (2004, p. 12) instead of conducting an independent and a comprehensive research and analysis as to how they would work at ensuring regular access, opted to rely on the NGOs and the private sector to drive increased access of ICT infrastructure in schools.

5.2.2.1. ICT challenges and the digital divide amongst learners

The ISADP (DoC, 2006, p. 89) stated that the shift from traditional to digital learning will coerce learners to interact with ICT more often. The acknowledgement in the WPeE (DoE, 2004, p. 27) that teachers and administrators in schools need training in ICT, which would mean that they could not effectively teach and deliver e-education. This study has also revealed that no special attention was given to ensuring learners not only understand ICT, but use it efficiently. It is also important to note, as Kozma (2008) did, that given not all learners are managing with their current curriculum, it cannot be assumed that all will cope with the shift from traditional to the digital learning method. The study did not find any response from the DoBE to address this possible learning catastrophe, neither did the other mentioned policies seemed to be aware of the existing digital divide between learners.

The introduction of digital learning is good news to schools in South Africa, but can be problematic, particularly when policy makers fail to understand the educational needs of learners and how the adjustment from traditional to digital learning will affect them. On the other hand, this study has discovered that most learners are in fact ready for digital learning and unlike teachers; they seem to be in haste to having ICT connectivity in their respective schools. The WPeE stated that most learners have shown the ability to navigate the ICT tools in a classroom and most have shown the ability to adapt to change (DoE, 2004, pp. 14 – 16). The national strategy by the DoBE in 2015 to address the poor learner

performances in schools as well as to intervene regarding ICT barriers experienced by learners' has not succeeded in resolving some of the learner issues highlighted by the WPeE. The strategy focused more on teachers than it should have on learners and that on its own renders it inconclusive.

5.2.3. Policy challenge 5: The impact of digital learning and learners' ability to handle ICT challenges inside a classroom

The WPeE stated not in many words that while teachers have to worry about acquiring ICT knowledge, learners have to learn both the curriculum and the use of ICTs, which is double learning effort for them (DoE, 2004, p. 27). The study has discovered that generally, most learners are ICT savvy, and are able to navigate and handle ICTs very well. But Arkorful (2014) has reasoned that the lack of computer learning is still prevailing amongst learners. The WPeE has reasoned that the impact on efficacy of ICT technology depends on learners getting regular access to ICT connectivity (DoE, 2004, p. 22). The study discovered that many learners still cannot operate the very basic computer programmes such as Microsoft Word, Access, and PowerPoint and cannot hence, manage digital filing.

The WPeE was not aware at the time and almost certain now that the shift from traditional to the digital learning method is a complex transition, particularly for learners. Fixing very basic computer problems in a classroom setting has proved to be a mammoth task for learners, as well as time consuming. It appears that the DoBE had calculatingly dissociated itself from the possible catastrophe, because the WPeE states that any ICT integration in schools requires teachers to pursue innovative methods of engaging the digital teaching and learning, including reshaping the curriculum to align with ICT developments (DoE, 2004, pp. 21 – 22). This is evidence that the policy is weak, particularly when it comes to learners' ICT experience subject. All six policies seemed to have misunderstood what digital meant in the context of learners. None of the policies had reflected on the need to investigate what are technological competences and how they could potentially interrupt and delay digital learning.

5.3. Theme C: Analysis of policy from perspective of ICT infrastructure and connectivity in schools

This section presents findings on analysis of policy from the perspective of ICT connectivity experience in South African schools. The study discusses findings from all 6 mentioned policies and the literature review. The NDP (NPC, 2012, p. 46) has stated that the standard of the ICT infrastructure and connectivity in school is relatively poor and the lack of policy enforcement to implement ICT in school needs further policy intervention. The DoBE is still faced with the challenge of equally servicing the ICT Infrastructure and connectivity demands from schools in all 9 provinces. The NBP was earmarked as the enabling policy to accelerate the implementation of ICT infrastructure and connectivity across all government's strategic sectors (DoC, 2013, pp. 6 – 7). The policy presents an implementation framework believed to be cohesive, which provides guidance on how different stakeholders, implementation agencies and policy makers can implement ICTs jointly without misperception (DoC, 2013, p. 31).

5.3.1. Policy challenge 6: Different ICT infrastructure issues that resulted in poor implementation

The research findings have demonstrated that although the WPpE appears to be somewhat comprehensive, the policy has failed to address the existing poor ICT infrastructure that is deterring the implementation of adequate ICT connectivity in schools. The success of the policy is also reliant on all 6 mentioned policies and as a result, the lack of proper policy coordination and exactness has led to the failure of implementing ICTs in schools. The WPpE had somewhat admitted that there are different ICT infrastructure issues between schools in South Africa. The research has discovered that there are quite a few existing ICT connectivity initiatives aimed at connecting schools which are at different stages of implementation maturity levels. The WPpE has reasoned it succeeded in lessening the digital divide by implementing initiatives such as Gauteng Online (Gauteng), Khanya (Western Cape), and Connectivity Project (Northern Cape). Studies have demonstrated that the lack of appropriate and well streamlined policy framework to incorporate ICTs in schools has led to some of these initiatives failing (Kreutzer, 2009).

The WPeE was not supported by all 6 mentioned policies. The ISADP was enacted three (3) years after the WPeE, but the plan seemed to have repeated most of the same policy statements. Thus, the policy has not enabled the WPeE with possible policy reviews, neither has it provided a comprehensive policy approach to fast track the implementation of ICTs in schools nor did it achieve its own set ICT connectivity policy goals. The NPD, eight (8) years after WPeE was published and remarkably had little to say about how it intended to address existing ICT connectivity problems in schools, except it acknowledged that, the state of ICT infrastructure in South Africa is still appalling (NPC, 2012, p. 313).

Nonetheless, the NDP has suggested the DoBE should collaborate with departments such as the DoC and Department of Public Enterprise [DPE] and NGOs in order to implement the ICT infrastructure in schools. But it was the NBP, NIICTPW, NeGSR, and NeSDSP that discussed and tried to enforce the implementation of adequate ICT infrastructure at affordable pricing. The NIICTPW had proposed 50% (e-rate) reduction cost of all Internet services provided to schools (DoC, 2016, p. 30). All 6 policies appear to have tried to provide guidance on how to implement ICT connectivity in schools, but none of them has clarified the usage of ICT connectivity and accessibility of broadband concerns.

5.3.2. Policy challenge 7: Lack of proper policy coordination to implement infrastructure in schools

As revealed earlier, the WPeE has failed to meet the 2013 deadline for implementing ICT connectivity in schools and to have every learner become ICT capable (DoE, 2004, p. 17). Although the implementation of the e-education is located in different government departments, the ICT connectivity implementation in schools has been provided in an incoherent manner between the departments and identified stakeholders. This had made it difficult to track the performance of the policy as well as monitoring it against policy demarcated measures to determine whether there is progress made or not including identifying existing gaps. In order to bridge or lessen the existing digital education divide, the study has identified a need for government to have one policy that will incorporate all elements (e.g. ICT infrastructure, teachers' ICT training and development programmes and learners' ICT training) associated with the implementing e-education. It is believed that such an initiative will lessen the existing policy and implementation bottlenecks that exist

due to lack of proper coordination and accountability. The NDP, which in short, provides a long-term national development perspective, was supposed to play the integration role. However, because of the magnitude of the work necessitated in assembling this policy, as it relates to the integration of ICT in school, the plan lacked focus and is ambiguous.

In addition, the study has discovered that there is existing policy confusion in coordinating the implementation of ICT in school. Schools in 'ICT progressive' provinces (as discussed) have continued efforts to implement ICT connectivity in their schools (DoE, 2004, p. 11), whereas other schools in provinces such as the Limpopo and Eastern Cape are still without basic infrastructure (e.g. school building) (DoE, 2004, p. 13). Schools in Limpopo and Eastern Cape tend to be more disadvantaged, not only lack of ICT infrastructure, but all Infrastructure (i.e. building structures, water and sanitation and electricity). The difference in understanding the policy which when understood confusion is unlikely to be the reason for being left behind.

Amory (2015) had stated that the implementation of ICT infrastructure in schools should be guided by robust policy and a coherent dialogue between all stakeholders. The ISADP (2007, p. 3) had argued that the implementation of a robust, accessible and reliable ICT infrastructure is reliant on the broadband price structuring apparatuses that occurs under the administration of the DoC. On the other hand, the NBP seems to have failed to rationalise the implementation of ICT in schools and enforcing the e-rate (50% discount) initiative that could have possibly furthered the implementation of ICT connectivity and uptake in schools. For the aforementioned, the study has also discovered that the NBP has missed its set policy targets of having more than 50% of school connected to broadband services by 2016 (DoC, 2012, p. 18).

5.3.3. Policy challenge 8: The technical and policy challenges deterring the implementation of ICT infrastructure and connectivity in schools

As discussed earlier, provinces in South Africa are at different developmental levels of ICT incorporation in schools (DoE, 2004, p. 11). The WPeE stated that in 2013 every learner in South Africa will be ICT capable (DoE, 2004, p. 17). The NBP in support of the WPeE policy goal stated that by the same year (2013) it would connect (implement ICT connectivity)

25% of schools in South Africa, in so doing increase the percentage of the schools connected to 100% by 2020 (DoC, 2013. p. 21). Despite the intentions, the study has shown that most of the schools in South Africa are situated far from the fibre nodes (broadband infrastructure coverage) and most are still not connected to ICT.

Simply put, the passing of fibre nodes through several schools does not suggest easier or automatic ICT connectivity in school as theoretically, the complete infrastructure requires connectivity elements such as the network links and proper network configuration. Therefore, the NBP had aimed higher than it should have considered the massive infrastructure backlogs formed by factors ranging from poor implementation guidelines to misapprehension of policy intent by other stakeholders. Tamim et al (2015) had reasoned that one of the critical factors when implementing ICT in schools is making sure the policy understands the technical aspects and not only the pedagogy and hypothetical frameworks.

The lack of the competitive infrastructure sharing, lack of industry competitive broadband pricing and the unavailability of infrastructure implementation, coordination have contributed in the implementation bottlenecks mostly in rural areas. Urban areas with high schools volume are not easily served. The study has discovered that the same lack of implementation, coordination has also resulted in duplication of infrastructure. But the NBP suggested that the government needs to expedite talks of releasing and allocating the spectrum to stimulate competition among telecommunication service providers (DoC, 2013, p. 23). Enough competition is more likely to drive telecommunication costs down, which, when policies are well-coordinated can maximise on this opportunity to effect the quick implementation of e-education in schools. On the issue of spectrum release, the study has discovered that both the NBP and NIICTPW intended to resolve all other hanging policy concerns including reviewing approaches to explore other effective implementation strategies. Both policies have also been advocating for the release of spectrum and its allocation (DoC, 2016, p. 79).

CHAPTER SIX: THE CONCLUSION AND RECOMMENDATIONS FOR EVALUATING THE ROLE OF ICT POLICY IN FOSTERING e-EDUCATION IN SOUTH AFRICA

6. Introduction

This chapter presents the final conclusions of the research findings by partly focusing on explored and existing policy gaps from all seven (7) policies reviewed in Chapter five (5) regarding the implementation of e-education in schools. The objective of the study is to determine and measure to what extent the WPeE has been successful in its goal to implement e-education in schools. This chapter frames the proposed recommendations and interventions and further provides guidelines on how to address the policy challenges in Chapters Four (4) and Five (5).

The aim is also to determine whether the research questions were not only understood, but addressed. Therefore, the chapter follows the in-depth analysis in Chapter 4 and findings in Chapter 5 in order to make informed recommendations as challenges and outcomes have been well-understood. Policy areas that require special attention are highlighted as well as proving the necessary measure to address the widening policy gaps and duplications between government structures. The subject of e-education remains complex as it has many elements, many facets and many interpretations. The suggested policy interventions underscored in this chapter focused on addressing challenges between teachers and learners, ICT infrastructure and the lack of policy coordination to stimulate the implement ICTs in schools.

6.1. How to improve teachers' ICT knowledge to enable implementation of ICTs in schools

The effective teacher ICT knowledge improvement requires adequate planning and coordination between all 7 policies discussed. It is recommended by the study for the WPeE to undertake the leading policy role, be the master plan and all other six (6) policies studied should be realigned, reconfigured and reinforced to ensure the implementation unfolds seamlessly. The DoC needs to review both the NDP 2030 policy documents as they appear to be out of scope (far from the existing teachers' ICT knowledge and ICT connectivity challenges in schools in South Africa) with regards to the ICT integration in

schools plans. This policy should be prudently reviewed against the NBP's policy objectives; simply because the ICT infrastructure implementation is the core responsibility of the NBP. Once the NBP presents a stable policy position (analysing recent ICT infrastructure in contrasted with future ICT infrastructure implementation prospects), then can the NDP restart their policy amendment processes to realign. The role and responsibility of other key stakeholder departments need to be relooked to ensure that a proper change management control process is followed and that all stakeholders are held accountable. In an attempt to provide the answers and solutions, the following recommendations are further made:

6.1.1. Development of an effective framework for effective ICT teacher training on the pedagogic use of ICTs in schools

This study has presented evidence that the WPeE has somewhat failed to provide teachers with proper ICT training programmes and development. The DoBE, as the custodian of the educational development in South Africa, should be wholly responsible for designing the ICT training programmes for teachers in schools. This does not prevent the DoBE from working with independent researchers, the NGOs or private sector, but the Department should own the development of the blueprint including fostering dialogue between teachers and researchers. Once this gap is addressed, resistance from teachers will be somewhat avoided as the consultation process endorses them as stakeholders.

Wild (2015) had made the point that knowing ICT technology and its strength to revolutionise teaching and learning in schools is unquestionably not the same as teaching with it. There is a huge distinction between the two, but the study has revealed that the DoBE has outsourced training of teachers to the NGOs and private sector. It is evident, from the Department's position, that the DoBE is not planning to build the training capacity internally, neither is there any indication that it will search for new teaching and learning consultants to educate teachers on various technology choices they need to master in order to deliver quality ICT education.

The study recommends that both the ISADP and NDP should effectively promote the use of ICT technologies in schools. This study has revealed that a significant number of the

teachers are still oblivious of how the DoBE expects them to efficiently use ICT technologies in classrooms. Given there is no evidence of engagements between the teachers and researchers' as the WPeE had sought, the DoBE will struggle to get a participant buy-in when implementing e-education in schools. Therefore, the DoBE needs to take full responsibility of shaping the teaching training and development programmes and should be proactive enough to assume leading role in coordinating the development and implementation of teachers' related programmes.

6.1.2. Teachers deep understanding of the alteration of pedagogy from traditional to digital

The study has found that most teachers do not understand how digital pedagogy is going to impact their capacity to still provide effective teaching. In the absence of a well-defined and well-constructed ICT teachers' training programme, some teachers may resist the implementation of ICT driven education and continue with the traditional teaching. The findings have revealed that teachers are more likely to rely on gaps in the mentioned policies, as reason to stick to their preferred teaching method, which appears to be the traditional system. To succeed in its mandate, the DoBE should review its e-education policies in consultation with the teachers, with the aim to begin to gradually enforce the use of ICT in schools. It is clear that the DoBE has not effectively steered the direction with regards to the subject of ICT teacher training and development programmes.

Almas and Krumsvik (2008) had reasoned in their study, on the use of ICT in schools, that one of the prominent problems with ICT infused teaching is the lack of proper teachers' in-service training ICT training and development programmes. The introduction of modern ICT pedagogy requires schools to provide adequate training for teachers to gain the necessary ICT skills on how to approach ICT technological tools differently. Nowhere in the policy did the study find teachers been allocated the professional development ICT programmes and their progress monitored to access their improvement. Though teachers' personal effort has proved to be helpful and enabling, the DoBE still has to understand that the responsibility of education teachers' lies with them.

The WPeE stated that teachers should find innovative ways of infusing ICT in schools and to further think about how to reshape the curriculum. A statement like this is subject to all kinds of interpretations that could possibly result in major challenges in ICT developments in schools. The study further found that the DoBE had extended too much power, to both provinces and district, to use their discretion when implementing ICT connectivity in schools. This has resulted in implementation that is not standardized. To counter this, both provinces and districts should be stripped off that power as they cannot function in isolation to other national policies. They need to be readjusted back to the national policy framework and the implementation should be centralised.

The study recommends that all other sections that discusses teachers' subject and in all 7 policies should first pursue the understanding of the alteration of pedagogy from traditional to digital. This is very critical as it can either enable or disable the implementation plans. The need to understand should be given special attention and policies should have unified approach to have realistic project implementation deadlines. For example, the DoBE needs to frequently have seminars where teachers are not only taught about this crucial transition, but for them to engage with other teachers from other schools to exchange ideas. It is, nonetheless, not enough for the DoBE to seek policy resolutions alone, the dialogue between the teachers and the Department should give rise to the alteration of pedagogy proof of concept (PoC) to be further remodelled by the researchers, NGOs and the private sector. The Department can no longer afford to ignore the power teachers have, nor can they continue excluding them from critical policy discussion (leading to decision makings) as they need to construct realistic policies based on teachers' experiences and their standpoints. ICT-based teacher activities need to be prudently shaped and handled with the required policy diligence. The failure to understand the significance of moving from traditional to digital, and the lack of having the realistic future outlook has prevented teachers from implementing ICTs in school. All schools with computers must be connected to the Internet and utilised effectively. The DoBE needs to ensure teachers' understand and value the digital teaching and learning.

6.1.3. Teachers' ICT competence and their interpretation of digital learning

Cuban (2001) had stated that teachers are the major key and strategic partners to implement e-education successfully in schools. This study has stated that some passionate teachers are in fact putting an effort to implement ICTs in schools. While the WPeE had initially suggested that teachers should be given personal computer and laptops in order to improve themselves even outside the classroom setting, the DoBE (2015) subsequently changed its strategy and is now dispensing ICT tools to learners in schools when it should be concentrating on the teachers first (also through proper dialogues). All 6 policies have repeated what the WPeE has stated suggesting that the policies were formulated in response to heightened political pressures and neglected extensive consultation of subject-matter experts.

The study recommends that the DoBE should thoroughly conduct a baseline study to determine whether teachers understand what digital education is, and the impact it has in schools. The NGOs and the private sector should assist the DoBE with benchmarking the study (teachers' ICT competency skills and the digital learning) set against other developing countries. It is important to note that the introduction of ICT is fairly new in most schools. Therefore, the DoBE should accelerate the ICT training and development programmes to increase teachers ICT knowledge which will effect the implementation of ICTs in schools. This initiative should be constantly pursued across all schools. Further, the Department should start producing monthly or quarterly ICT usage statistics and ICT development progress in schools in order to identify schools that still need further interventions. This approach will help the Department to understand that different implementation dynamics exist in different provinces.

6.2. How to improve learners' ICT knowledge to enable implementation of ICTs in schools

The DoBE envisioned implementing e-education jointly, with other government departments to transform the quality of digital learning in South Africa. The Department has since gone through an indispensable curriculum makeover in pursuance of realising the goal of implementing digital learning in schools. The WPeE stated that it would have each and every learner in South Africa ICT capable by the years 2013. The target has long

passed and the study has discovered that even the subsequent target set out in the NDP 2020 vision will be expiring in 2020 without achieving the set ICT integration goals.

Learners find themselves in the purportedly digital era without any groundwork from the DoBE. The ISADP has failed to comprehend what enablement learners needed and what ICT interventions were necessary to fast track the implementation of WPeE. Kozma (2008) had reasoned that while it appears easy to introduce ICT to learners as opposed to teachers, not all learners are ICT savvy.

The study recommends that the DoBE should have an ICT skills knowledge subject that deals with what ICT is and its use. This subject should be mandatory. Learners should be given the freedom to utilise computers in the classroom. The learners ICT training and development programme should be linked to that of the teachers. One of the modules in the teachers training should involve learners as the case study. It is believed that the outcome of this module will provide teachers and learners the opportunity to explore ICT digitised platforms, which can improve the ICT interactions between these two primary stakeholders.

6.2.1. Policy intervention to involve learners when implementing ICTs in schools

The aim of the WPeE, in conjunction with other policies, is to be clear on the key objective. Each policy milestone regarding learners must highlight the critical policy outcomes that should be aligned to realistic timeframes. This study has found that learners were not the main concern during the construction of all seven policies. They were mentioned as 'by the way' participants with a little strategic focus to explore whether or not they understood the complexity of having to switch from traditional to digital learning. None of the mentioned policies have introduced a systematic approach of implementing ICT as well as measuring the value it brings in a classroom. Like Cuban (2001) had argued, that the presence of ICTs in a classroom does not mean anything. It is the processing and effective applications that yields improved digital learning. The DoBE needs to review current implementation frameworks to incorporate principles and guidelines towards addressing learner ICT challenges.

In addition, the WPeE, ISADP and NDP should prioritise ICT training for learners. It has been discussed in the study that using ICT technologies and applications in a classroom can be a double effort for learners as they first have to understand their curriculum and then the use of ICT. The DoBE needs to review its current national curriculum framework as the policy has failed to address concerns such as the kind of technology required what ICT tools and what how to access digital educational content.

The study recommends that the DoBE evaluates the level of ICT connectivity among schools and learners and institute a program of action to ensure learner from all different schools have the same access to ICT connectivity. There should be a strong policy guide to enforce the use of computer laps in schools that already have access to ICT connectivity. The lack of policy coordination and the assumption on how learners have been receptive to the introduction of ICT by the DoBE has led to all manner of confusion between what is the right ICT technology and how learners should interrelate. The Department together with the identified stakeholders should accelerate the implementation of ICT connectivity including offering training. Lastly, the DoBE needs to be aware that, the same ICT tools integrated into teaching and learning can be disruptive at the same time. Therefore, the Department needs to provide a guide and regulate on an ICT user policy that will, among others, control which content to be viewed using ICT tables and which sites of the Internet should be blocked (sites that are outside the scope of school learning or not age-appropriate).

6.3. The role of the school to enable learner ICT digital learning

The specific roles of the school teachers and principals in nurturing digital learning are not clear in any of the policies. The findings have revealed that teachers still don not understand their role when it comes to the implementation of ICT connectivity in schools. As a result, their lack of knowledge means they cannot be considered as ICT technology leaders; schools teachers should start seeing themselves as ICT technology leaders. It cannot be expected that teachers or principals to decide on what technology should be used in schools. The DoBE through its policies need to develop suitable policy standards and procedures.

The study recommends there should be a policy link across all 7 policies to ensure there is a unified ICT knowledge before the implementation of ICT connectivity in schools. The ISADP is not talking about connectivity as the main focus; the NBP is neither saying anything specific about connecting teachers and learners, except the policy is generic. All policies should be well synchronised, and in this instance the NBP should be also reviewed and realigned with the policy goal of WPeE of enabling learners to be ICT capable.

6.4. Schools ICT infrastructure and connectivity

This section highlights some the ICT infrastructure and connectivity challenges the DoBE and DoC experience when rolling out ICTs in schools. The NDP (2012, p. 313) had reasoned that the implementation of ICT in schools is a complex process that requires the involvement of all strategic implementing partners. In South Africa, the implementation of broadband differs from one province to another. There are different economic and infrastructural challenges that hinder the implementation of ICT connectivity. The policies remain silent on the issue of using e-rate initiatives to invoke change in the implementation of ICTs in schools.

6.4.1. Lack of established funding model to implement ICTs in schools

The findings have revealed that the e-education initiative does not have a formal funding prototype. The DoBE is not in control of funding this initiative both at the national and provincial level as there was never a specific (set aside) budget to finance any ICT related developments. It was further found that over 110 schools remain connected to broadband services, but through uncoordinated processes outside the guidelines of the DoBE. There is no funding donor model to allocate funding for the e-education initiative. The DoBE needs to develop a funding model strategy that will make provisions for the implementation of ICTs in schools.

The study recommends that the DoBE should not only focus on urban areas (quick win areas since they have basic infrastructures), but place more policy intervention effort to include rural areas where accessibility to ICT connectivity is the major challenge. The DoBE should look into to regulating the spending abilities across all 9 provinces, by allocating funds accordingly. This study has revealed that there is no standardisation of funding and

as a result, the connectivity gap is broadening between schools. The revised policy should, therefore, close funding loopholes to eliminate possible corruption, among others. Another recommendation is to empower communities to partner with the DoBE to jointly develop a framework that will attract funding from the private sector. The framework should focus also on engaging the private sector to donate software, hardware and to possibly finance the labour costs to have computers installed in schools (as an example).

6.4.2. Centralisation of the broadband infrastructure implementation and connectivity in schools

The NBP intended to have over 25% of school in South Africa connected to ICT services by 2013 and 100% between 2020 and 2030. The aim was to bridge the digital divide by having all schools connected to broadband services. The study has revealed that there are few and manageable implementation challenges in urban areas as opposed to rural areas. Most private companies are located in urban areas and this is because of the availability of broadband infrastructure, which even schools in this area stand to benefit from the infrastructure. But this approach has left many schools in rural areas without any hope of ICT connectivity. Therefore, the DoBE needs to find a coordinated approach of implementing ICT connectivity equally across all regions irrespective of the geographic location. The study proposes the following possible policy intervention to remedy the ICT connectivity concerns:

6.4.2.1. Review the current regulatory framework that seeks to stimulate reasonable broadband pricing between telecoms service providers

The study has discussed the commitment by the NBP to implement the e-rate (50% discount to Internet services) for the implementation of ICTs in schools was not fully explored. The NIICTPW also envisioned resolving all the hanging ICT implementation challenges. However, the study found that effective stakeholder engagement model and effective regulations can affect the implementation of ICT connectivity and ICT utilisation in schools. It is not also clear why the telecoms service and policy regulator (ICASA) has not played a pivotal role in enforcing price cuts as policies have long suggested. The effective reduction of costs would see the increase the broadband penetration in schools. But poor policy compliance and enforcement fitness has let to slow ICT implementation in schools.

The study recommends that the NBP should focus on developing a dedicated programme that focuses on the implementation of ICT connectivity in schools. The implementation should take place through the coordinated policy guide to enforce uniformity. Since the NBP is advocating the implementation of broadband across all government sectors, the policy should centralise the implementation plans including defining realistic completion time lines. The DoC should exploit the e-rate initiative as it still has the potential to drive broadband prices down to enable an increased ICT connectivity implementation in schools.

6.4.2.2. Broadband connectivity implementation in schools through the consolidated strategy

The DoBE intended to work together with the DoC to ensure that the policy goal of have ICT implemented in schools was achieved. The WPpE stated that the challenges regarding the implementation of ICT infrastructure prevented schools from leapfrogging into the digital teaching and learning era. The study posits that in the absence of a centralised policy, plans are more likely to be either misunderstood or implemented in isolation of a master plan. The DoC needs to appoint a dedicated team that will coordinate policies and focus exclusively with the implementation of ICTs in schools. This team or committee should also be responsible for ensuring they resuscitate the e-rate initiative, handling the acquisition of ICT technology procurement and deal with third party clients.

It is recommended that the DoC policy (NBP) should be reviewed to provide direction to structures that are responsible for the implementation of ICT connectivity in schools. This should include policy enforcement to have these implementing 'teams' to report to the Director General (DG) of the DoC and also liaise frequently with the steering committees appointed by the DoBE. These teams should be transparent and able to effectively exercise their independence freely.

6.4.3. The digital development strategy to improve teaching and learning

The government of South Africa has tasked the DoC to resolve ICT infrastructure implementation challenges as well as ensuring ICT connectivity is realised in sectors such as the health and education. The finding has shown that the NBP had planned to ensure there was dedicated connectivity in schools. But the NeGSR had called for the need to have

effective coordination of strategies between government departments towards the implementation of ICT connectivity in schools.

The study recommends that there should be further in-depth research and analysis conducted by the DoC to determine which strategies should be merged to have one, unified strategic approach that aims to effectively drive the implementation of ICTs. Other mentioned policies should not necessarily find their expression in the WPeE, but be able to identify with its policy goals. The study has recognised the need to promote independence between these policies, except it recommends that they be actioned in a well-coordinated manner to stimulate consistencies.

6.4.4. The impact ICT connectivity and strategy to increase ICT uptake in schools

The NDP (2012, p. 303) stated that ICT connectivity objective in schools appears to be a complex task that required the full commitment from all identified stakeholders to constantly work to achieve set policy goals. Most schools in the Eastern Cape and Limpopo, for instance, are the poorest in terms of the infrastructure in schools compared to the ones in Gauteng, Northern Cape and Western Cape (Westhuizen & Jacobs, 2009). As discussed, the DoC in partnership with the DoBE needs to invest time in understanding the underlying complexities of implementing ICT in all schools in South Africa.

The study recommends that the DoBE should partner with DoC to explore strategic ways and measure to drive the consumption of ICT in schools. Both the DoBE and DoC need to document the benefit realisation and the impact of having ICTs in schools. Part of documenting benefits should include addressing the mindset of schools towards the use of ICT. The findings of the study have revealed that the lack of policy dialogue between schools and the DoC has negatively impacted the adoption of ICT use in schools. Therefore, proper communication channels should be established as well as the dialogue between the DoBE and teachers. The policy dialogue should also be effective between the DoE and DoC during and after the implementation of ICT connectivity in schools.

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APPENDIX A



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THE DOCUMENT REVIEW GUIDE

Evaluating the role of ICT policy in fostering e-Education in South Africa

Date: _____

Document review questions
1) Are there any similar instances in history where infrastructure readiness of e-education post 1994 was prioritised and integrated into other policy documents?
2) What are the recent education paradigm and views on e-education as highlighted by different policies?
3) Is there any policy weaknesses underlining reasons for excluding teachers' from participating in the development of the electronic (digital) content and how were their concerns amalgamated in other policies?
4) To what extend is the e-education policy successful in developing learners' capacity to handle ICTs effectively and what is the alignment between e-education and the National Strategy for Learner Attainment (NSLA) in South Africa?
5) How has the government addressed the e-education ICT infrastructure and connectivity challenges and what are other policies saying, particularly about the problem of predatory broadband pricing that exists in South Africa?
6) Are policy makers and educators brave enough to embrace the implementation of ICTs in schools

and do they really understand the distinction between e-learning, internet in schools and e-education?
7) What kinds of power do teachers have in deciding what method of teaching (traditional or digital) they prefer, and what are some of the policy enforcement processes in compelling them to use ICTs?
8) Are teachers' ready and comfortable to use ICTs to improve teaching and learning in the classrooms and what is their overall culture towards the integration of ICTs in schools?
9) Is there any development of effective and well-integrated framework to stimulate effective ICT teacher training on the pedagogic use of ICTs in schools?
10) Do policies address learners' ICT experience and challenges, and what are some of the policy measures to ensure that learners will benefit from using ICT in a classroom setting?
11) What is the real impact of having digital learning?
12) Do policies compare the traditional learning versus ICT modern learning to evaluate if the investment of e-education will yield positive educational results?
13) What are the ICT infrastructures' challenges affecting the performance of both teachers and learners?
14) What is the role of government in ensuring other departments collaborate towards implementing the e-education policy?
15) To what extent is the implementation of e-education successful and what are the qualifying policy elements associated with either success or failure to implement e-education?
16) How will DoBE address the ICT challenges and the digital divide amongst learners in schools and what will happen to learners' preference on what method of education (traditional or digital)?
17) Are there any government funded ICT learning centres in various communities that allow learners' access to the Internet?
18) Do schools have enough ICT capable teachers to ensure that all learners' have equal opportunities to become computer literate.