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A MULTIPLE COMPARATIVE INSTITUTIONAL CASE STUDY EXPLORING THE EXTENT TO WHICH FINAL YEAR B. ED. STUDENTS ARE PREPARED FOR ICT USAGE IN THE CLASSROOM

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A RESEARCH REPORT SUBMITTED TO THE FACULTY OF HUMANITIES, UNIVERSITY OF THE WITWATERSRAND IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER'S IN EDUCATION

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ABSTRACT

The digital era brought with it sophisticated ATMs (automated teller machines) in their different forms. These ATMs go beyond the banking sector and are sophisticated as you cannot perform or process any task without instructing them to do so. Such ATMs are what we refer to as ICTs – Information Communications Technology. Now, in a world that is constantly evolving as technology continues to advance, the schooling sector is amongst those that face unique challenges. In line with this study, these challenges are inclusive of, but not limited to, professional Information Communications Technology (ICT) teacher training and development. The dominant narrative around this challenge is lack of sufficient professional training for teachers (in-service and pre-service), often inconclusive frameworks and official policies on ICT teacher preparedness. Despite these challenges, the Department of Basic and Higher Education along with higher education institutions (HEIs) continue to establish policies and curriculums that address the challenges at the use and implementation of ICTs as far as initial teacher training is concerned.

In order to explore the extent to which final year Bachelor of Education students are prepared to use ICTs in the classroom, a multiple case study and qualitative research method were employed. A link to the study questionnaire was sent followed by semi-structured virtual discussions with twelve (four students from each university) final year students from three purposefully selected South African universities. Three official policies on initial teacher training and ICT and teacher preparedness and the respective institution's B.Ed. curriculums were analysed. Even though majority of students come from technology destitute backgrounds, the findings point out that, universities are one of the biggest 'equalizers' in as far as technologically preparing students from different social circumstances are concerned. Secondly, official policies are being adhered to and applied within institutional context. The study recommends that more research case studies focusing on initial teacher preparedness as far as ICTs in education are concerned be conducted so that the HEI space gets to constantly reflect, self-correct and improve on their implementation measures in attempt to preparing teachers to using ICTs in the classroom.

Keywords: ICTs, Initial teacher training, HEIs, official policies on teacher training.

DECLARATION

I, **Palesa M. Mofokeng (1099746),** declare that this research study is my own work. It has not been submitted before for any other degree or examination in other universities. All the work taken directly from other works has been cited accordingly and the list of references has been provided. I fully understand that the University of the Witwatersrand will take disciplinary action against me if evidence suggests that this is not my own work or that I failed to acknowledge the sources of the ideas or words in my writing.



……..

University of the Witwatersrand, March 2022

Protocol number: 2021ECE081M

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DEDICATION

I dedicate this research report to my baby and vision that has always been so close to my heart - Edtech Bridges. As a registered non-profit company (NPC) whose aim is to capacitate and professionally train teachers in the use of ICTs for the purposes of teaching and learning, I hope the vision behind the NPC may also be informed by the contents of this report.

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DEFINITIONS/CLARIFICATION OF TERMS

ICT - An acronym for Information Communications Technology. The term refers to technologies that enable access to information through telecommunications (Christensson, 2010).

IT – An acronym for Information Technology. The term refers to computers and associated storage, networking devices and infrastructure that are used to create, process, store, secure and exchange electronic data (Glendinning & McEwan, 2006).

Rural areas – In general terms, rural areas are defined according to the place of residence and the type of jobs people are involved in (Gardiner, 2008). Rural areas are classified by primary activities inclusive of fishing, farming etc. These areas are further and largely associated with lack of connectivity, electricity and industrialization.

Urban area – Geographically, this is a human settlement with high population density. There is greater level of industrial activity due to the relative availability of connectivity and electricity

Suburban area – A mixed use area. It can be used for commercial or residential area, associated with employment opportunities.

Traditional classroom – a teaching and learning space that is more teacher-centred than it is learner-centred. A teacher in the transmitter of information while the learners are the recipients of this information. There is minimum to no active participation of learners.

ABBREVIATIONS/ACRONYMS

4IR – Fourth Industrial Revolution

APS – Admission Points Score

B.Ed. – Bachelor of Education degree

CAT – Computer Applications Technology

CRQs – Critical, Reflective Questions

DBE – Department of Basic Education

DBE MTEQ (on Initial Teacher Education) – Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education

FET – Further Education and Training

HEIs – Higher education institutions

ICT – Information Communications Technology

IT – Information Technology

LMS – Learning Management System

TAM - Technology Acceptance Model

TPACK – Technological Pedagogical And Content knowledge

SAMR - Substitution, Augmentation, Modification, and Redefinition

T&L – Teaching and Learning

PD – Professional Development

PPP - PowerPoint Presentation

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CHAPTER 1:

HIGHLIGHTING THE ROLE OF HIGHER EDUCATION AND OFFICIAL POLICIES IN THE CONTEXT OF INITIAL TEACHER ICT TRAINING IN SOUTH AFRICA

1.1.The role of higher education in the context of teacher education

Higher education institutions' (HEIs) primary role is to train and produce individuals who will contribute positively to society as critical thinkers, problem solvers and more importantly, contributors at an economic level of a country. In the context of initial teacher education, this role further extents to ensuring that teachers who are capacitated and professionally prepared for the constantly evolving schooling sector are produced. Furlong and Smith (2013) noted that, "The extent of change affecting schools, universities, and our society in general makes it easier to understand why the preparation of teachers is such a complex issue" (p.2). In other words, at their core, higher learning institutions concerned with teacher education should first understand that the initial teacher preparation journey is not an easy one as it is characterised by multi-dimensional demands and challenges. These demands and challenges are inclusive of prevalent socio-economic and demographic factors along with highly (and often unregulated) politicised education policies (Bush, 2007; Christie, 2010) just to name a few. Being aware of these complex factors necessitates that higher education institutions must, by all means possible, seek to ensuring that pre-service teachers are holistically developed for the classroom. Admittedly, the training of in-service teachers can be a rather complex task due to some of the factors alluded in the body of this paragraph.

In the interest of this study, holistic development can be attributed to teachers who are subject specialists of the content they teach (Shulman, 1976). That is, they know and understand the content of the subjects they are teaching. Secondly, the holistic development of teachers can be attributed to their administrative competence – having the skill and knowledge to direct affairs within their respective institutions of employment. Thirdly, they understand the policies that preside over the profession. understand inclusivity and diversity in the classrooms they might find themselves in. This holistic development is further attributed by understanding the impact of bullying in its different forms. Finally, in respect to this study, a holistic development further speaks to graduates who are capacitated and prepared to use Information

Communications Technologies (ICTs) in the classroom. By so doing, higher education institutions in the context of teacher education would have checked some of the boxes that holistically develop teachers for the constantly evolving schooling sector.

1.2. Policies around initial teacher ICT preparedness and usage in the classroom

At the dawn of democracy in South Africa, what Sayed and Jansen (2001) described as a frenzy of policy documents and acts, was witnessed. Various policies: *National Education Policy Act* (DoE, 1996), *Curriculum 2005 framework, Norms and Standards for Teacher Education, South African Council for Educators (SACE)* to mention a few were gazetted. Although the chief point of interest was teacher training and professionalism at the heart of a nation wanting to rebuild itself, each policy brought a different angle from which this central point can be tackled from. For the sake of focus as per this study, I have analysed three official documents, namely, The *White Paper on e-Education*, The *Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education* and *The Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* as they apply in the initial teacher ICT training and preparedness in the classroom.

1.2.1. The White Paper on e-Education

The *White Paper on e-Education* was finalised in 2004. It rightly highlights that, "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" (p.27). As a guide to help us understand the extent to which ICTs are important for the teaching and learning practices with the human teacher facilitating this process, the white paper gives an overview of some of the reasons pertaining to hesitancy and the lack of comfort among teachers. These reasons are discussed in Chapter 2. And given the time the paper was published, the cohort of teachers it is referring to is likely attributed to those over 35 years of age and above. The understanding of this cohort is outlined using an article by Brown and Czerniewicz (2012) in Chapter 2. Moreover, with this policy, I locate the importance of ICTs in South Africa's education system with the preparation of the current teacher in mind.

1.2.2. The Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education

This official document guides institutions of higher learning on the minimum requirements that their students should possess upon graduation. These minimum requirements are believed to be affording initial teachers a competitive advantage in the classroom and the schooling sector as a whole. An analysis of this policy document is discussed in chapter two and will help the broader discussions of this study.

1.2.3. The Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology

The Department of Basic Education adopted the *Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* framework in 2018. This framework is said to provide, "…a fresh approach to the professional development of teachers and all stakeholders using digital tools and content resources to support improved learning outcomes and higher learner attainment in the curriculum" (DBE, 2018:9). It becomes a relevant policy document for this study as the scope focuses on the extent to which B.Ed. students are capacitated for the use of ICTs in the classroom. Furthermore, this document will serve as a guide in understanding how institutions have employed and have adapted it within their own initial teacher curriculums. In light of this study, aforementioned policy provides a framework to developing teachers who are facilitating their teaching and learning practices with the aid and use of technology. With this understanding, the extent to which this policy is been applied in institutions of initial teacher training is drawn in chapter(s) 2, 5 and 6.

1.3. Background of the study

The introduction of ICTs in government schools and the narrative of going digital within the sector remains highly politically motivated in South Africa. While this introduction came as one of the tools for equity given our apartheid past, this introduction within the sector had no blueprint on how to prepare and capacitate teachers. The fact that the Department of Basic Education only adopted the *Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* framework in 2018 – 14 years after the White Paper 7 was finalised proves this.

Undoubtedly, however, the past five years or so have shown and continue to show an increasing need for the availability of Information Communication Technologies (ICTs) in South African classrooms as learners require the technical and soft skills embedded at the use of ICTs, for society. Understanding that these skills are imperative, the South African government continue to foreground the idea of 'going digital' given the technological gap that is currently existing in South Africa (Brown & Czerniewicz (2012); Gillwald, Mothobi & Rademan, 2018). Within the education field, the idea of going digital is largely associated with using technology to enhance learning. At the heart of this idea is the need for preservice teachers to be prepared in this regard and hence the research question for this study.

1.3.1. The state of ICTs in South African schools

In 2018, the department of Telecommunications and Postal Services met jointly with the Department of Basic Education with regards to the provision and availability of ICT connectivity in schools across South Africa. In their report, 46% (higher compared to the 26.5% stats for the year 2002) of approximately 25 000 schools had some form of connectivity for teaching and learning purposes (Department of Basic Education, 2018). Evidently, it took sixteen years to get these departments to at least get almost half of the schools in the country connected in some shape of form yet on yearly basis budgets are drawn and money is given to these departments to effect change.

Beyond the role and impact of politics in education, Gillwald et al., (2018) call attention to the prevalent digital divide - inability to access technological device and means to be able to participate in the networked society. They write, "…ICT deprivation can be considered alongside, and strongly linked to more traditional twentieth-century social exclusion factors, such as low income, unemployment, poor education and social isolation" (p.104). Sadly, at the heart of this deprivation and the state we find ourselves in as far as the provision of ICT connectivity in South African school, is corruption witnessed within these public administrative offices and lack of adequate accountability (Baxter, Ehren, & Patterson, 2018).

Corruption exists across societies. In a developing and unequal society such as South Africa, this global phenomenon is seen through mismanagement of public funds where the money that was meant for a particular project, for example the installation of ICTs in schools, will not be fully used for that purpose as individuals direct it for their personal use (Twinomurinzi & Ghartey-Tagoe, 2011). As a consequence, ICT projects meant to aid in the advancement of

teacher training and pedagogies become affected while disadvantaging the learner that should be prepared for an ICT infused future in the process.

1.4. **Research aim**

The purpose of this study is three fold. First is to explore the extent to which final year B.Ed. students are prepared for ICT usage in classroom teaching and learning. Second, to examine the extent to which curriculum heads and heads/deans of faculties in schools of education within the purposefully selected institutions are preparing their graduates for ICT resourced classroom as guided and expected by official bodies and policies. Third, to critically analyse the official policies mentioned previously along with factors that allow and/or hinder initial teacher ICT preparedness.

1.5. Research problem

Section 1.3.1 foregrounds that democratic South Africa has profound challenges relating to ICT connectivity and access. The article I wrote in April 2020 underscored the issue of technological access in South Africa's disadvantaged schools. These schools are mainly from the rural and township parts of South Africa. In this article, I problematised how the technological divide is not only as a result of the overwhelming amount of corruption prevalent in the public administration offices but also as a result of insufficient teacher ICT preparedness and capacitation at undergraduate level of their degree (Mofokeng, 2020). This article, amongst others is further contextualised in chapter two of this research report.

Furthermore, in the context of the South African basic education system in its entirety and the overall teacher preparedness, the most vivid reality is that a tick-box approach in most of the ICT Frameworks administered is, like in most of these frameworks, used. This must stop if the aim of all these policies and frameworks are to improve the quality of our basic education.

It is therefore my contention that, the current initial teacher programs do not sufficiently prepare nor capacitate preservice teachers with adequate ICT skills, particularly teachers outside of Information Technology (IT) and Computer Applied Technology (CAT) related subjects.

Taking this thought further and upon observation and engagement with some teachers in the field, I have concluded that all official documents pertaining to the enhancement in quality of

our education system and teacher preparedness at the introduction of Information Communications Technologies (such as tablets, smartboards etc.), are indeed well-informed, very intentional and to a reasonable degree, contextually responsive. This is because a considerable number of expert academics duly form part of the policymaking gatherings where robust, vigorous and intense engagements relating to the future of our education occur. The sad part is, the teachers who must implement these arguably, well-informed policies, are by and large sidelined. "These policies are dumped to us, without consultation and sufficient, proper induction", said one of the participant teachers in an informal conversation.

With reference to "ICT Support to Curriculum", the goals that could be achieved through the Framework include: • Goal 16: Improve the professionalism, teaching skills, subject knowledge and computer literacy of teachers" (The Framework, 2018).

It is paramount that this goal is implemented. What needs to be clear from the policy is the 'How-To' strategy for this policy to be implemented. Important to note at this juncture is that the core component of my study is not around the policies on teacher preparedness but rather on the various initial teacher curriculums (within institutions of my study interest) for pre-service teachers' professional ICT preparedness and learning. I am highlighting some of the policies and quotes from each as reference point; understanding that each claim should and must be supported by a particular framework informed by the prevailing official policies to guide them.

The problem is further evident in the amount of research literature done on teacher professional training and ICT preparedness (Ingvarson, Beavis & Kleinhez, 2007; Ndlovu & Moll, 2016). The amount of research on professional ICT teacher training is not enough. Instead, what is currently more popular is current literature pertaining to ICT skills capacitation is on how schools/institutions prepare learners (Narasuman et al, 2011; Hicks, 2011; Geisinger, 2016; Satell, 2018; Jenkins, 2020; Goddard, 2019). As such, the kind of initial teacher curriculum and reforming it in a way that speaks to current ICT-incorporated debates within the classroom teaching and learning context, serves as one of the starting points as teachers form a crucial part of molding an education system of a country.

1.6. Research question and sub-questions

This study seeks to address the following main research question:

To what extent are final year B.Ed. students prepared for ICT usage in classroom teaching and learning?

The research sub-questions for final year B.Ed. students were structured around:

1. What is their understanding of ICT in (or for) education?
2. How they identify ICTs for education they are aware of and how do these foster learning?
3. What are their experiences throughout their B.Ed. degree as far as the usage of and their exposure to ICTs are concerned? Probing further the effectiveness of these ICTs in relation to their intended purpose.
4. How often they used ICTs or a form of ICT in their practical teaching experience and what informed the kind of ICT(s) they would use in their lessons?
5. From their B. Ed curriculum design, which modules helped prepare and capacitate them with ICT knowledge-base and skills set? The participants were also required to mention the duration and/or level of study for the module(s) and also describe their experiences in this regard.

1.7. Research rationale

Having established that a significant number of studies has been published on how and what schools can do to prepare learners for e-learning environments (Ingvarson, Beavis & Kleinhez, 2007; Ndlovu & Moll, 2016) but little focus on the preparedness of final year students - that is, what informs course designers' approach for the development and design of initial teacher curriculum; what strategies are schools of education employing in order to capacitate pre-service teachers on ICT professional development skills and what are the views from pre-service teachers on their interaction with the content and the schools heads greater vision for their initial teacher development a lot of work in term of research in this terrain of knowledge needs to be done.

While examining South Africa's educational implementation plans such as *The White Paper on e-Education* adopted in 2004, the following sentiments are captured:

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

In relation to this study, I wish to analyse the initial teacher education programs across four contextually different institutions of higher learning in South Africa along with some of the policy documents used within these institutions. Furthermore, relate this to how they actually go about preparing ICT capable students.

I am particularly interested in conducting a study on final year B.Ed. students as they are on their path to being employed as teachers. Some of the classrooms they are likely to be in contact with may have an ICT equipment and the background knowledge on how to operate these hardware and educational technology software is pivotal hence the focus of my study.

1.8. Structure of the research report

This research report is made up of six chapters. **Chapter 1** provides the background and purpose of the study as a way to make a case for this research. This was also done by highlighting the role of higher education and official policies in the context of initial teacher ICT training in South Africa. In particular, three official policies – namely, *White Paper on e-Education*, The *Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education* and The *Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* - were briefly discussed. Furthermore, in thinking about initial teacher education and training, this chapter also painted a picture of the state of ICTs in South African schools given the fact that the South African government (and other members and groups) continues to accent the fourth Industrial Revolution (4IR) narrative. With all this, I found it pivotal and relevant for this study to narrow down the extent to which this narrative is translated also in South African schools.

Chapter 2 presents reviewed literature on the importance of initial teacher ICT training and the role of a teacher in an ICT aided environment. The chapter critically discusses debates around preservice teachers' contexts and how these allow or hinder the teaching and learning processes using ICTs. Aforementioned are unearthed within South African classrooms. In this chapter, some of the arguably best international practices are discussed to corroborate,

collaborate and complement the complex realities prevalent within the South African teaching context.

In **Chapter 3**, I discuss the conceptual and theoretical frameworks used in this study, particularly the concepts of blended learning (van der Merwe, 2015), Mindtools (Jonassen, 1998), Praxis and Critical Consciousness (Freire, 2007). In thinking about initial teacher training, this chapter proposes that these concepts should be understood and used in direct relation with each other.

In **Chapter 4**, I give a detailed account of the research methodologies employed for the study. As a qualitative research, the chapter accounts for the research paradigm informing this study, the reasons pertaining to how participants sampling, data collection and analysis were done. Additionally, issues around research validity and reliability are also accounted for.

Chapter 5 explores the extent to which final year B.Ed. students are prepared to use ICT in the classroom. To explore this, study findings are discussed and analysed in relation to the conceptual and theoretical frameworks identified in Chapter 3, and literature reviewed in chapter 2.

Chapter 6 draws on data collected and chapters forming part of this research in order to rethink initial teacher curriculum in the context of ICT usage in the classroom. The chapter also gives the research implications, limitations and recommendations for future research. To conclude, a reflective account of my overall experience during this research journey is given.

CHAPTER 2:

REVIEWED LITERATURE: PRESERVICE TEACHERS' CONTEXTS AND THEIR ICT PREPAREDNESS FOR THE CLASSROOM

2.1. Introduction

Although their article is focused on school-based ICT teacher training, the sentiments alluded by Ndlovu and Moll (2016) hold ground for the point I am making as far as this research is concerned. They write, "ICT teacher training should therefore go beyond exposing teachers to technology …" (p.124; see also Gill & Dalgarno, 2008). The training should further go beyond reading about content and practicing content such that the knowledge-base is deepened. This chapter focuses on the role of a teacher in the classroom and some of the prevailing challenges encountered by them.

2.2. Policies around initial teacher ICT preparedness and usage in the classroom

The *White Paper on e-Education* proposes the government's response to an ICT-led learning environment in education and the role of the Communications department in achieving this proposal. In order for this proposal to be realised, measures inclusive of professional development along with non-governmental organizations to drive this professional development for in-service teachers are outlined. One non-governmental body mentioned is SchoolsNet SA. HEIs are also part of the institutions for this purpose. At the time of publishing the paper, it was found that the cohort of teachers was hesitant to use ICTs in the classroom (White Paper 7, 2004). Some of the reasons pertaining to hesitancy and the lack of comfort among teachers was unfamiliarity with technology and their perceptions (which in turn caused fear) around using technology just to name a few.

Additionally, the Paper gives a systematic approach towards achieving ICT infused classrooms. The approach is outlined in three phases. Phase 1 is about enhancing a system-wide and institutional readiness to use ICTs for learning, teaching and administration purposes. This Phase is concerned with building human capital (teachers alike) in using ICTs. Moreover, build teachers confidence is using ICTs and establishing a framework to this effect (*The Framework* which came to effect in 2018). The second Phase focuses on system-wide integration of ICTs into teaching and learning. And the third phase outlines the use ICTs as

integrated across all levels of education system – management, teaching and learning and administration.

As a policy that was gazetted in 2015, the *Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education*, is also one policy that encourages the use of ICT in the classroom. The emphasis is placed on pre-service teachers being equipped with computer literacy skills and other related skills upon graduation. The policy also puts in writing that teachers who enter the teaching fraternity without ICT skill are required to take a short course (12C at Level 5) to upskill.

Lastly, the *Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* also known as *The Framework* (2018) can be regarded as an answered call from *White Paper 7*'s Phase 3 systematic approach towards achieving ICT infused classrooms. It provides an approach to the professional development of teachers and all involved departments and stakeholders in using digital tools and content resources to support improved learning outcomes and higher learner attainment in the curriculum. It outlines what could be done as far as integrating ICTs is concerned. Teachers and all involved departments and stakeholders can apply contents of *The Framework* in context. As such regular programs and workshops are conducted for teachers to develop their knowledge base on the subject matter and further improve their pragmatic skills for the purposes of effective, context-relevant, ICT-integrated lessons that will in turn help provide long term learning

The ICT in education plan is outlined across all policies. For example, White Paper 7 quantitatively envisaged that, "50% of teachers are trained in basic ICT integration into teaching and learning. Teachers have access to ICT technical support training. 80% of institution managers integrate ICTs in management and administration" (2004:47). However, there are no deadlines and timeframes as to what must be achieved, when and by who. One can also read this from a point of lack of urgency from the responsible department (DBE). Also, if a policy is to come to effect, "A systematic way to introduce the use of ICT in education, especially in HEIs, is needed so that lecturers in these institutions model the use of ICT in their teaching, and by extension, preservice teachers conceptualise ICT as an important tool to use in their own teaching" (Dlamini et al., 2018:154). If the integration of ICTs in schools and institutions of higher learning is to be addressed with the urgency it deserves, there should be clear and reasonable deadlines, terms of reference and review criterion for all stakeholders

involved. I did not find these in the policies. At the same time, the policies are big on the generic skills (e.g. 21st century skills) and not discipline-based skills (skills needed by a learner/student to succeed both professionally and academically. E.g. Metacognitive strategies, reading and writing strategies etc.) (Jansen, 1998, see also Chisholm, 2003). The policies should focus on the teacher focusing on disciplined-based skills as these are needed by the learners to succeed. They should further focus on how teachers can be adequately prepared in using ICTs for teaching and learning purposes. A clear blueprint should be included. A clear blueprint is inclusive of deadlines and timeframes. On the other hand, critics posit that, like the White Paper for Post School Education, *The Framework* "…will remain a wish list unless it begins to provide a solid framework for bringing results" (Dlanga, 2014:1). I did put forward that within these policies, deadlines and timeframes of what must be achieved, when and by who should be clearly stipulated.

2.3. The role of a teacher in the use of ICTs in the classroom

Over and above what is evident and what lacks in the official documents, a teachers' role in the classroom at the use of ICTs is that of a mediator and facilitator (Ndlovu & Moll, 2016). In Freirean terms, her role is to cultivate and facilitate discussions that will enable learners to interrogate the world around them such that they are able to transform it (2007). With the use of educational and technological software and hardware for teaching and learning purposes, this role is seen much more explicitly. It is because of this reason that preservice teachers need to be capacitated and trained for the use of ICTs for classroom teaching and learning.

When it comes to capacity and training within the context of this study, highlighting what professional development means, is paramount. Murtaza (2010, p.217) defines professional development (PD) as "…the sum of all continuing activities, formal and informal, carried out by individuals or systems to promote staff growth and renewal" (as cited in Tsotetsi & Mahlomaholo, 2015, p.46). In other words, the ongoing accumulation of the skills, experience, knowledge (in class and out of class) etc. obtained by an individual student throughout their in-service training years translates to their professional development. Therefore, as a continuous process, it is critical that institutions (private and public) concerned with teacher training implement ICT development programs and policies that speak to this ongoing accumulation of knowledge and skills. They should further be interrogated in terms of their relevance and impact on a teacher's role in the use of ICTs within the classroom level.

2.3.1. The prevailing challenges encountered by preservice teachers at the use of ICTs in the classroom: Problematising Prensky's digital natives and digital immigrants' terms

Challenges encountered by preservice teachers at the use of ICTs in the classroom are a topic of concern. These challenges include (but not limited to) demography and the material conditions (Marx, 1867) within those demographics. To understand these challenges, it is ideal to unpack some of the concepts by Prensky (2001) along with Brown and Czerniewicz (2012). Embedded in these concepts is the importance and role of context. Unpacking the concept of 'digital literacy' will be a point of departure.

Digital literacy can be defined as "the ability to reliably achieve desired outcomes [behavioural and cognitive outcomes] through the use of digital technology" (Briggs & Makice, 2011:64 as cited in Dlamini et. al. 2018). On the other end, Spires defines digital literacy as three-fold: "(1) Finding and consuming digital content; (2) creating digital content; and (3) communicating or sharing it" (Heitin, 2016:1). At the core of both these definitions lies an ability to do something with technology and this ability positions its possessor to be able to participate in any ICT-led environments and educational technology infused teaching and learning practices. What normally stands in the way of this form of literacy is the language (or lack thereof) for this field of knowledge. This language or lack thereof, is highly influenced by their cultural, racial, social and economic backgrounds (Bourdieu, 1973; Bernstein, 1991) before they enter institutions of higher learning. The challenge that this brings for institutions of higher learning is bridging the digital literacy gap given the very nature of the space and what it demands of students.

In his 2001 article on, *Digital Natives, Digital Immigrants*, Prensky boldly states that, "Today's students are no longer the people our educational system was designed to teach" (p.1) and reassures his readers that "A really big discontinuity has taken place" (p.1). In other words, the traditional chalk-and-talk mode of teaching is no longer the order of the students within this generation. He further defines this generation of students as 'digital natives' – (those born during and grew up in the era of ubiquitous technology and the internet) and their teachers/lecturers as 'digital immigrants ("…not born into the digital world but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology) respectively.

What is problematic about Prensky's definitions is that they take a one-size-fits-all approach and boxes everyone in the same box of digital fluency and/or lack of thereof (2001). Words and phrases such as "our students/students of today/they/their/today's students" etc. demonstrates this. Bringing this debate in the context of South African higher education students, who Prensky (2001) defines as a 'digital native or digital immigrant' is relative and circumstantial. Brown & Czerniewicz (2012) also find these concepts (as defined by Prensky, 2001) as problematic, "…both empirically and conceptually" (p.1). The term 'native', they argue, has connotations within the South African context and previously colonized locations. In this case, the term is "…synonymous with colonialism, apartheid, and domination and does not connote images of superiority and the future" (p.3). Fundamentally, there is nothing worth celebrating in the term as it reminds the natives of the very oppressive and horrific history they had at the hands of their colonizer. In essence, this is not a term to comfortably embrace due to its connotations.

Still on Brown & Czerniewicz (2012), the duo propose redefining the concepts 'digital', 'net', 'native', and 'generation' in favour of reclaiming the term 'digitizen' (p.1) and confirm that "A concept such as this would acknowledge the full spectrum of digital capabilities (thinking beyond computers) in varied configurations. It would allow for notions of access as being determined by connectivity and not location, and the acknowledgement of skills based on what students are able to achieve rather than the mastery of a device" (p.10). What this term means is that it is not focused on age but the length and wealth of experience that the person has had with technology. At the heart of their argument, Brown & Czerniewicz (2012) assert that Prensky's argument and concept of digital natives is not a reality in South Africa. In our country and similar countries, his concept does not hold empirical validity as most of the 'generation' it refers to has not been systematically immersed and socialized in the use of ICT. And further argue that, "The 'digital native' literature posits that one is either a native or an immigrant. What if one is not even in the picture? In South Africa, there are groups of students who do not exist in the prevailing millennial discussions" (Brown & Czerniewicz, 2012).

The concept of 'digitizen' becomes one of the critical concepts guiding my study in relation to preservice teacher training and those that obtain their Bachelor of Education qualifications from the previously disadvantaged (to some degree, still are) institutions and may not have proper infrastructure to enable them to foster learning and teaching activities embedding technology. In this study, the concept of 'digitizen' is used to understand the different lived experiences of students from the two institutions. It is further used as a blueprint to understand

their wealth and length of experience (or lack thereof) with technology. As a concept founded on the basis of access to connectivity, it aids in understanding how the co-researchers (research participants for this study) navigate and negotiate their spaces at the use of ICTs in their respective contexts.

Within these contexts and in line with the abovementioned concept, Walton, Bowman and Osman (2015) argue that access does not necessarily mean success. In other words, having access to connectivity and ICT related equipment for teaching and learning activities does not necessarily equate to success. That is, successful usage of the equipment including academic success. In addition to these skeptic views around ICT provision, access and success, other scholars put forward that "mere provision of ICTs will not contribute positively towards teaching and learning" (Minty & Moll, 2020, p.3) more especially if there is no pedagogic understanding of ICT integration. And I agree fully. However, having said that said, the concept of 'digitizen' gives an idea of what it means to be in a fairly connected context yet lack some of the enabling equipment. It also locates the concept of 'digital democracy' within the conditions of the South African higher learning education and access to connectivity. It further assists in understanding how the two contexts – compared on this study - reinforce and to some extent negate the pre-conceived notions about these contexts. This concept is arguably relevant to this study.

As previously alluded, the premise from which I am building my argument for this research is also centered on 'digital democracy' – a concept outlined by Brown & Czerniewicz (2012). By definition, digital democracy is the fundamental right for every citizen of a country to have access to and be equipped with digital literacies and this should be seen as an opportunity for digital justice more especially at the level of institutions of higher learning which also play a crucial role in ultimately preparing students for society and/or the workplace. Institutions should, therefore, provide their graduates with skills enabling them to survive in the digital world irrespective of some of the hindrances that may cause this – one of which may be funding for these ICT equipment. Brown & Czerniewicz (2012) posit that, "The challenge is therefore to situate our responses in that rich diversity, rather than in exclusionary dichotomies" (p.10). That said, we must find ways to respond to societal demands in relation to our contexts – differences should not necessarily deter nor demotivates us. Boyd summarises this point nicely and asserts, "Unless teachers and educational institutions are consciously committed to closing the digital literacy and access gap, the very presence of online education contributes to increasing disparities not only in the educational present, but also in the future possibilities for

those students to whom access is denied" (2016:176). In thinking about institutions of higher learning, and those training teachers, the students' background should be regarded. Measures to ensuring that those coming from previously disadvantaged backgrounds are accommodated and equipped to navigating the cultural space which, in most instances is influenced by the use of Information Communications Technologies.

2.3.2. Models – TPACK and SAMR - that enable teachers to integrate ICTs

In thinking about teacher preparation and preparedness in integrating ICTs in their teaching activities, it is important to do so in relation to some of the best practices from an international perspective. Additionally, in thinking about these practices we do so with our context in mind. The American ICT-integration models such as TPACK (Mishra & Koehler, 2006) and SAMR (Puentedura, 2010) can help to integrate ICTs for blended learning purposes. Although these are American models, they can be applied within the South African context. These models foreground the powerful fusion of technological, pedagogical and content knowledge. Given the efforts and strides made by departments of education as far as teacher ICT workshops, policies and training are concerned, that background knowledge obtained (irrespective of its depth) can aid and serve as a stepping stone in certify that such American models – TPACK and SAMR work.

TPACK is an acronym for Technological Pedagogical and Content Knowledge. It was developed by Punya Mishra and Matthew Koehler in 2006. As a teaching and learning model at the use of ICTs, it "…describes an integrated connection between content knowledge, pedagogical knowledge and technological knowledge" (Srisawasdi, 2014 in Dlamini et al., 2018:19). Within this model the 3 knowledge-base are further recombined in various ways. This further remerging is done to provide the undisputed instructional links. For example, the technological pedagogical knowledge (combining technological knowledge and pedagogical knowledge) describes and shows the relationship between technological tools and specific pedagogical practices. As a teacher, it's of paramount significance that you understand the model and what it is trying to achieve. This understanding can help teachers to relate much better with ICTs when teaching with technology.

Moreover, the triangular knowledge relationship brought forward by the TPACK model stress on the fact that teachers are working within a complex, constantly changing teaching space and the unique contextual challenges that they face (especially now that ICTs have been introduced

in majority of schools). As one of the measures to curb that challenge, regular workshops incorporating contextually updated ways of incorporating the model along with constant feedback on these training workshops can assist. Once teachers begin to fully learn and appreciate the inextricable nature of the pedagogical, technological and content knowledge in the era of ICTs in education, this model can be realized within the South African context. This model is designed for teachers. It is designed to support them in being able to amalgamate the aforementioned types of knowledge for teaching and learning purposes.

Withal, the initialism 'SAMR' – Substitution, Augmentation, Modification, and Redefinition - "…is a four-level conceptual framework developed by Puentedura (2010). It came to be so as to enable teachers to make effective use of ICTs in their lessons. *Substitution* refers to merely replacing traditional tool with technology in such a way that the task is not functionally altered. For example, if a teacher is used to giving students a physical A4/A3 paper to make a poster; she would use of an application software such as Canva for her students and they would then create posters using this platform. In *augmentation*, the task is altered slightly to argument the work that is usually done in a traditional way. When we come to *modification*, the task alters functionally in the presence of technology. Finally, when we come to *redefinition*, the task is altered so fundamentally with the technology that it cannot be done without technology" (Dlamini et al., 2018:201). Used in their stipulated sense, both models are able to adequately position the human-teacher (also within the rural context) in these blended teaching and learning environments if and when she is well capacitated, developed and trained (personally and professionally) to deal with such pedagogical changes and navigate her way in this very classroom irrespective of context.

In line with this research, the usage of these models are one of the ways in which institutions of higher learning can capacitate pre-service teachers in incorporating ICTs in the classroom. Additionally, government departments can also use these to train in-service teachers much more qualitatively and intentionally. By so doing, we are getting a step ahead in curbing the fear and lack of comfort that normally arises from in-service teachers when using technology for teaching and learning (Jones, 2012). Moreover, in understanding the concept of "digitizen" and the above discussed models (in *2.3.2*) - particularly when thinking about incorporating technology into classroom practices in South African schools - will help prepare and capacitate ICT ready teachers. More so when these are appropriately applied. Additionally, for pre-service teachers to be able to embrace the idea of going digital in the classroom, TPACK and SAMR must be included in their day-to-day teaching practices. The belief system of teachers along

with their comfortability with ICTs also comes with being familiar, through ongoing practice, of the ICTs currently existing in most classrooms they find themselves in.

2.3.3. Teacher ICT perceptions: Challenges and Opportunities

That said, the notion of a belief system allows me to unpack some of the influences on pre-service teachers' ICT usage in the classroom. To unpack this, Davis (1986), came up with what they called 'TAM - Technology acceptance model'. Without delay, in 1989 he partnered with Bagozzi and Warshaw to improve the model (see figure 2.3.1. below).

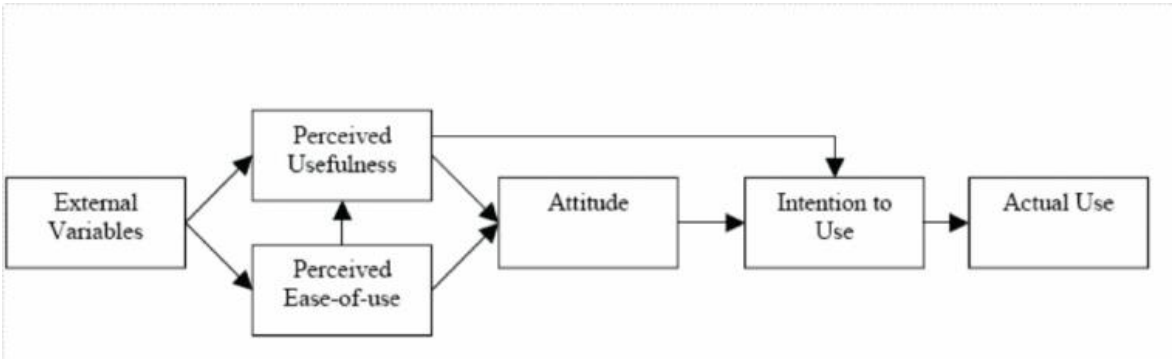


Figure 2.3.1: Technology acceptance model (TAM) (Davis, Bagozzi & Warshaw, 1989).

As shown in Figure 2.3.1, external factors that influence the acceptance of technology and ultimately its use are driven by the teacher's preconceived beliefs about technology. These preconceived beliefs are inclusive of technology's perceived usefulness and ease of use. Having determined these perceptions, then the attitude towards the use of technology changes. As informed by these beliefs, the intension to wanting to use technology is birthed and thus the actual use occurs (Gill & Dalgarno, 2008). At face value, what this model fails to acknowledge is that the ability to change people's perceptions is not a linear process as the model suggests. Rather it is a back-and-forth, trial-and-error task. Embedded within this task is the need to educate oneself about technology and be reflective in practice. The model is indeed representative of the processes included towards accepting technology as far as teacher perceptions are concerned. However, we must use this model with a pinch of salt given its limitations.

All the above considered and as I attempt to devise a possible way-forward for pre-service ICT teacher training, what becomes significant to note is how unequal our South African society is

(Mofokeng, 2020). It becomes equally material to note how contextually different the institutions preparing teachers for this country are. The material conditions are inherently different. In some shape and form these different contexts, amongst many things, affect teacher training. This multiple comparative case study seeks to highlight these11 (see Chapter 5 of this research report).

2.4. Chapter summary

The chapter presents reviewed literature on the importance of initial teacher ICT training and the role of a teacher in an ICT aided environment. It confers debates around preservice teachers' contexts and how these allow or hinder the teaching and learning processes using ICTs. Aforementioned are unearthed within South African classrooms. Given the strides taken and continues to be taken by the Department of Basic Education, policies that speak to initial teacher training and their ICT preparedness are analysed. As a build up from the brief policy discussion in the previous chapter, Chapter 2 analyses these policies both at an institutional and curriculum level. Institutionally, the policies are analysed to understand how institutions of higher learning afford students conducive learning environments and offer a curriculum that prepares them to being able to navigate ICT aided classrooms.

Moreover, there are a number of relatively best international practices as far as models to assist teachers to integrate technology are concerned. The TPACK (Punya & Mishra, 2006) and SAMR (Puentedura, 2010) are examples of such models. These two American models are discussed in relation to initial teacher ICT training. In arguably the highest standard of academic rigor, they are located within possible grounds for application within the South African context.

Needless to say, indeed there are prevailing challenges encountered by preservice teachers at the use of ICTs in the classroom. One of many is the teachers' perceptions around technology. To address the complexities around ICT preservice teacher training, professional development and policy implementation at the level of the B. Ed curriculum and context, the chapter problematizes Prensky (2001)'s digital natives and digital immigrants' terms in contrast with Brown and Czerniewicz (2012)'s concept of 'digitizen'. Davis (1986)'s TAM model is used to descriptively illustrate the processes involved in tackling teacher ICT perceptions. The following chapter (Chapter 3) discusses the conceptual and theoretical frameworks employed in this research.

CHAPTER 3

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1. Introduction

Chapter 2, amongst many, reviewed literature on preservice teachers' contexts and their ICT preparedness for the classroom. Secondly, it discussed concepts that have been largely debated within the educational technology space. Thirdly, it foregrounded some of the models in educational technology that can be used and applied in context in relation to initial teacher training; and further located these within the South African milieu. This chapter outlines the conceptual and theoretical grounds for the study. Taking into consideration that this research is centred on the human teacher and ICT training for classroom practices, this chapter tackles the pivotal role of a teacher in relation to a learner's acquisition of knowledge (Cooper, 1974; Sfard, 1998). This is on the basis that using ICTs in a classroom setting is highly dependent on the teacher's sufficient training and understanding of the ICT-enabled environments (i.e. classrooms). Embedded within this notion is the concept of constructivism (Vygotsky, 1934, Piaget 1936, Bruner, 1966), situated and embodied cognition (Wilson, 2002) along with Vygotsky's socio-cultural theory, which are discussed in depth in this chapter.

Below (figure 3.1) is a visual representation of the focal concepts and theories employed in this study to inform the findings and conclusions drawn in later chapters.

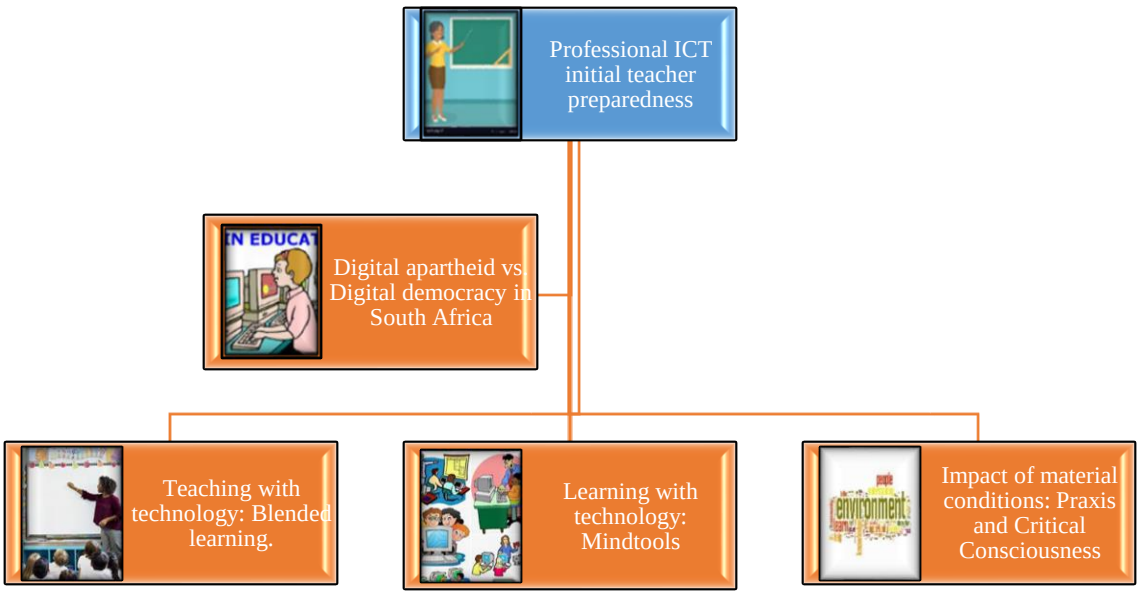


Figure 3.1. Conceptual & theoretical framework

In thinking about initial teacher programs and understanding their approach towards preparing teachers for an ICT-enabled classroom, it is important to do so (as Figure 3.1. proposes) from the professional (and perhaps even personal) ICT development. This means that, at the level of pre-service training; student teachers should be exposed to such knowledge-base and skills set training. Furthermore, to effectively implement this training, an ongoing assessment on the usage of ICTs for teaching and learning are done and constructive feedback is given. This professional ICT preparedness should be done from the lens of digital apartheid and democracy given how unequal the South African society is. Both these concepts were discussed in chapter two. This lens helps pre-service teachers by making them aware of the different contexts from which they will be required to teach using technology and how they can navigate the different classrooms under these contrasting conditions.

As teachers who are expected to teach with technology, preservice teachers need to understand the concept of blended learning (Van der Merwe, Bozalek, Ivala, Peté, Vanker, & Nagel, 2015) on grounds that this directly affects how they will teach post-graduation. In order for pre-service teachers to move away from technological determinism (a term that can be traced back to the work of Karl Marx and Thorstein Veblen respectively. It assumes that a society's ability to use technology can solve all their problems, improve their social structure and cultural values) but seek constructive teaching and learning opportunities that will position learners to learn with technology. Johansson's concept on 'Mindtools' compellingly does this. In light of initial teacher training, context along with material conditions associated with that environment are pivotal. Freire's (2007) work on 'praxis' and 'Critical Consciousness' assist in situating this argument. The following section (3.2.) outlines these.

3.2. Understanding blended learning through a constructivist lens, Vygotsky's socio-cultural theory and Jonassen's concept of 'Mindtools': A teacher's role in knowledge acquisition using ICTs

As a way to introduce his definition of the 'acquisition metaphor', Sfard (1998), contends that "Since the dawn of civilization, human learning is conceived as an acquisition of something" (p.5) and that 'something' is deposited somewhere. The somewhere, as believed by an early philosopher (John Locke) is termed, a blank slate or *tabula rasa*. However, in relation to learning, knowledge as we got to read about it from the writings of Piaget (1936) and Vygotsky (1934) has been studied as "…concept development" (Sfard, 1998, p.5). Although not entirely

part of my discussion, this subject matter – knowledge acquisition - has blurred the lines between what is innate and what is learned (Montessori, 1907; Spelke & Newport, 1992). Moreover, central in the contemporary debate of constructivism is that, new concepts are accommodated upon the restructuring of mental representations in the processes of learning (Carey & Vosniadou, 1994). For instance, if a learner is to learn about Phases of Matter (solid-liquid-gas) from the Natural Sciences strand of *Matter and Material*, as a teacher facilitating that lesson, I must incorporate concrete, real-life examples in that lesson to help the learner formulate mental representations of the underlying concepts embedded in the knowledge strand. Essentially, in acquiring new knowledge, the activities leading to and informing conceptual change, as carefully facilitated by the teacher needs to be pragmatic and concrete.

In that way, the learner is able "… to modify, interpret, transform the object and understand the manner in which the object is constructed" (Piaget, 1936:5). Thus exposing them to and taking them from one level of their knowledge (or unknowing) to the next. Now, understanding that, "Conceptual change involves change in the core principles that define the entities in a domain and govern reasoning about those entities" (Carey, 1991, p.179). This means that when it comes to understanding a concept, the basic, most fundamental basis must be understood and internalized for what they are. Moreover, this internalization process "…brings the emergence of new principles, incommensurable with the old, which carve the world at different joints" (Carey, 1991, p.179). Hitherto, the acquisition of new knowledge positions the learner to be able to construct their own understanding and meaning while coupling prior experience with core principles upon being meaningfully learned as per the careful and appropriate facilitation of the teacher within the specific subject domain.

Therefore, when teachers carefully and appropriately facilitate lesson in an ICT-aided classroom, they need to understand the role of ICTs in the processes of knowledge acquisition (Carey & Vosniadou, 1994; Sfard, 1998), conceptual change (Carey, 1991; Piaget, 1936) and meaning construction (Vygotsky (1934; Piaget, 1936). Jonassen (1998) compellingly articulates what teachers need to understand and writes, "…technologies should not support learning by attempting to instruct the learners, but rather should be used as knowledge construction and representation tools that students learn *with*, not *from*" (p.1). Simply put, educational ICT software and hardware should be prepared (by the teacher) in a way that the learners will actively collaborate and co-create their knowledge and understanding with the ICT tools used. Not for the ICT tool to do all the work and the learner is a passive participant. In that way, ICT equipment used for teaching and learning purposes are at their core, mind

[enabling] tools[1] (Jonassen, 1996). They enable the mind/brain to be actively and creatively involved in the construction of knowledge and understanding while the teacher facilitates this process in a blended learning setting.

"*Blended learning* may be defined as the thoughtful integration of classroom face-to-face experiences with technology-enhanced learning experiences. When the technologies used for education and communication outside the classroom are used to supplant some of the face-to-face work, reducing the time actually spent in the classroom, the result is a hybrid course" (Van der Merwe, Bozalek, Ivala, Peté, Vanker, & Nagel, 2015:11).

By giving an arguably radical constructivist approach, a precautionary measure for teachers is given by Kirschner et al., (2006). They firmly believe that minimally guided instruction -as echoed by early constructivists - does not work. They regard the early pedagogical, constructivist learning theory as minimally guided instruction. In their work they allude to three key approaches to teaching and advocate for one. The first approach is WIG – Without Information Given. Using this approach, a teacher leaves learners to construct their own knowledge and meaning thereof, while with the BIG – Beyond Information Given – approach, she teaches concepts and creates opportunities and possibilities for learners to create their own knowledge and the final approach, is when she gives full information (i.e. AIG – All Information Given) to learners so that they determine their own position (Kirschner et al., 2006). In an ICT-enabled environment, teachers need to be able to decipher which of these key principles will work on a given lesson or concept.

Equating initial constructivist school of thought as, minimally guided instruction for learners to acquire new knowledge; while drawing inferences from prior experiences at the teacher's facilitation and mediation (Selepe & Moll, 2016); Kirschner et al. (2006) believe that in the process of enabling learners to acquire new knowledge, it is of paramount significance that a teacher presents them with various knowledge streams relevant with the topic at hand. By so doing, teachers enable learners to determine, construct their own meaning and stance while collaborating with others. The process of knowledge acquisition as Vygotsky (1934) puts

[1] "Mindtools are computer applications that, when used by learners to represent what they know, necessarily engage them in critical thinking about the content they are studying (Jonassen, 1996). Mindtools scaffold different forms of reasoning about the content that students are studying. That is, they require students to think about what they know in different, meaningful ways. For instance, using databases to organize students' understanding of content organization necessarily engages them in analytical reasoning, where creating an expert system rule base requires them to think about the causal relationships between ideas. Students cannot use Mindtools as learning strategies without thinking deeply about what they are studying"

it is fundamentally a shared experience with those we are in the same sphere of influence with. Within this sphere of influence, such as an ICT-enabled classroom, teachers are at the core of the knowledge facilitation and mediation processes (Selepe & Moll, 2016). Hence the need to sufficiently capacitate teachers in using ICT for educational purposes is key.

In thinking about initial teacher programs and understanding their approach towards preparing teachers for an ICT-enabled classroom, it is important to do so from the professional (and perhaps even personal) development. This means at the level of pre-service training, student teachers should be exposed to such skill set training. There should be ongoing assessment on the usage of ICTs for teaching and learning are done and constructive feedback is given. In doing so, HEIs are one step up in ensuring that pre-service teachers are sufficiently prepared. Whether or not these institutions are not already doing that is discussed in Chapter 5 of this study.

3.3. Contextualising Paulo Freire's concepts of 'Praxis' and 'Critical Consciousness' in ICT teacher training

When facilitating the learning processes, particularly within most South African government schools, ICT hardware resources are largely unavailable. In most cases, if available, they are not enough and frequently maintained or updated. That said, a teacher needs to be critically aware of such teaching realities and forge a plan to effectively work under these unfavourable circumstances. Moreover, Paulo Freire writes about conscientisation and its role on 'Praxis and Critical Consciousness'. At their core, these Freirean concepts highlight the importance of understanding 'digital apartheid/exclusion and digital democracy' in a country as unequal as South Africa. The latter concepts have been discussed in Chapter 2.

According to Freire (2007), praxis is reflection and action that comes after the reflection processes directed at structures that have to be reconfigured or changed. Upon reflection, being able to intervene or come up with applicable and contextually relevant solutions results in what Paulo Freire termed 'Critical Consciousness' or broadly, 'conscientisation'. In a country unequal as South Africa, where challenges faced by teachers are that, most government schools (especially primary schools) do not have ICTs; and the large part of the existing cohort of teachers are not so welcoming to the idea of learning to use ICTs; in-coming teachers must be able to critically reflect so that they are in a position to forge applicable solutions. Against the odds, they must also be committed to fostering pedagogies that enable students to be actively

involved in their learning process (Jonassen, 1998). They must use what they have (the knowledge, expertise, skills, training etc.) in order to navigate challenges they find in schools they teach at. In essence, the ability to navigate ICT related challenges they may find in schools they are likely to teach in, is afforded by the conducive learning environments in HEIs and curriculum that prepares them for the classroom.

3.4. Chapter summary

Chapter 3 discussed the conceptual and theoretical frameworks used in this study, particularly the concepts of blended learning (van der Merwe, 2015), Mindtools (Jonassen, 1998), and Praxis and Critical Consciousness (Freire, 2007). In thinking about initial teacher training, this chapter proposes that these concepts should be understood and used in direct relation with each other.

Taking into consideration that this research study is centred on the human teacher and ICT training for classroom practices, this chapter tackled the pivotal role of a teacher in relation to a learner's acquisition of knowledge (Cooper, 1974; Sfard, 1998). This was done on the basis that using ICTs in a classroom setting is highly dependent on the teacher's sufficient training and understanding of the ICT-enabled environments (i.e. classrooms). Further discussed in this chapter is the understanding that, embedded within the notion of 'knowledge acquisition' is the concept of constructivism (Vygotsky, 1934, Piaget 1936, Bruner, 1966), situated and embodied cognition (Wilson, 2002) along with Vygotsky's socio-cultural theory – all which were discussed in depth on this chapter.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. Introduction

Creswell (2012) defines research as a complex procedure, a sequence of steps used to collect and analyse information to increase our understanding of a topic or issue. Similarly, Gray (2014) describes research as a "…systematic and organised effort to investigate a specific problem that needs a solution" (p.12). As such, it is at this point that I outline the processes I will be employing in my study. Included in this part of the study is the research design, paradigm, methods, and research approach along with ethical considerations and research practices to address issues of validity and reliability.

Smith's (1999) work on *Decolonizing Methodologies*, has been used to problematize the importance of using research practices that are contextually sensitive. In order to illuminate my research findings and device solutions that are more contextually responsive, this study uses this literature. For example, as a non-indigenous person conducting research in an environment that is not my indigenous dwelling (*see New Dawn university below*), there are twenty-five specific principles that Smith (1999) advices researchers to be aware of. For the sake of this research, I will be focusing on six. Namely, storytelling, celebrating survival, representing, democratizing, discovering and sharing knowledge. These will help in narrating the story from the perspective of my co-researchers (i.e. research participants). In ways more than one, Smith's work incisively positions the power of research and representation (Wilson, 2001) and I want this to be reflected in this research upon completion.

4.2. Research paradigm

In defining research paradigm, Mouton (2006) outlines this as a holistic system of thought guiding and informing a researcher's philosophical stance and work throughout their research or a way of viewing one's research material (De Vos, 2010). A paradigm gives an epistemological (the relationship between knower and known (Creswell, 2013), ontological (nature of reality) (Creswell, 2013) and axiological (the researcher's existing values (Davis, 2014) stance. As such my frame of reference for this research stems from three orientations with a broad overall qualitative paradigm: Namely, interpretivism - I believe that knowledge is co-created through interaction with the world (people and their geographical location), and

hence will conduct various interviews in this study to understand the *meaning systems* of participants. Secondly, an emancipatory orientation that seeks to find ways in which teachers can be professionally developed in order to implement transformative pedagogical practices (Scott et. al, 2011) for effective teaching and learning is employed. Lastly, this research takes a pragmatic line of thought as it aims to find practical measures that schools (and faculties) of education in institutions of higher learning along with government departments of education can better inform their policies. This is to ensure that the aforementioned institutions are enabled to implement these policies for the qualitative enhancement of initial teacher education and training.

4.3. Research approach and sampling

Because the abovementioned paradigms will be used to inform and guide this study, I planned on conducting a qualitative study on the knowledge and skill set along with an overall impression of final year students' preparedness in the usage of ICTs in the classroom.

For the sake of clarity, I will define what research sampling is. Research sampling refers to the selection of a representative and/or targeted group of participants from whom research data is collected. As such, participants must be dimensionally, purposefully, strategically, and/or conveniently selected (McMillan, 2012). Although small in quantity, a sample is a statistically or wholly representative collection of units from a population where data is collected to determine some of the lived experiences of that particular population (McMillan, 2012).

In this comparative case study research approach, three purposefully selected South African institutions of higher learning, using a stratified sampling procedure, have been studied respectively in relation to their initial teacher programs and pre-service teacher ICT preparedness. The sampling strata is informed by the location of the institutions and historical background discretely. I have chosen them on the basis of their demographic context and geographical location within South Africa; and historical and socio-political issues affecting the specific institutions in the democratic dispensation of our country. Within this stratified, purposive sampling, this research uses criterion sampling strategy to select participating institutions of higher learning and personnel. Moreover, for purposes of identity protection of all three institutions and participants, pseudonyms will be used to maintain and ensure anonymity:

I. Hope university is a medium-size town university with three branches across two South African provinces. The university is a product brought about a merger between three previous apartheid universities. The university's language policy hopes to expand this by rolling out short courses of learning other South African languages. More specifically, the Faculty of Education at this institution designed a 'multilingual pedagogies in the classroom' short-learning programme as an attempt to show how lecturers can navigate the diverse classrooms they find themselves in.

II. Unless dictated by the then apartheid government to close doors for black students in specific departments then later across the university, Phaphama only started to welcome the non-racial, open university stature around mid-1980s. It is a well-established university. This institution of higher learning further has a long-standing history of education, offers internationally accredited degrees, research intense and is internationally recognised as one of the best in Africa. Administratively and officially, this university's incorporation of the school of education occurred in early the 2000s. The institution went through various transitions thereof dating back to the early 1900s.

III. New Dawn is a rural-based university which houses students who are from the highly disadvantaged backgrounds. This institution was founded in democratic South Africa and has two academic campuses. What is of interest with this university is the growth journey that it went through, and the emphasis it places on continued commitment to producing competent, principled teacher graduates irrespective of their arguably and relatively challenging material conditions.

Important to highlight is that although these institutions of higher learning may be different in stature and form, they do however, share a common goal and that is to prepare and produce teachers for the South African education system.

4.4. Research data collection methods

This study uses quantitative methods to collect data. Qualitative data will be used to understand the prevailing perceptions and beliefs about ICTs and initial teacher preparedness. This will help to understand the extent to which each school/faculty of education prepares their students

and their intention from the onset towards preparing their students for the classroom at the use of ICTs.

Using a qualitative method to gather data for this study enables it to provide insights specific to the study itself given the purposeful selection of participants and demographics. It is inclusive of real-life, lived human (or co-researchers'/participants') experiences and thus positions a researcher to make conclusive recommendations for future research given its detail-orientated nature in data gathering. This data gathering will be done through a cross-sectional survey. Cross-sectional surveys are administered at one point in time and give a picture of how things are for the respondents (in this research, the final year students) (Kezdy, Martos, Boland & Horvath-Szabo, 2011). The problem, however, with this form of survey is that, its findings may differ at another point in time since they are not stagnant. As a measure to address this weakness of the survey, I will then corroborate the findings from the survey with virtual, real time interviews for more reliable conclusions and recommendations.

As dictated by the constantly changing lockdown regulations, I used semi-structured, in-depth (virtual) face-to-face interviews with aforementioned stakeholders (i.e., final year B.Ed students). Semi-structured interviews do not have predetermined, structured choices like structured ones. Rather, they are open-ended yet specific; reasonably objective yet allowing for probing, follow-up and clarification (McMillian, 2012); and hence this kind of an interview approach is most suited for this study.

4.5. Case study research design

Creswell (2012) states that, in a case study, the researcher seeks to develop a detailed and comprehensive understanding of a phenomenon by gathering data of a single case or small number of related cases through methods inclusive of observations, interviews and documentary analysis. Case studies are interested with a more clearly delineated entity (e.g., A specific institution, context and or household) providing an in-depth investigation of that particular context or institution. Hence the three institutions of higher learning to form part of this research study.

Although they come with an inability to replicate over time, case studies are good for developing new research for a particular phenomenon within an area and/or field of study. As such, it contributes positively to new knowledge due to its very detailed and in-depth study of

the phenomena. I found using multiple, institutional case studies (Creswell, 2012) for my research question justified and appropriate in order to successfully finish this study.

Additionally, case studies enable the researcher to go to the microscopic level of a phenomenon. In so doing, they engage with indigenous (native to a particular place) people found within a particular context. The researcher also gets to have a perspective on the people's lived experiences. Arguably, majority of students from New Dawn university are indigenous inhabitants within the area the institution is located. As such, conducting this comparative case study will mean that in reporting on their lived experiences, as a researcher, I should do this from their perspective and not from mine. The same goes for students from other institutions forming part of this study.

The unintended harm that most researchers from the so-called privileged institutions do, subconsciously, is to perpetuate the stereotypes, pre-conceived notions as well as inequalities that come with the context such as the one from the said institution (i.e. New Dawn). In purpose and indeed, the stance I am consciously taking on reporting on the findings from this case study is powerful and "relentless in its pursuit of social justice" (Smith, 2012, p.143 as cited in Louie, Poitras-Pratt, Hanson & Ottmann, 2017, p.21). This is because, I believe that, at its core, research is fundamentally an activist act. We research a phenomenon with hopes of coming up with practical solutions. With this understanding, I'm positioned as a proponent of action-based research that, the succeeding chapters of this study carry with them a meaningful contribution to some of the phenomenon in the field of educational technology. Hence this multi-comparative case study research.

4.6. Data organization and the process of analysis

The process of gathering qualitative data is inclusive of identifying repeated general statements and phrases. These repeated, general statements and phrases form as illustrative data that help the researcher to organize them in various categories at different levels of coding. In a qualitative study such as this one, collecting data and analysing it is inextricably intertwined (Stake, 1995). This section highlights this relationship.

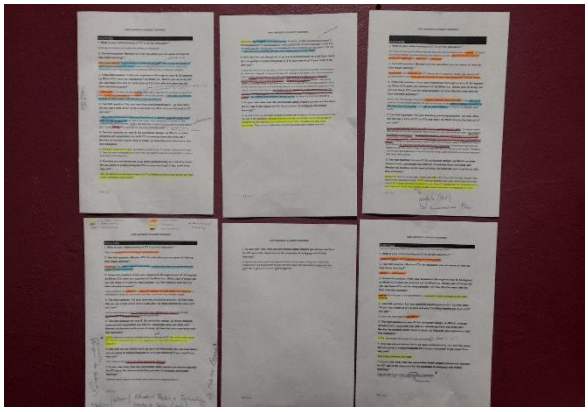
As constrained by the Covid-19 regulations, I had to find specific people within the institutions I was conducting my study on through referrals. I could not physically go to the institutions. I used the institutions websites for contact details of people I thought might help. In some institutions it was a chain of back and forth emails leading to a dead-end. This led to me having

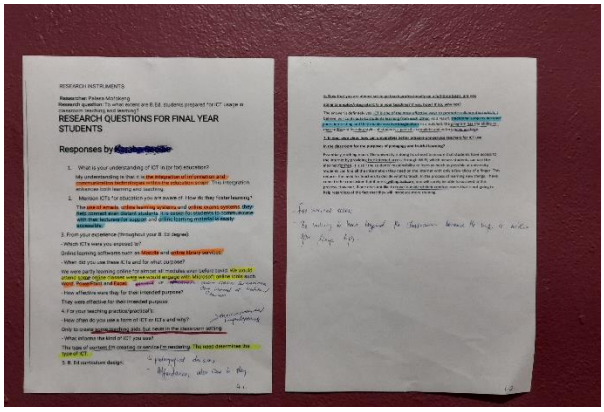
to rethink my communication approach and channels. With some institutions I found a lecturer or staff member who would then connect me with the relevant students. Over and above the hurdles, I had the opportunity to liaise with friendly and welcoming school administration officers across all institutions.

To gather data for this research, I explained the processes involved to the participants and sent through the information sheet and consent form. I gave the participants time to go through each document and allowed them a platform to ask any clarity seeking question pertaining to the documents and the research as a whole. Having established a common understanding and participants are comfortable to proceed, I then sent the Google Document link questionnaire for this research. After sending the Google Document link to the participants (or co-researchers), I began to analyse the data as I was collecting it. Each institution was represented by four students. The students responded to the research questions in a way that was convenient and accessible for them. Some used and answered directly from the link, others typed in their answers and others wrote down their responses and sent screenshots privately to me. The attached below pictures show this.

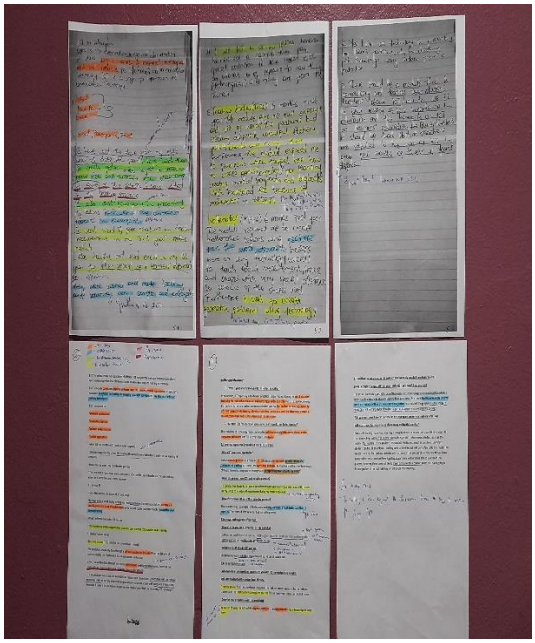
Upon consent of all co-researchers, WhatsApp groups for each of the institutions were created to centralise the sharing of information for this research. These groups also served to ease communication between me and the participants. Depending on availability and platform preference, I then set up virtual meeting discussions (some via Microsoft teams and some through WhatsApp video calls). The discussions were recorded and I took notes during the process. Immediately after each virtual discussion, I would repeatedly listen to the recordings and identify illustrative phrases and statement that they use as they navigate classrooms using ICTs. Photograph 4.6 visually shows this.

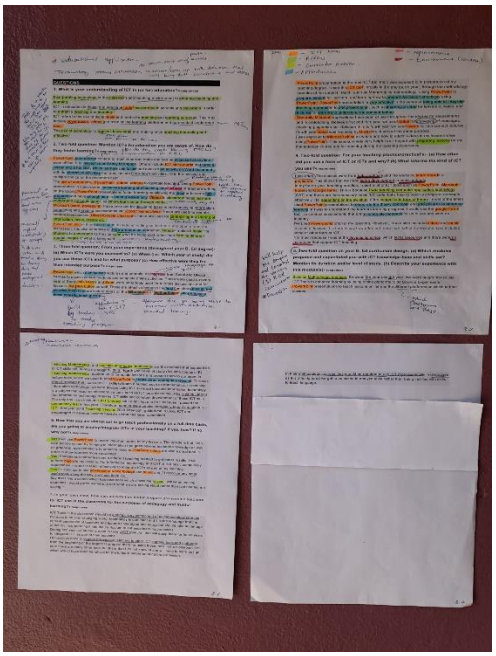
Creswell (2007) refers to the above-mentioned data coding process as ‘horizontalization’ of data. Saldana (2009) refers to this process of data coding as open coding. Understanding that coding is “…not just labelling, it is linking” (Saldana, 2009, p.11) and that it leads the researcher “…from data to an idea” (Saldana, 2009:11), it was useful for me to use colors to this effect. I used different colored highlighters and created a key for myself. Each color represented the first level of coding. Guided by concepts discussed in Chapter 3, I was then able to categorize each open code into a theme during the axial coding (Saldana, 2009) process. Table 5.1. illustrates this.





Questionnaire and interview transcripts





Photograph 4.6: Horizontalization of data analysis

4.7. Validity and reliability

In regard to the validity and reliability of the research, there are a number of studies that have come before this one as alluded in the initial literature review section. Although they looked at a particular knowledge area, this research study will feed into the already existing body of research with a specific focus on preservice ICT teacher preparedness along with its uses as a way to strengthen its validity and reliability.

With the understanding that, “The essence of qualitative research is to make sense of and recognize patterns among words in order to build up a meaningful picture without compromising its richness and dimensionality” (Leung, 2015:1), validity and reliability

measures for this research were taken with this understanding in mind. The research methodology employed, data sampling and the process of data analysis were appropriate for this multiple case study research. Echoing the words of Leung (2015), all these tools enabled me to "…build up a meaningful picture…" (p.1) of the extent to which final year B.Ed. students are prepared and capacitated to use ICT in the classroom. Furthermore, this was carefully done "…without compromising its [this multiple comparative case study qualitative research] richness and dimensionality" (Leung, 2015:1). In thinking about how reliable is the data gathered for this research, it is important that I mention that the data analysis stage went through an iterative process of interpretation and meaning-making until it was saturated (Strauss & Corbin, 1990). Having said that, where I did not fully understand, or needed further clarification and understanding, I spoke to the relevant participant(s) to either verify and clarify and/or further elaborate on responses given as a measure to give the research findings credibility. This is known as member checks (Guba & Lincoln, 1994).

Guba and Lincoln (1994) also give ways in which the rigour of qualitative research can be assessed and established. Using their work, credibility, dependability, transferability and confirmability have been used to further inform the validity and reliability of this research. For this research, I used three official documents and did an analysis on the extent to which they are applied in HEIs as they prepare of pre-service teachers. Furthermore, the literature review provided the basis for dependability of the research findings in the form of an audit trail. This audit trail helped to also confirm, through comparison of data findings in relation to the literature (Chapter 2) and research methodology (Chapter 3), the degree of objectivity in the data findings and analysis. Chapter 6 provides, with evidence, that indeed the research findings can also be applied in other similar contexts as the three institutions studied (Guba & Lincoln, 1994).

4.8. Ethical considerations

In light of ethical considerations, the proposal for this study has gone through an Ethics application process through the Wits School of Education and was approved.

4.9. Chapter summary

The paradigm informing my research has been discussed. I gave a detailed account of the research methodologies employed for the study. To help situate my research within the South

African context, Smith's (1999) work on *Decolonizing Methodologies*, helped in this regard. In this chapter, this literature has been used to problematize the importance of using research practices that are contextually sensitive research practices. It further exposed me to the power and the limits thereof that I have as a researcher and how that awareness can help in research that is not from my perspective but that of my co-researchers (research participants). As a qualitative research, the chapter accounted for the reasons pertaining to how participants sampling, data collection and analysis were done. Additionally, issues around research validity and reliability were also accounted for.

CHAPTER 5

STUDY FINDINGS AND DISCUSSION

5.1. Introduction

This study sought to understand the extent to which final year B.Ed. students are prepared for ICT usage in the classroom across three purposefully selected South African universities. To further understand this extent, the structure of their respective B.Ed. curriculums across different years of study is interrogated and examined. In this chapter I critically analyse the responses to the questionnaire against the background of the literature reviewed along with the theoretical and conceptual frameworks in the previous chapters (chapter 2 and 3 respectively).

With the understanding that coding is not only highlighting and labelling but linking data gathered to an idea (Saldana, 2009), collectively, all three institutional research responses enabled me to come up with seven open codes and four themes. Aforementioned open codes and themes are shown in the table (Table 5.1. Summary of coded research data and themes) below and further discussed in this chapter. Reflected in Table 5.1 are the illustrative phrases from interviewed final year B.Ed. students that paint a picture of the extent to which they are prepared to use ICT in the classroom. In order to give the illustrative data an academic standing, the coding processes - open and axial coding – were employed as previously mentioned.

To help me identify these illustrative phrases in order to come up with the other two categories for coding (open and axial coding), I worked with a deductive approach. Deduction reasoning is a logical process that starts from general ideas to specific conclusions (Azungah, 2018). I then went through the data gathered to look for the information that is going to help me determine the extent to which final year B.Ed. students are prepared for using ICT in the classroom. From a general vantage point, the illustrative data in the form of the students' phrases needed to align with their usage of ICT(s) for teaching and learning within their institutions and also during their teaching practice respectively. Additionally, to determine their awareness and understanding of ICTs and the ICT discourse in the education sector, the open coding process enabled me to come up with categories of meaning to illuminate and further strengthen their understanding of ICT usage in this regard. Having done this, the task of allocating the illustrative data and axial coding information into key themes and concepts discussed in Chapter 3 was done. The different colors in table 5.1. encapsulates this distinction.

Illustrative data	Open coding	Axial coding
"*I was exposed to the **smartboard**. **I used it** to integrate **YouTube videos** in my classroom*." – Hope University. "*In my fourth year teaching practice **I used** a lot of ICT tools such as **PowerPoint**, **Microsoft Excel and Google Forms**.*" - Phaphama University student. "***I use ICT** in all my lessons. Whenever learners see a **laptop** they pay special attention…"* – New Dawn student.	Examples of ICT tools and usage of these tools.	Mindtools (Jonassen, 1998)
"…***I started using the email** more often… It was effective because it resulted in **fast replies** from the lecturers. And it **can be used at any time***…" – Hope University student *"PowerPoint: [Enables the teacher/lecturer to] **Summarise content** to most important notes and **can be accessed at any time**… It is **interactive** and **easy to engage***." - Phaphama University student. *"[I] was **taught and used Excel** in my first year **to keep record of learners' information**…"* – New Dawn student.	Using ICT affordances (Gibson, 1979) for teaching and learning.	

"***Laptops**…**I was able to type** my essays so they were effective*." – Hope University student. "***Using PowerPoint to prepare lessons** for learners, and learning how to **present the lesson effectively using PowerPoint***." – Phaphama University student. "***I used Word 3D feature** in **teaching Measurement** in my third year Maths module*" – New Dawn University student.	Actions related to incorporating ICTs for T&L (in recognition of their affordances)	Blended learning (Van der Merwe et al. (2015))
"*I have always visited schools that **still use the traditional mode of teaching**…*" – Hope University student. "***Instead** of teachers **writing on the board**, **PowerPoint presentations** foster learning by…*" – Phaphama University student. "*…most teachers **prefer to use the old traditional method of teaching** and **will not readily accept** any kind of change*." – New Dawn University student.	Replacement of old teaching methods (or lack thereof) when using ICTs.	
"***EDTC** (Educational Media and Technology) … This module really helped me a lot with **understanding ICT in the classroom** and how I can*	Curriculum enablers (or disablers) for the use of ICT.	

incorporate it in my classroom." – Hope University student. "***Science Methodology modules***… *We were taught how to use ICT tools to enhance learning by using online platforms to do Science experiments*." – Phaphama University "***The module*** *(Teaching Studies) give [gave] me* ***full exposure*** *and [provided knowledge and skills to]* ***use of Word****, the* ***features*** *and* ***creating different, colourful stickers****,* ***posters****,* ***charts*** *and many others."*- New Dawn student		
"*How can I integrate it if* ***we do not have ICT devices in the class****? Like I have mentioned before,* ***public schools have no ICT*** *and remember* ***most of the learners from public schools are from unfortunate backgrounds***…" – Hope University student. "*The classes were* ***from public schools*** *and there were* ***no Smartboards or Projectors****. This shows that* ***we need some development in public school***." – Phaphama University.	Environmental/contextual factors that favour (disfavour) the use of ICTs for T&L.	Praxis (Freire, 2007)

"*It will be* ***difficult to employ ICT*** *because* ***most government schools are not really equipped to accommodate it.*** *There are* ***no projectors*** *for group viewing and so* ***the use of ICT would be greatly limited*** *even though I have that desire to use it in different ways.*" – New Dawn University student.		
"*When* ***I see*** *that most learners do not understand this type of ICT I try and change it and find the one they can understand better.*" – Hope University student. *"This was* ***when I realised*** *that I can use ICT skills to teach a subject such as Mathematics.*" – Phaphama University student. "*…most teachers* ***prefer to use the old traditional method of teaching*** *and* ***will not readily accept*** *any kind of change.*" – New Dawn University student.	Awareness/realisation (or lack thereof) of factors that accommodate (or are unaccommodating for) the use of ICTs in teaching and learning.	Critical consciousness (Freire, 2007)

Table 5.1. Summary of coded research data and themes.

5.2. Actual research data per participant role across universities studied

As mentioned in Chapter 4, each university had a total of four randomly selected participants to respond to the study's questionnaire. After responding to the questionnaire, based on availability, I then had informal conference calls with respective students to further understand their contexts and different lived experiences. Upon concluding with the data coding processes and observing that the data has been saturated (Strauss & Corbin, 1990) four main themes

surfaced. As alluded in Chapter 3, The first theme is from Jonassen's concept of Mindtools (1998), the second being blended learning as discussed by Van der Merwe and colleagues in 2015 along with Paulo Freire's idea of 'praxis' as the third one emerged. Building also from the work of Freire (2007), Critical Consciousness is the last theme that came from coding the data across the university participants' responses. These have been discussed in Chapter 3. In direct relation with the study finding, the concepts will be reviewed once again in section 5.3.

5.2.1. Students from Hope University

As mentioned in Chapter 4, Hope university is a small town located higher institution of higher learning with three branches. It was established in post-apartheid South Africa and openly embraces two of the country's official languages. In exploring the extent to which the final year B.Ed. students from this university are prepared for the usage of ICTs in the classroom the following was found from their responses.

The students demonstrated an understanding of what ICT in (and for) education entails. In addition to this illustrative understanding, they were also able to give examples associated with ICTs in education. Simply put, one student responded, *"[ICT refers to the] Technology we use to make teaching and learning easier*." At its core, this technology enables the smooth processes of knowledge acquisition within a classroom context. Additionally, another student gave examples of this classroom technology and wrote, "*Most ICT devices used at schools are smart boards, projectors and computers.*" Needless to say, these are the hardware equipment that are often associated with ICTs at the level of schooling.

However, in the further education and training space, and still on the question of ICTs and the students' understanding thereof, emails are also an integral part of student learning. As a software application enabling communication between people – in this instance between lecturers and students – one student foregrounded this form of information, communications technology from their first year of study. "…*from first year, I started using the email more often. Email was mostly used for communication between me and my lecturers*." The student further gave an account for the software's affordances (Gibson, 1979) and wrote, "*It [the emailing system] was effective because it resulted in fast replies from the lecturers. And it can be used at any time*…". The affordances linked to this form of ICT make teaching and learning possible beyond the four walls of a traditional classroom.

Taking this thought further, embedded within a traditional classroom are hardwired traditional teaching methods. Hardwired traditional methods do not only demotivate student teachers during their teaching practice at some of these schools but equally play a fundamental role in disallowing student teachers to explore and teach with ICTs. One student reflected on their teaching practice journey and said, "*I have always visited schools that still use traditional mode of teaching, with only books and pens*." Central to the reasons for this lack in order to use up-to-date teaching methods using ICTs, two out of the four students from Hope University postulate not having "…*proper settings in the classroom*" or "…*no ICT*…"and "…*load shedding*" as principal reasons hindering the use of ICTs more especially in fully government owned and dependent schools. Unfortunately, these are some of the realities that student teachers find themselves during teaching practice.

Moreover, as part of data gathering, students from this university were given an opportunity to reflect on their four-year Bachelor of Education curriculum and how it prepared and capacitated them with ICT skills set and knowledge base for the classroom. A module called Educational Media and Technology (EDTC) offered in first year of study is one that students confirm that it assisted them with understanding ICTs for the purposes of teaching and learning. One student responded, "*EDTC was just amazing, plus I was fresh from high school*." Not only was this a module that students could learn about the basics around sending an email, typing out an assignment but it was one that this particular student enjoyed and found it beneficial. Early constructivist and behaviourist scholars have echoed the fact that when students enjoy what they are taught, they learn best. This student's reflection is testament to this.

In addition to the first year module, a different module –offered from first year up until fourth year - mentioned by the students forming part of this study was ENIP - English (First Additional Language) for Intermediate Phase. An interesting reflection is given by one of the respondents and said, "*As for ENIP, it taught me [about] the importance of integrating ICT in the classrooms, as this helps to make learning easy*." From this level of study and with this background information and understanding as far as teaching with ICTs is concerned, student teachers are able to pioneer different ways they can incorporate ICTs in the classroom. This ability is further made possible by the students' willingness to learn against the odds.

That said, a different student shares their challenges with two modules in as far as ICT capacitating modules are concerned – Teaching Practice module and English. The student wrote, "*They are [were] quite challenging but for me I think you need to study the concepts*

first in order to apply them in the classroom." Again, against the odds, it is possible to see the extent to which students want to learn and understand the technological knowledge field better in order for them to become teachers who can integrate ICT in the classroom (Jonassen, 1998; Van der Merwe et al., 2015).

In light of the initial teacher curriculum, the Bachelor of Education at this institution is offered across three schooling phases – that is, Foundation, intermediate along with Senor and FET. In pages 19 – 41 of the Faculty's 2021 Year Book each course and course code is outlined. Additionally, pages 44-119 give a detailed layout of each phase specialization, respective subject majors, other included modules and electives per year of study and semester. As mentioned in the beginning of this discussion, Hope University is made up of three branches. What was of particular interest when I was scrutinizing the institution's year book was seeing that some degree specializations are offered in other campuses and not in others. Whether or not this is a response to contextual demands as determined by the Senior Executive Team of the institution is a debate for another day.

Explicitly, two modules were mentioned by the students (also outlined in the year book) as being the ones capacitating them with ICT knowledge-base and skills set. The two modules are, Educational Media and Technology along with Environmental Management for Sustainability. The modules are offered in first semester of their first year; and first semester of their third year respectively. Furthermore, included within all the other modules in each and every year of study is the use of ICTs. In support of these sentiments, one student mentioned how "*Lecturers would send their PowerPoint presentations and videos to portray the content.*" Not only is the use of educational technology and other related multimedia for teaching and learning effective, as this student further elaborated, these have the ability to help students deeper understand what has been put on the presentation.

As indicated in Chapter 4, in Freirean terminology, praxis is reflection and action that comes after the reflection processes directed at structures that have to be reconfigured or changed. Upon reflection, being able to intervene or come up with applicable and contextually relevant solutions is central to critical consciousness. As such, students wrote about how most of the schooling environments and teaching setting did not afford them the opportunity to tech using ICTs due to lack of ICT resources, load shedding etc. One students reflected, "*I have always visited schools that* ***still use the traditional mode of teaching***…" while the other, with a sense of frustration responded to the question and said, "*How can I integrate* ***it if we do not have***

ICT devices in the class*? Like I have mentioned before, public schools have no ICT and remember most of the learners from the Public schools are from unfortunate backgrounds, some are without phones"* Not only are public schools mentioned to not having ICTs at the same time, there is an element of resisting change. The resistance in change to using some form of ICT for teaching and learning purposes. It is true that some resistance is due to greater government mishaps, others are as a result of teachers' beliefs about ICTs. The impact of ICT perceptions of teachers was discussed in Chapter 2.

Conclusively, below I give an overview of the B.Ed. curriculum as offered at Hope University in the form of tables as taken from their Year Book. How elaborate and detailed each program is allowed me to only show part of these curriculums to get a picture of the extent to which the students are prepared for the usage of ICTs in the classroom.

EDU.3.3.6 BEd Foundation Phase / *BEd Grondslagfase*

CODE AND DELIVERY MODE: 4BJ-J01 (Distance) **DL (English)**

KODE EN METODE VAN AFLEWERING: 4BJ-J01 (Afstand) ***AL (Engels)***

YEAR LEVEL 1 / *JAARVLAK 1*			YEAR LEVEL 2 / *JAARVLAK 2*			YEAR LEVEL 3 / *JAARVLAK 3*			YEAR LEVEL 4 / *JAARVLAK 4*		
Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*
YEAR MODULE / *JAARMODULE*											
TPED176	16	H	TPED276	16	H	TPED376	16	H	TPED476	16	H
FIRST SEMESTER / *EERSTE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		
EDCC114	8	H	EDCC214	8	H				EDCC413	8	H
EDCC115	8	H	EDCC215	8	H	EDCC315	8	H	EDCC414	8	H
EDTC112	8	X	MTLS211	12	X	EDTM312	8	X	RESF412	8	X
						UTEW311	12	X			
Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*		
MFPC111	12	H				MFPC311	8	H	MFPC411	12	H
LSKS111	8	H	LSKA211	8	H				LSPP411	8	H
Choose one Home Language *Kies een Huistaal* AFRF111 / ENFF111 / PEFF111 / SEFF111 / SOFF111 / ZUFF111	12	H	Continuation of Choice *Voortsetting van Keuse* AFRF211 / ENFF211 / PEFF211 / SEFF211 / SOFF211 / ZUFF211	12	H	Continuation of Choice *Voortsetting van Keuse* AFRF311 / ENFF311 / PEFF311 / SEFF311 / SOFF311 / ZUFF311	12	H	Continuation of Choice *Voortsetting van Keuse* AFRF411 / ENFF411 / PEFF411 / SEFF411 / SOFF411 / ZUFF411	12	H
			Choose one First Additional Language *Kies een Eerste Addisionele Taal* AFAF211 / ENAF211 / SEAF211	8	H	Continuation of Choice *Voortsetting van Keuse* AFAF311 / ENAF311 / SEAF311	8	H	Continuation of Choice *Voortsetting van Keuse* AFAF411 / ENAF411 / SEAF411	8	H
Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		72
SEMESTER / *TWEEDE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		
EDCC125	8	H	EDCC224	8	H	EDCC323	16	H	EDCC423	8	H

Table 5.2.1.1. Parts of Hope University's four-year B.Ed. Curriculum in Foundation Phase teaching

EDU.3.4.6 **BEd Intermediate Phase: Mathematics, Science and Technology / *BEd Intermediêrefase: Wiskunde, Wetenskap en Tegnologie***

CODE AND DELIVERY MODE: 4BR-J01 (Distance) *Only available for spesific bursary group **DL (English)**

KODE EN METODE VAN AFLEWERING: 4BR-J01 (Afstand) **Slegs beskikbaar vir spesifieke beursgroep* ***AL (Engels)***

YEAR LEVEL 1 / *JAARVLAK 1*			YEAR LEVEL 2 / *JAARVLAK 2*			YEAR LEVEL 3 / *JAARVLAK 3*			YEAR LEVEL 4 / *JAARVLAK 4*		
Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*
YEAR MODULE / *JAARMODULE*											
TPED177	16	H	TPED277	16	H	TPED377	16	H	TPED477	16	H
FIRST SEMESTER / *EERSTE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		
EDCC114	8	H	EDCC214	8	H				EDCC413	8	H
EDCC115	8	H	EDCC215	8	H	EDCC315	8	H	EDCC414	8	H
EDTC112	8	X	MTLS211	12	X	EDTM312	8	X	RESF412	8	X
SSSE112	8	X				UTEW311	12	X			
Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*			Specialisation Subjects *Spesialiseringsvakke*		
Choose one Home Language *Kies een Huistaal* AFRI111 / PEFI111 / SEFI111 / SOFI111 / ZUFI111	12	H	Continuation of Choice *Voortsetting van Keuse* AFRI211 / PEFI211 / SEFI211 / SOFI211 / ZUFI211	12	H	Continuation of Choice *Voortsetting van Keuse* AFRI311 / PEFI311 / SEFI311 / SOFI311 / ZUFI311	12	H	Continuation of Choice *Voortsetting van Keuse* AFRI411 / PEFI411 / SEFI411 / SOFI411 / ZUFI411	12	H
			ENIP212	8	H	ENIP312	8	H	ENIP412	8	H
			MAIP211	8	H	MAIP311	8	H	MAIP411	8	H
NSTL111	12	H	NSTL211	8	H	NSTL311	8	H	NSTL411	8	H
Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		72	Total 1st semester *Totaal 1ste semester*		72	Total 1st semester *Totaal 1ste semester*		68
SECOND SEMESTER / *TWEEDE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		
EDCC125	8	H	EDCC224	8	H	EDCC323	16	H	EDCC423	8	H
						EDCC325	8	H			
Choose one											

Table 5.2.1.2. Parts of Hope University's four-year Intermediate Phase B.Ed. Curriculum (Majors: Mathematics, Science and Technology)

EDU.3.5.10 **BEd Senior and Further Education and Training phase: English for Education / *BEd Senior en Verdere Onderwys en Opleidingsfase: Onderwysengels***

CODE AND DELIVERY MODE: 4BP-J04 (Distance) **DL** (English)

KODE EN METODE VAN AFLEWERING: *4BP-J04 (Afstand)* ***AL*** *(Engels)*

YEAR LEVEL 1 / *JAARVLAK 1*			YEAR LEVEL 2 / *JAARVLAK 2*			YEAR LEVEL 3 / *JAARVLAK 3*			YEAR LEVEL 4 / *JAARVLAK 4*		
Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*	Module code *Modulekode*	Cr *Kr*	Type *Tipe*
YEAR MODULE / *JAARMODULE*											
TPED178	16	H	TPED278	16	H	TPED378	16	H	TPED478	16	H
FIRST SEMESTER / *EERSTE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		
EDCC114	8	H	EDCC214	8	H				EDCC413	8	H
EDCC115	8	H	EDCC215	8	H	EDCC315	8	H	EDCC414	8	H
EDTC112	8	X	ENAC211	8	X	EDTM312	8	X	RESF412	8	X
						UTEW311	12	X			
Specialisation Subject 1 *Spesialiseringsvak 1*			Specialisation Subject 1 *Spesialiseringsvak 1*			Specialisation Subject 1 *Spesialiseringsvak 1*			Specialisation Subject 1 *Spesialiseringsvak 1*		
ENGV111	**12**	**H**	**ENGV211**	**12**	**H**	**ENGV311**	**16**	**H**	**ENGV411**	**16**	**H**
Specialisation subject 2 [and GET subject] *Spesialiseringsvak 2 [en AOO vak]* **CHOOSE ONE / *KIES EEN***			Specialisation subject 2 [and GET subject] *Spesialiseringsvak 2 [en AOO vak]*			Specialisation subject 2 *Spesialiseringsvak 2*			Specialisation subject 2 *Spesialiseringsvak 2*		
ACCE112 [BSTG111]	12 8	H H	ACCE212 [CULV211]	12 8	H H	ACCE312	16	H	ACCE412	16	H
AFRE112 [MATF111]	12 8	H H	AFRE212 [CULV211]	12 8	H H	AFRE312	16	H	AFRE412	16	H
BSTE112 [MATF111]	12 8	H H	BSTE212 [ACCG211]	12 8	H H	BSTE312	16	H	BSTE412	16	H
HISE112 [MATF111]	12 8	H H	HISE212 [GEOS211]	12 8	H H	HISE312	16	H	HISE411	16	H
LESE112 [MATF111]	12 8	H H	LESE212 [CULV211]	12 8	H H	LESE312	16	H	LESE411	16	H
~~LIFE113 [NSSP113]~~	~~12 8~~	~~H H~~	~~LIFE213 [NSSP211]~~	~~12 8~~	~~H H~~	LIFE312	16	H	LIFE411	16	H
MATH111 [MATV111]	12 8	H H	MATH211 [CULV211]	12 8	H H	MATH311	16	H	MATH411	16	H
SEFV111 [MATF111]	12 8	H H	SEFV211 [CULV211]	12 8	H H	SEFV311	16	H	SEFV411	16	H
SOFV111 [MATF111]	12 8	H H	SOFV211 [CULV211]	12 8	H H	SOFV311	16	H	SOFV411	16	H
Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		64	Total 1st semester *Totaal 1ste semester*		68	Total 1st semester *Totaal 1ste semester*		64
SECOND SEMESTER / *TWEEDE SEMESTER*											
Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*			Fundamental modules *Fundamentele modules*		

Table 5.2.1.3. Parts of Hope University's four-year Senior and FET Phase B.Ed. Curriculum (Majors: English for Education)

5.2.2. Students from Phaphama University

The second university to be discussed is Phaphama University. Phaphama has a long-standing non-racial, open university stature history. It is an arguably well-established university. As indicated in Chapter 4, this institution of higher learning further has a long-standing history of education, offers internationally accredited degrees and is research intense. From the themes indicated in Table 5.1. Summary of coded research data and themes, the following illustrative responses were captured from each research question as answered by each student.

Like Hope University, the students demonstrated an understanding of what ICTs for and in education are. There was a generic understanding of some of the ICTs in education they are aware of. Students are also able to give examples and affordances (Gibson, 1979) of the ICTs mentioned for teaching and learning purposes. Words such as, '…*summarises*…' …*accessibility*…, …*interactive/easy to engage*…, …*not time consuming*…" were used to describe these ICTs. For example, one student responded, *"PowerPoint: [Enables the teacher/lecturer to]* ***Summarise content*** *to most important notes and* ***can be accessed at any time****… It is* ***interactive*** *and* ***easy to engage***." The students' ability to extract affordances (Gibson, 1979) has an ability to position them (as teachers in training on their way to work) to knowing which ICT to use to serve what educational purpose.

One interesting observation as I was going through the responses, the word 'Instead' was usd by one student from this institution. Although the word **'instead'** is used once on the particular question, the word has an equally interesting implication. It implies that, at the use of technology for teaching and learning purposes, there is a replacement of some sort happening. In essence, ICTs (or using ICTs for teaching and learning) have the ability to replace 'something' and in this case, this replacement is for the better. The following response from one of the students supports the interpretation of this word and its implication. The student wrote, *"Instead of teachers writing on the board, PowerPoint presentations foster learning by allowing the teacher to come fully prepared and have enough time to teach a lesson fully."* This statement further carries with it a misconception around teaching and learning using ICTs - that the teacher comes to class "…*fully prepared and have enough time to teach a lesson*…". More often than usual this is not entirely and always the case.

Furthermore, there is an account for different learning styles. One respondent says: *"Videos in classroom helps learners understand concepts better, as others learn better through media."* What this implies is that, as a teacher teaching using technology, you (and your teaching

practices) must be grounded in and informed by a particular school of thought and theory. Kolb's (1984) theory of learning styles is widely known in the education fraternity and can be used to understand how different learners perceive (concrete vs. abstract) and process (active vs. reflective) information. Although there are various academics (Kirschner, 2007; Scott, 2010; Patterson, 2016) opposing this terrain of knowledge, the learning styles theory has arguably given a blueprint from which to understand learning within the context of individuality, context and culture of a learner. It also highlights what teachers should be aware of especially when teaching with technology. Not all videos can help learners *"…to understand concepts better…"* however, videos that have been carefully and purposefully selected can.

In addition to the aforementioned point, one student uses the phrase "mental images" – a phrase associated with the cognitive revolution in education. The student writes: *"Videos =* ***makes it easier*** *for students to understand as they see what it's been said rather than* ***forming different mental images*** *of what is being said.";* with this response one can decipher that this teacher is grounded and informed by a particular teaching and learning theory, in this case, the cognitive theory (Piaget, 1977; Jonassen, 1998; Van der Merwe et al., 2015). It is imperative for teachers to be grounded in theory as this directly influences what they teach and how they teach it (using ICTs).

Another interesting observation from the findings from this institution, in their immediate memory and similar to Hope University students, the students from this institution, easily associate the main form of ICTs as 'PowerPoint presentations' and write about its affordances (Gibson, 1979). Does this mean that this is the only form they know and were exposed to? Or is this the form they are comfortable with? Missed learning opportunity perhaps? Also, how has the institution deprived students from learning about other ICT forms? How have the students deprived themselves of taking initiative of learning about other forms of ICTs to enhance their teaching and learning along with their teaching and learning practices?

Important to note is that online learning along with teaching and learning with technology has proven to be ubiquitous and continues to blur the lines of what constitutes a formal learning environment and an informal one. Although some not sufficiently explained, other forms of ICTs the students showed to be aware of include computers, ICT storyboards, videos, printers. Learning Management Systems mentioned include Zoom, Teams, Ulwazi, Google Classroom

In their different years of study students from Phaphama university were exposed to software applications such as PowerPoint presentations for learning, assessments and micro-teaching,

and learning management systems such as MS Teams and Zoom, Big Blue Button, Sakai which was at 4th year level replaced by Ulwazi. PowerPoints summarized content to be learned in lectures and tutorial. The LMSs were used for tutorial discussions and lessons. What made these forms of ICTs effective for their intended purpose is their affordances and features. One student affirmed that, *"These are **effective** because the host can **share their screen**, **allowing them** to share lecture notes on the MS meeting or BigBlueButton **while engaging those notes to teach** guests."*

Furthermore, as a teaching platform, BigBlueButton prides itself as a learning management system built by teachers for teachers. This message is communicated clearly on the platform's website page. It is encouraging to see an institution using up to date and relevant platforms for in-service teachers. This may come in handy as they go practice full-time. Also, the usage of this platform can also be seen as an opportunity seized by the school to explore other means of teaching using technology (Jonassen, 1998; Van der Merwe et al., 2015). Providing students with multiple and various forms of learning and teaching is crucial in the formative years of their profession as this has the ability to translate into their professional spaces (i.e. Affording their learners with multiple and various ways of learning).

With PowerPoint, the students highlight that they used this form of ICT in their methodology courses. It was used for preparing a lesson. It was also used as a tool to learn how to present lessons effectively. PowerPoint Presentation (PPP) is also effective on grounds that one is "*…able to integrate teaching methods in one presentation such as inserting a video for leavers to watch, and pictures for learners to understand the concept better*" outlines one student.

Another student briefly shares their experience as follows: "*I was exposed to Microsoft office as a whole and how to attach videos in my lessons when using PowerPoint. This exposure was very helpful as it helped me with preparing lessons for my methodology course and for teaching during my teaching experience.*" That shared, one can deduce that the importance of a teaching curriculum degree is also seen as beneficial if what has been taught can be translated in the students' teaching practices (Jonassen, 1998; see also Van der Merwe et al., 2015).

In thinking about initial teacher preparedness in relation to ICTs, how often a student uses ICT tools speaks to the extent to which they have been prepared, feel comfortable in using the tool. This also speaks to the ability of the student to be able to make sound pedagogic decisions when it comes to teaching with technology. This question was to understand this extent.

Depending on the school they do their teaching experience at, students within this institution use a form of ICT to conduct their lessons. This was also the case for Hope university students. Microsoft applications such as PowerPoint presentations (PPP) and Excel are mentioned. Additionally, one student alludes to using "…*google forms tools, to conduct assessments that bring immediate feedback*". In the token, the other student confirms, "*In my fourth year, teaching practice, I used a lot of ICT tools such as PowerPoint, Microsoft Excel and Google Forms.*" Both of these responses show some level of comfortability with using various ICT tools. Having understood their affordances assists on what form of ICT to use so as to facilitate learning within a classroom context.

According to another respondent, some subjects allow for more use of ICTs than others. A subject such as Computer Applications Technology (CAT) enables them to use ICT tools "…*to teach computer concepts effectively*." In the case where a student is in a public school that doesn't have smart boards or projectors or "lacks resources" as one respondent mentioned, using a form of ICT would be less often or not be used at all.

From these responses it becomes clear to see how the environment in which a student finds themselves in during their teaching practice has the ability to hinder or enable them to use ICTs or a form of ICTs. As it stands not enough schools in Gauteng (as this province is largely one where majority of these students do their teaching practice at) have enough – if any at all – ICT equipment to enable teachers to teach using technology. One interesting point to note, is how these students are able to make pedagogical decisions when using ICTs for teaching and learning purposes. This point is articulated within the following response: "...*most of the time I used PowerPoint presentation to elaborate the theory concepts and add pictures to enhance learning.*"

As indicated in Chapter 4, Paulo Freire writes about critical consciousness/awareness and praxis. One of the questions posed to students focused on curriculum awareness question, ¾ students demonstrate a sense of awareness with regards to modules within their Bachelor of Education (B.Ed.) degree that prepared and capacitated them with ICT knowledge-base and skills set. Collectively, the three students mention modules such as Science Methodology modules, Teaching Mathematics, Teaching Information Technology (IT), ICT literacy, an ICT Competency test, done in first year and Teaching Sesotho as modules that exposed them to ICT skills set and knowledge-base. One of the students accounts for some of their realisations and reflects on what they learned during the course of their four-year degree. They write, "*In*

teaching Information Technology, we were always using ICT skills set because information technology requires collaborative tools such as a discourse. This is when I learnt that information technology requires ICT skills and constant development of these skills." Part of being a teacher means that one has to be reflective and be a life-long learner. Sentiments shared on the response highlight this.

In responding to the question of B.Ed. curriculum design question and how this prepared and capacitated them with ICT knowledge-base and skills set, the one student responded and wrote: "*The **only one** I can think of is ICT Literacy but I didn't have to do it because I passed the (ICT) competency test in first year. Therefore, **none of the modules I did really taught me about ICT**.*" The student's response does not show an awareness of forms of ICTs embedded in the modules they did.

Concluding the discussion for Phaphama university, it is at this point that I outline the Bachelor of Education curriculum at Phaphama University as it appears in their B.Ed. handbook.

HFA00 B Ed (Foundation Phase Teaching) Curriculum Summary						
YEAR 1	Education I (24 credits)	Childhood Studies I (24 credits)	Mathematics for Primary School Teachers I (12 credits) Literacy for Primary School Teachers (12 credits)	Becoming a Foundation Phase Teacher (12 credits) Arts for Teachers (12 credits)	Teaching Experience I (12 credits)	ELECTIVES (2 x 12 credits) Choose one of the following course elective options, to be completed during your degree: • One language of conversational competence from: IsiZulu; Sesotho; South African Sign Language (compulsory if you are not yet able to speak, read in one of these languages) • ICT Literacy* (compulsory for students who did not obtain 65% for the ICT competency test) • Fun with Choir • Learning in and through Art • Learning in and through Drama • Physical Activity and Sports in Schools • School-based Support (Year 3 students only)
YEAR 2	Education II (24 credits)	Childhood Studies II (24 credits)	Mathematics for Primary School Teachers II (12 credits) Literacy for Primary School Teachers II (12 credits)	IsiZulu Home or Additional Language I / Sesotho Home or Additional Language I / SASL I (24 credits)	Teaching Experience II (12 credits)	
YEAR 3	Education III (24 credits)	Childhood Studies III (24 credits)	Mathematics for FP Teachers III (12 credits) Literacy for FP Teachers III (12 credits)	IsiZulu II /IsiZulu Additional Language II; Sesotho II /Sesotho Additional Language II / SASL II (24 credits)	Teaching Experience III (24 credits)	
YEAR 4	Education IV (24 credits)	Childhood Studies IV (24 credits)	Mathematics for FP Teachers IV (12 credits) Literacy for FP Teachers IV (12 credits)	Teaching Additional Languages for Primary School Teachers (12 credits) Being a Teacher (12 credits)	Teaching Experience IV (24 credits)	

Table 5.2.2.1. Phaphama University's four-year B.Ed. Curriculum in Foundation Phase teaching

HFA01 B Ed (Intermediate Phase teaching) Curriculum Summary							
YEAR 1 (120 credits)	Education I (24 credits)	Mathematics for Primary School Teachers I (12 credits)	Literacy for Primary School Teachers I (12 credits) English I (24 credits)	Social Science I (24 credits)	Becoming a teacher (12 credits)	Teaching Experience I (12 credits)	ONE ELECTIVE course (12 credits) ○ One language of conversational competence from: IsiZulu; Sesotho; South African Sign Language (compulsory if you are not yet able to speak and read in one of these languages) ○ ICT Literacy (compulsory for students who did not obtain 65% for the ICT competency test) ○ Fun with Choir ○ Learning in and through Art ○ Learning in and through Drama ○ Physical Activity and Sports in Schools ○ School-based Support (Year 3 students only)
Year 2 (120 credits)	Education II (24 credits)	Mathematics for Primary School Teachers II (12 credits)	One language course: • isiZulu I • isiZulu Add Language I • Sesotho I • Sesotho Add Language I • South African Sign Language I (24 credits)	Natural Sciences I (24 credits)	Teaching Social Sciences (Intermediate Phase) 12credits	Teaching Experience II (12 credits)	
Year 3 (120 credits)	Education III (24 credits)	Mathematics for Primary School Teachers III (24 credits)	Teaching Home Language III (24 credits)	Life Skills I: Arts for Teachers (12 credits)	Teaching Natural Sciences (Intermediate Phase) (12 credits)	Teaching Experience III (24 credits)	
Year 4 (120 credits)	Education IV (24 credits)	Mathematics for Primary School Teachers IV (24 credits)	Teaching Additional Languages for Primary School Teachers IV (12 credits)	Life Skills II: Personal, Social and Physical Wellbeing (12 credits) Economic and Financial Literacy (12 credits)	Being a Teacher (12 credits)	Teaching Experience IV (24 credits)	

Table 5.2.2.2. Phaphama University's four-year B.Ed. Curriculum in Intermediate Phase teaching

HFA02 B Ed (Senior Phase & FET Teaching) Curriculum Summary						
	Theory stream	**Content stream**		**Practical, pedagogical Knowledge**	**TEACHING EXPERIENCE**	**TWO Electives**
YEAR 1 (120 credits)	Education I (24 credits)	SUBJECT A Level I (24 credits)	SUBJECT B Level I (24 credits)	Becoming a teacher (12 credits) Literacy for Secondary Teachers (12 credits)	Teaching Experience I (12 credits)	*Choose two of the following course elective options, to be completed during the course of your B Ed.* ○ ICT literacy (compulsory for students who did not obtain 65% for the ICT competency test) ○ One new language of conversational competence from: IsiZulu; Sesotho; South African Sign Language (Compulsory for students who do not speak a Black South African Language) ○ Fun with choir ○ Learning in and through Art ○ Learning in and through Drama ○ Physical activity and sports in schools ○ School-based support (Year 3 students only) ○ Financial Planning and Entrepreneurship
Year 2 (120 credits)	Education II (24 credits)	SUBJECT A Level II (24 credits)	SUBJECT B Level II (24 credits)	Life Skills for teachers (12 credits) Teaching Subject A (Senior Phase) (12 credits)	Teaching Experience II (12 credits)	
Year 3 (120 credits)	Education III (24 credits)	SUBJECT A Level III (24 credits)	SUBJECT B Level III OR Another Level III course offered within Subject A cluster (24 credits)	Teaching Subject A (FET) (12 credits) Teaching Subject B (Senior Phase) (12 credits)	Teaching Experience III (24 credits)	
Year 4 (120 credits)	Education IV (24 credits)	Subject A Level IV (24 credits)	Timetable permitting: ANOTHER Level IV course OR Another Level III course OR A Level I course in a language (24 credits)	Teaching Subject B (FET) (12 credits) Being a teacher (12 credits)	Teaching Experience IV (24 credits)	

Table 5.2.2.3. Phaphama University's four-year B.Ed. Curriculum in Senior Phase and FET teaching

As shown across all phases of specialisation curriculums, ICT literacy module is compulsory for all first year students who did not obtain 65% for the ICT competency test. Upon entry all students are assessed on their ICT readiness through the ICT competency test and are further given a second chance with the ICT literacy year module. There is no explicit ICT module in other years of study.

5.2.3. Students from New Dawn University

As indicated in Chapter 4, New Dawn University houses students who are from the highly disadvantaged backgrounds. Like Hope university, New Dawn was founded in democratic South Africa. What is of interest with this university is the growth journey that it went through, and the emphasis it places on continued commitment to producing competent, principled teacher graduates.

Having completed the data coding process, there were varying degrees of ICT usage in the classroom amongst the students. This variance, by and large, is as a result of the environment and material conditions associated with the context that the students find themselves in. This context has been alluded to in the previous chapters (chapter 2, 3 & 4) and at the beginning of this discussion as students from Hope and Phaphama Universities highlighted.

As was the case with the two previously reviewed institutions, students from New Dawn University revealed an understanding of what ICTs are. They are also able to identify their purpose within the context of teaching and learning. Simply put, one student asserts: *"In my opinion, **ICT**, especially in the **field of education**, simply means allowing **the use of advanced technology** to make education **easier and more enjoyable** for **students**"*. In a nutshell, the purpose of ICTs as mentioned by the student in their response is to make learning and teaching, or in their words, 'education' easier and enjoyable for students when one decides to use ICT within the education sphere.

Students from this institution were also able to give some of the examples associated with ICT for (and in) education. These examples given include "ICTs include computers, laptops, software programs, printers, mobile applications etc." Additionally, like Phaphama and Hope university students, New Dawn university students are aware of the affordances that are associated with these ICTs.

On account of their awareness of ICTs in education and their affordances, one student replied: "*The use of **emails**, **online learning systems**…they **help connect** even **distant students**. It is **easier for students** to **communicate** with their lecturers for **support** and **online material** is **easily accessible.***" That said there is easy access. Not only of online (learning) material but also students can easily access their lecturers for support through communication means (i.e. emails) that come with the use of Information Communications Technology within the educational space.

Another student touched on how ICTs enable educators to *"... **design interesting** and **engaging classroom activities** and they also foster **efficient learning techniques.***" In essence there is a creative opportunity for teachers to use ICTs. This creative opportunity makes it possible for them to come up with classroom activities that are suitable and appropriate for their learners learning needs and demands.

New Dawn University students attest that throughout their B.Ed. program they were exposed to a form (or forms) of ICT. One student highlights that's, "***Almost every day** of my school [varsity] life [.] [This involved] involving the **completion of school tasks** and **effective learning of concepts**.*" Being able to be aware of what is happening as far as your academic journey is concerned shows that one is constantly reflecting and applying applicable measures to stay afloat and relevant within their field (Jonassen, 1998; Freire, 2007; Van der Merwe et al., 2015). The fact that this was their "Almost every day" experience positions them to potentially being comfortable when it comes to teaching with technology.

Another student draws special attention to Microsoft applications such as "Word, PowerPoint and Excel". As they reflect on the years of their study, they extensively and in great depth described their ICT exposure and experience throughout their B.Ed. degree program as follows:

> *"I have **used** the above (referring to Word, PowerPoint and Excel) **from my first year to date (4th year)**. I have **used them to create posters** which helped in **creating print rich and numeracy rich classrooms** for **some of the schools** I have visited for **my teaching practice**."*

> *"I **used Word 3D feature** in **teaching measurement** in my **3rd year maths module**"*

> *"[I] was **taught and used Excel** in my first year **to keep record of learners' information**..."*

In ways more than one, this reflective account shows a student who has been constantly reflecting on their practice and the knowledge presented to them. This is also an example of a student who makes pedagogical decisions when using ICT decisions and is aware of the purpose and affordance (Gibson, 1979; Jonassen, 1998) that comes with each form of ICT.

At the beginning of this discussion, I did mention the varying degrees as far as ICT usage in the classroom is concerned. The students' responses propagate this thought in their various responses when asked the question: "From your teaching practice, how often do you use a form of ICT or ICTs and why?"

> *"Only to create some teaching aids, but never in the classroom setting",* said one student.

> *"...**less often than not**, most teachers prefer to **use the old traditional method of teaching** and will **not accept** any kind of change.",* said another.

> *"Perhaps twice a week during writing and reading activities",* responded the third student.

From these responses one can detect that not only is not as frequent but is not as frequent as enabled by the environment in which they find themselves in. It also easy to infer that, the students not only use ICTs for the sake of using them. They make educational and pedagogical decisions during the process of preparing for lessons. In order to ignite the learners' interest in the lesson, another student said, "*I use ICT in all my lessons. Whenever learners see a laptop they pay special attention with an interest of exposure to new things (technological) since they are from the rural [areas]*." Fundamentally, the use of ICTs is not only for the purposes of presenting content for lessons but also, within a classroom behavioural management level, is to ensure that the learners pay attention and perhaps engage.

The B.Ed. in Foundation Phase curriculum is designed in a way that prepares teachers for ICT usage in the classroom as mentioned by the students. A module called "Teaching Studies" is one that all students referred to as having contributed in the preparation and capacitation with ICT knowledge-base and skills set. In detailing the ICT knowledge and skills offered within this module, one of the students acknowledged:

> "***The module** give [gave] me **full exposure** and [provided knowledge and skills to] **use of Word**, the **features** and **creating different, colourful stickers**, **posters**, **charts** and many others. Furthermore, the module exposed me to **PowerPoint** which **taught me** how **to create games** (animated) **for learning**. **Creating animated storybooks** and **big books** which facilitated [facilitate] the **teaching of mathematics**…"*

Important to note is that this is a semester module however, within other modules, the students did highlight that they are required to use a form of ICT when presenting lessons for assessment purposes.

On the notion of praxis and critical consciousness (Freire, 2007) the students gave their reflections. Like Phaphama and New Dawn University students, New Dawn universities explained how the schools setting they go teach at are not presenting them with some opportunities to teach using ICTs most of the time. In some instances, is the teachers at the school and more often is because the schools do not have ICT resources. Their responses were, "…*most teachers* ***prefer to use the old traditional method of teaching*** *and* ***will not readily accept*** *any kind of change*." In all honesty, as a relatively young teacher, who's fresh from university, it is arguably hard to get into a system that has individuals that resist change. Processes embedded in blended learning (Van der Merwe et al., 2015) are almost impossible to occur under such circumstances.

Accounting for lack of development in public schools, another student responded, "*The classes were* ***from public schools*** *and there were* ***no Smartboards or Projectors***. *This shows that* ***we need some development in public schools***." Needless to say, DBE needs to fast-track the ICT infrastructure plan to schools as a matter of urgency.

In addition to this, the institution's prospectus outlined the Bachelor of Education curriculum and the areas of study covered by the programme are:

English for Foundation Phase; siSwati or isiNdebele for Foundation Phase (electives); Mathematics for Foundation Phase; Life Skills for Foundation phase; Teaching and Computer Technology; Education Studies; and practicum training within the profession. In the first three years, students spend time in the adjacent teaching school where they begin to develop their teaching practice. In the final year students are placed at a school for work-place based learning where they begin to apply the theory, knowledge and skills developed in the first three years, in a real world setting.

5.3. Overall students' experiences: To what extent are final year B.Ed. students prepared for ICT usage in classroom teaching and learning?

Despite the prevalent unequal power relations and contextual differences, the higher learning fraternity is a source of hope in as far as providing equal learning opportunities for students

coming from different backgrounds are concerned. The fraternity serves as an 'equalizer' as far as benchmarking the standard of teacher professional development (or any other professional development for that matter. As it stands all students are taught in the same lecturer room by the same lecturer. However, turning a blind eye to most students' unfavourable backgrounds as they enter these institutions will be a grave injustice. In hindsight, we see how the previously marginalised groups of students rise above the challenges presented to them as they enter and continue with their journey within HEIs against the odds.

The HEIs concerned with initial teacher training remain one of the professionalising bodies and equally so, battlefields for ideas. Along the same vein, government schools remain a ground to which these ideas are tested. And if there are no grounds for this to occur, we are indeed failing the future generations of this country. The findings for these research highlight that the schooling system needs to repurpose itself such that the cohort of new teachers who desire to teach using ICTs in their various form can do so. Challenges such as lack of ICT infrastructure, rigidity towards change (i.e. Teachers letting go of traditional ways of teaching) load shedding prove to be at the heart of not enabling preservice teachers not being able to explore teaching with ICTs or a form of ICT in class for blended learning (Van der Merwe et al., 2015) purposes.

Findings from this research illustrate how universities are re-purposing themselves. Universities are indeed constantly reflecting on their practices in attempt to start students on grounds informed by the principles embedded in equity, irrespective of unequal social circumstances. Students pointed out modules they did in first year and how those assisted them in the rest of their undergraduate years. Those who fell off the wagon, as it was difficult to adjust to the new order of doing things – i.e. Typing assignments for submission, using online platforms and blended learning for teaching and learning purposes just to name a few – either consulted for further help within and beyond their university space. Initiative and the hunger can be drawn from these students.

In conclusion, inequality affects all students. However, it occurs and affects all students in various and complex ways (Brown & Czerniewicz, 2012). What is failing the students are government schools. What they get taught as far as ICTs are concerned is not mirrored in majority of the classrooms they find themselves in during teaching practice and ultimately as they go teach fulltime as professionals. Students in this study alluded to no infrastructure or proper classroom setting and equipment to enable them to teach with technology. As HEIs are

playing their part when it comes to ICT teacher preparation and curriculum design, DBE should also do the same and keep their end of the bargain by ensuring that there are resources and equipment to enable teachers to use ICTs in their various teaching pedagogies.

5.4. Chapter summary

The state of ICTs in schools as outlined in the joint report by Department of Telecommunications and Postal Services along with the Department of Basic Education in 2018 with regards to the provision and availability of ICT connectivity in schools across South Africa revealed that only 46% of approximately 25 000 schools had some form of connectivity. Although this number was much higher compared to 26.5% recorded in 2002, the numbers are alarming given the slow pace and rate that the two departments are moving under (more on the state of ICTs reviewed in Chapter 1). With this background, Chapter 5 explored the extent to which final year B.Ed. students are ICT prepared. From the HEIs perspective, strides have been made and continue to be made for students to be ICT ready. However, the lack of infrastructure in schools is frustrating and demotivating for preservice teachers. The findings of this study revealed this from the students' reflective responses.

The chapter foregrounded the various themes as per Table 5.1. from the students' responses. Concepts such as blended learning (Van der Merwe et al., 2015), mindtools (Jonassen, 1998), Praxis and Critical consciousness (Freire, 2007) were indicated in various responses and thus discussed in context. The chapter also discussed the overall students' experiences and highlighted the pivotal role that HEIs are playing in as far as ICT initial training is concerned.

CHAPTER 6:

RETHINKING PRESERVICE TEACHER EDUCATION IN THE CONTEXT OF ICT USAGE IN THE CLASSROOM: ANALYSIS OF FINDINGS AND CONCLUSION

6.1. Introduction

The study's overarching objective was to explore the extent to which final year B.Ed. students are prepared for the use of ICT in the classroom across three purposefully selected South African universities. To further understand this extent, the structure of their respective B.Ed. curriculums across different years of study was interrogated and discussed in chapter 5. In light of this study, subsequent chapters examined, in different ways, the factors influencing ICT initial teacher preparedness within South African HEIs and schools. As such:

First thing to remember, **Chapter 1** provided the background and purpose of the study as a way to make a case for this research. This was also done by highlighting the role of higher education and official policies in the context of initial teacher ICT training in South Africa. In particular, three official policies, namely - – namely, *White Paper on e-Education*, The *Department of Basic Education's Minimum Requirements for Teacher Education Qualifications (MRTEQ) on initial Teacher Education* and The *Professional Development Framework for Digital Learning: Building Teacher Competencies in Facilitating Learning with Technology* - were briefly discussed were briefly reviewed.

Chapter 2 provided an analysis of aforementioned policies and highlighted the most compelling contextual evidence on the concept of 'digitizen' over Prensky's 'digital natives vs. digital immigrants' notions. This evidence helped to see the distinction between the aforementioned concepts within the South African context and to see the nuances in as far as understanding technology and access to this technology. This chapter examined models that teachers can use in order to integrate ICTs in their daily teaching pedagogies.

Additionally, 'Mindtools' (Johanssen, 1998) as a concept also relevant for this study afforded me an opportunity to look at the concept of ICT tools as enablers of the construction of knowledge upon the learners with the human teacher mediating and facilitating this process (Vygosky, 1976; Ndlovu & Moll, 2016) in **Chapter 3**. Furthermore, the concepts of blended learning (Van der Merwe et al., 2015), praxis and critical consciousness (Freire, 2007) helped build a conceptual and theoretical framework for this study.

In **Chapter 4** I outlined the methods and thinking followed in the study for the research paradigm, sampling, ethical considerations and issues around validity and reliability of this research. Amongst many, I drew from the work of Smith (1999) on *Decolonizing Methodologies*. This was used has used to problematize the importance of using research practices that are contextually sensitive.

Chapter 5 explored the extent to which final year B.Ed. students are prepared to use ICT in the classroom. The discussion was a build up from the previous chapters (Chapters 1 to 4).

In this chapter, I critically and comparatively analyse the data gathered as discussed in Chapter 5. Amongst many, this chapter suggests possible ways in which institutions could reimagine initial teacher education and training in the context of ICT usage in the classroom.

6.2. Comparative analysis of research findings and discussion

The three institutions studied on this research were compared on various levels. After the discussions in Chapter 5, the comparative grounds are: B.Ed. curriculums, learning platforms used within the institutions and the ones the students were exposed to, context or location, teaching practice, availability of (enough) computer rooms (for teaching and learning + out of class activities). Table 6.2. elucidate these.

Table 6.2. Summary of the research data gathered from participating institutions.

criteria ↓ / Institutions →	**Hope University (Faculty of Education)**	**Phaphama University (School of Education)**	**New Dawn University (Faculty of Education)**
B.Ed. curriculum specialisations offered	B.Ed. Foundation Phase	B.Ed. Foundation Phase	B.Ed. Foundation Phase

And Entry Requirements	B.Ed. Intermediate Phase B.Ed. Senior & FET Phase **And** 26 APS	B.Ed. Intermediate Phase B.Ed. Senior & FET Phase **And** 36+ APS	**And** 28 &/ 29 APS
Online platform(s) used for teaching and learning	eFundi (Sakai); Zoom, MS Teams	Ulwazi (Canvas); Zoom, BigBlueButton, MS Teams	Moodle; MS Teams
Location	Suburban	Suburban	Suburban
Teaching practice	Yearly; 28 days (i.e. 14 days in 1st semester & 14 days in 2nd semester)	Yearly for 6 weeks (2nd semester)	In 4th year for 24 weeks
Availability of computer rooms for teaching and learning	Available	Available	Available

With the exception of New Dawn University, all institutions offer three phases of the teaching degree. New Dawn only prepares Foundation phase teachers at the moment. More so, the structure of all their degrees are different but carry the basic fundamentals of the information required for an initial teacher. Important to highlight however, is the depth and extent to which major subjects are taught particularly within the Intermediate phase up until the senior and FET phase. One institution being a 'faculty' and the other being a 'school' the depth and the extent in which the major subjects are taught as shown in Tables 5.2.1.1. to Table 5.2.2.3. is almost similar. A student will have a major subject from year one and do this in all years of study.

And that is true for New Dawn university as well. Still on curriculum, as Faculties of Education, Hope and New Dawn university offer research module in fourth and Phaphama University does not. Even though the school is the only one amongst the three which offers an elective called 'Financial Planning and Entrepreneurship' at fourth year level, I think an added module such as Introduction to research can assist and better position students should they want to further their studies or just be knowledgeable in the subject area. Financial Planning and Entrepreneurship is important coupled with the research module will be even more beneficial for students.

All institutions use two or more platforms for teaching and learning. As its main teaching and learning platform, Hope university uses Ifundi; Phaphama uses Canvas and the New Dawn uses Moodle. All these platforms are, at their core, student friendly. Given the vast difference in the times (how frequent) and duration the students go for their teaching practice, it would have been ideal to understand the thought process that informed this decision from either a School or Faculty Head and/or a Curriculum Head. It would have been ideal to also get from the aforementioned stakeholders as to what informed the kind of learning management system (LMS) that each institution is using.

Over and above the knowledge gaps and the unanswered questions, all institutions computer rooms available for teaching and learning. This in essence, enables the students to get to the habit of using these sophisticated forms of ATMs in preparation for their own classroom practices.

6.3. Summary of findings

In closing, the last question asked to students was: *In your own view, how can universities better prepare pre-service teachers for ICT use in the classroom for the purposes of pedagogy and fruitful learning?* The students shared worth noting responses based on their overall four-year experience.

In ways more than one, majority of the students shared that there should be a compulsory IT and digital technology crash courses; or a compulsory an introduction to IT in first year for all B.Ed. students. While they acknowledge the efforts done within their institutions in as far as incorporating semester ICT based modules, majority of the respondents write about a compulsory module to teach students about ICTs. This module should further be explicit in how ICTs foster learning, what can teachers do, how can teachers incorporate ICTs given the

sad reality of the state of ICTs in most government schools. In my view, regular workshops on a semester basis can play a major role in these ICT trainings. ICT course must be in all years of study so that students master the language of ICT. Bernstein and Solomon (1999) write about how important it is for a student or child to be taught the language of a certain discourse so that the master the discourse and everything associated with it.

Secondly, there was a general consensus to say, B.Ed. students need to understand and be aware of various software application and their intended purpose. There are a lot of ICTs beyond PowerPoint presentations and other Microsoft applications.

Over and above the students' suggestions in how HEIs can further help them in their journey towards becoming teachers, participants of this study demonstrated an understanding and comfortability in using ICTs for classroom learning and teaching. There is a level of awareness in as far as the affordances of ICTs and these teachers apply pedagogical thought in the kind of ICT they employ when teaching. Moreover, students alluded to the schooling environment and how this allows or hinders their use of ICTs. There is an urgent call made by the students to DBE. They would appreciate it, if the government ensured that the state of ICTs in schools is improved for the better.

6.4. Implications of the findings: Rethinking preservice teacher education in the context of ICT usage in the classroom

Thorough data gathering and review enables the research to realise and come up with interesting models or figures for interpretation. As such, while reviewing and discussing the data gathered in all the three institution a three-fold model to understanding what happens and perhaps should occur at the level of initial teacher ICT training came about. Figure 5.3.1. visually illustrates this.

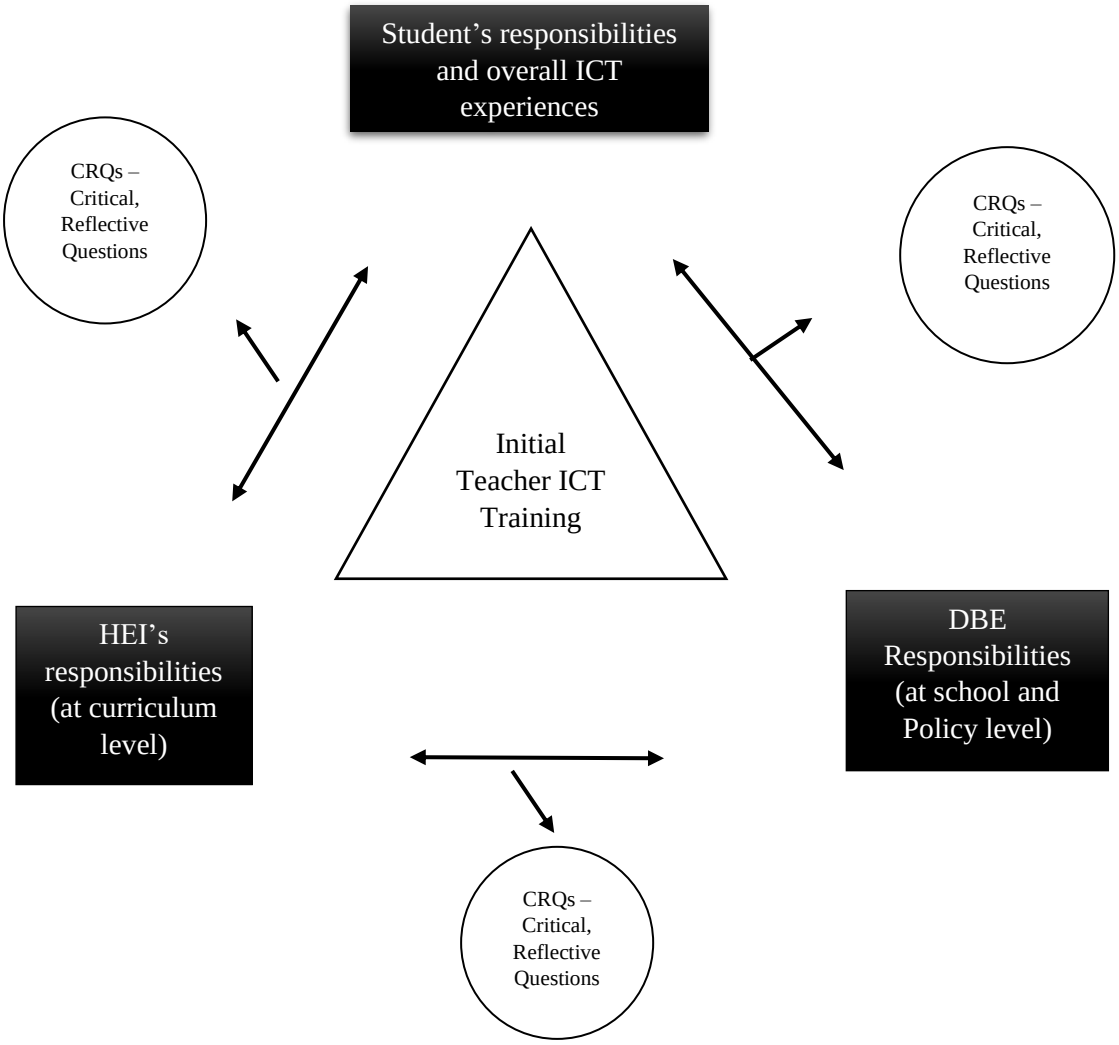


Figure 6.4. Triangulation of ICT Initial Teacher Training

In order for initial teacher ICT training to be successful, I realised that three variables are inextricably involved. At the helm is the student. The student should be aware of their responsibilities. While aware of their responsibilities for the successful ICT training and preparation, the institutions along with the DBE should take into account their overall ICT experiences. As institutions think about designing a responsive and contextually sensitive initial teacher curriculum, the curriculum should be informed by the experiences and perhaps even suggestions of the students. Equally, HEIs should be aware of their responsibilities at the level of curriculum design and general initial teacher training as far ICT is concerned. Needless to say, the curriculum must also reflect the requirements of DBE. Lastly, the DBE should also understand their responsibilities, particularly at the school and policy level.

For example, this is how this triangulation would typically work: hypothetically, let's say the DBE mandates HEIs to produce teachers that have technological knowledge base and skills set upon graduation. Or in their words, "…technologically-savvy graduates." Critical, reflective questions that the DBE must ask themselves are (but not limited to): How is DBE supporting HEIs in order to ensure that the goal is achieved? If the DBE is going to insource or outsource ICT programs for institutions to help students, what will inform the selection and feedback criteria? What will inform the terms of reference in choosing these programs? Guidelines must be clear and stipulate to whom are they directed to, for when (deadlines or time-frames) and what purpose are they intended for? The reverse is true. In other words, how are HEIs supporting the DBE in order to ensure that the goal is achieved? If HEIs are going to outsource or insource ICT programs to help better prepare students to using ICTs in the classroom, what will inform the selection and feedback criteria? What will inform the terms of reference in choosing these programs? And likewise, guidelines must be clear and stipulate to whom are they directed to, for when (deadlines or time-frames) and what purpose are they intended for?

The next variables to be discussed are the HEIs and the student. Central to CQRs between this relationship is the questions (again, not limited to these): How are institutions, at the level of curriculum design, preparing students in the use of ICTs for learning and teaching? Again, if HEIs are going to outsource or insource ICT programs to help better prepare students to using ICTs in the classroom, what will inform the selection and feedback criteria? What will inform the terms of reference in choosing these programs? And likewise, guidelines must be clear and stipulate to whom are they directed to, for when (deadlines or time-frames) and what purpose are they intended for? On the students' side, how are the students meeting HEIs half-way? What after class programs or activities are they involved in to capacitate themselves with sufficient ICT knowledge base and skills set?

And lastly, is the DBE and the student dialogue. Critical, reflective questions to be asked as one thinks about initial teacher ICT training are: How are government schools enabling (or disenabling preservice teachers in using ICTs for classroom practices? In light of the DBE policies, how student-centred are they? In other words, how are students' experiences reflected in the strategic planning and implementation of these policies? What programs or activities are currently in schools to help newly qualified teachers further with ICTs skills, and the language of the field in general?

Fundamentally, in the presence of such levels of back and forth accountability and fertile grounds for reflection, it is my contention that the idea that DBE (or HEIs) is (or are) a 'superstructure' of some sort in the sense that it cannot be called to book, is dealt with. Each variable within this triangulation of ICT Initial Teacher Training is accountable to each other in order for the ultimate goal to be achieved. Figure 6.4. requires the highest level of intentionality, positionality and decisiveness for all parties involved. In so doing, we are a step ahead in rethinking preservice teacher education in the context of ICT usage in the classroom.

6.5. Recommendation for future research

Therefore, what this study recommends are the following:

There is a need for more research of this nature – i.e. Multiple comparative case study research focusing on initial teacher preparedness in South Africa as far as ICTs in education are concerned so that the HEI space gets to reflect, self-correct and improve on their correct implementation measures in attempt to as far as ICT teacher preparedness in concerned. In light of such research critical research questions can include: **(a)** How welcoming is the schooling system to new teachers and their current knowledge-base and expertise: A case for ICT usage in the schooling sector. **(b)** Given the state of ICT readiness in schools, the other question can be: How ready is the schooling system to absorb ICT prepared teachers? A case for transformative pedagogies vs. traditional practices **(d)** Given the strides taken by DBE in pumping ICTs in schools, how far are we? A multiple case study reflecting on the challenges and opportunities for new teachers. **(e)** A case for DBE and HEIs: How are the two institutions holding each other accountable in as far as initial teacher ICT training is concerned? Exploring challenges and opportunities. **(f)** A comparative study on educational leadership in the era of educational technology will equally be as useful to the knowledge tank of this country.

6.6. Limitations of the study

Given the fact that this is a multiple case study exploring the extent to which final year B.Ed. students are ICT prepared, the aim is to not generalise findings from this research. The scope of this study was focused on only three out of a total of twenty-six universities in South Africa. Even though the results are consistent with research before this one in that, ICT preparedness in as far as initial teacher training is a unique challenge that needs an all-on-board approach. HEIs cannot do it alone and DBE cannot do it alone (Brown & Czerniewicz, 2012). Secondly,

blended learning in South Africa classroom is indeed a problem given the realities of our contexts (Van der Merwe et al., 2015). Thirdly, not all universities in South Africa in similar locations experience education the same way nor do the students have similar experiences. The accounts given on this study should rather be perceived within the lens of the four students whom represented each institutions. Generalizations may not be drawn as a result.

Additionally, another limitation is not being able to interview school heads or Faculties of Education Deans and Teacher Education or B.Ed. curriculum Heads so as to get the full extent to which student teachers are prepared. Due to time constraints I had to drop down this cohort.

6.7. Reflections on the study and the entire Master's degree journey

The aim of this study was not to criticize institutions purposefully selected for this research nor reinforce existing forms of inequalities and how they are reflected within institutional demographics or even compare universities according to their 'status' - i.e. Which one is better. Instead this study sought to understand the extent to which final year B.Ed. students are prepared for ICT usage in the classroom across the three universities. To further understand this extent, the structure of their respective B.Ed. curriculums across different years of study were interrogated and discussed in relation to the official policies discussed in Chapter 1 and further analysed in Chapter 2.

The findings of this research gives some insights as far as the extent to which final year B.Ed. students are prepared in using ICTs in the classroom. Chapter 5 painted a picture of this extent through the students' reflective responses. The study gave an understanding of some of students' ICT perceptions. Given the overall ICT training, exposure and knowledge the students are comfortable in what they know. This level of comfortability is accompanied by confidence to being able to use ICTs for learning and teaching purposes. What is of concern and a point also raised by the students is the incapacitation of the large majority of the current teacher cohort and the availability of ICT resources in schools. The cohort of teachers alluded to is still not open to any kind of change. In support of this view one of the students from New Dawn University students reflected, "…*most teachers* ***prefer to use the old traditional method of teaching*** *and* ***will not readily accept*** *any kind of change*." There's only so much a new teacher can do. Some solutions to be explored in relation to this are discussed under section 6.5. Recommendation for future research.

In hindsight, I have learned a lot through this research. I have learned how the university space affords students more than just degrees. It affords them experiences and a language that enables them to contribute to the grand narratives and current affairs. With some of the students we were able to engage on issues beyond the classroom setting and just the greater education spectrum. It was refreshing to listen to some of the insights the students had. During my two-year journey of this Master's degree I also found my voice within academia and started writing opinion pieces. Thanks to the various academic writing discussions and workshops that I had with my core supervisor – Dr. Ian Moll. The links and references to these opinion pieces are shared below.

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Given the opportunity to do this research again, I would physically go to the institutions studied to be see how lecture rooms are structured, the general student life and the actual ICTs present. Initially, I also planned on interviewing Faculty Deans in the case of New Dawn and Hope Universities and the Head of School in the case of Phaphama University along with Curriculum Heads from each institution. Due to time constraints, I could not reach this cohort. I would have loved to hear from them in as far as their vision for initial teacher education, how is that vision translated in the curriculum designed, what are some of the challenges they encounter (from a

leadership, governance and strategic implementation levels) just to name a few areas of interests. Above all these challenges, the experience in the journey leading to the completion of this research and the degree in its entirety was worthwhile.

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