EXPLORING ICT PEDAGOGIC INTEGRATION OF ECONOMICS TEACHERS IN TWO JOHANNESBURG SCHOOLS

BY

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DECLARATION

I certify that this project has not been previously submitted for a degree nor has it been submitted as part of the requirements for a degree. I also certify that the project has been written by me. Any help that I have received in my research work and the preparation of the project itself has been acknowledged. In addition, I certify that all information sources and literatures used are indicated in this piece.

March 2019

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ABSTRACT

This study was designed to investigate how teachers make meaning of the concept of ICT integration and to determine pedagogic value in their practice. This study assumed that teaching and learning are a form of dialogue as conceptualized by Laurillard (1999). The conceptual framework developed also drew on the interactive equivalency theorem (Miyazoe and Anderson, 2010) and the taxanomy of affordances (Conole and Dyke, 2004). Data was collected through both interviews and classroom observations. The interaction equivalency theorem was used to analyze the different interaction modes that happen in the classroom. The study found that learner to teacher interaction was the most common and dominant interaction facilitated by the technology. In learner to learner interaction, ICT use was limited to the projection of group activity. In learner to content interaction ICT was predominantly utilized as a source of content through videos, images and text in slides. The key finding of this research is that the use of ICTs can enhance classroom interaction in teaching FET economics.

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LIST OF ABBREVIATIONS

DBE-Department of Basic Education

HOD – Head of Department

GDE–Gauteng Department of Education

GET–General Education Training (Grade R-9)

FET–Further Education Training (Grade 10-12)

ICT–Information Communications Technology

IFP-Interactive Flat Panel

ISPFTED–Integrated Strategic Planning Framework for Teacher Education and Development

LTSM–Learner Teacher Support Material

PD – Professional development

NSLA–National Strategy for Learner Attainment

SMT – School management team

TPACK– Technological Pedagogic Content Knowledge

IWB– interactive flat panel display

DEFINITION OF TERMS

Information Communications Technology (ICT)-refers to digital technologies that may be used for storing information, communication and projecting information, data and content.

Full ICT School- This is a category of school in Gauteng Province that is endowed with digital technologies such as interactive flat panel displace (Smart Board) , laptop for teachers and tablets for learners.

Fee Paying School- This refers mostly to township schools in South Africa that are not exempt from paying school fees.

No Fee Paying School- This refers to township schools that are exempt from paying school fees.

Pedagogy- refers to the art and science of teaching.

Teacher Practice- refers to the enacted methods of teaching.

High School Economics-refers to CAPS approved subject taught in South African schools focusing in economics.

Student-synonymous with learner, any person enrolled for courses within the General Education Training (GET) or Further Education Training (FET) in South Africa

FIGURES AND TABLES

CHAPTER 1

1.1 Background to Study

There is a dominant view that Information Communication Technology is a necessity for human development (Laurillard, 1999; Nkula and Krauss, 2014; Ndlovu, 2015). According to Ndlovu (2015) Information Communication Technology (ICT) is perceived by educational practitioners, policy makers, ordinary citizens as well as teachers and learners as having a significant role in enhancing teaching and learning. The use of ICT for teaching and learning (Padayachee, 2017) has been identified as a top priority in South Africa and deliberate efforts have been made to ensure that ICT integration is embedded into teacher practices. The Integrated Strategic Planning Framework for Teacher Education and Development (DBE, 2011) commits the Department of Basic Education and its Provincial Departments to invest in digital technologies between 2011 and 2025 in order to improve teacher knowledge and practice in each subject area using digital technologies. In addition, the Professional Development Framework for Digital Learning (DBE, 2016) provides a fresh approach in the use of ICT in teaching and its main aim is to define professional development for digital learning in an education system that seeks to improve access, quality, equity, redress and efficiency. However, a lot of questions are being asked (Clark, 2005; Dron, 2012; Padayachee, 2017) on whether ICT should be considered and pursued by teachers and principals. There is compounding literature that suggests that ICT integration in the processes of teaching and learning in the classrooms enhances teaching and learning (Laurillard, 2002; Lim and Khine, 2006; Nkula and Krauss, 2014).

On the other hand, there are studies that refute the effectiveness of ICT integration in aiding teaching and learning (Floden, 1981; Clark, 2005. These studies contend that ICT integration in teaching and learning has a potential to inhibit or limit the teaching and learning of intended knowledge. Empirically there has been no universally agreed upon direction on the integration of ICT in teaching and learning, hence leaving the two opposing hypothesis as a source of contention amongst educational stakeholders. Several studies (Ndlovu and Lawrence, 2012; Ng'ambi, 2013; Nkula and Krauss, 2014; Tarling and Ng'ambi, 2016) report that South African teachers lack technological skills in integrating ICT into the curriculum.

Other studies, for instance, by Nkula and Krauss (2014), reported that teachers lack professional development, technical support and limited access to ICT infrastructure and facilities.

Most studies (Wilson-Strydom and Thomson, 2005; Ng'ambi, 2013; Ndlovu, 2015; Tarling and Ng'ambi, 2016) have managed to conceptualize ICT integration in teaching and learning, yet the actual integration of ICT into teaching and learning is not easily realized in actual teaching practice. This study explored the role of ICT in improving teacher practices in the teaching of FET economics in two Full ICT schools in Johannesburg. In addition, this study developed a conceptual framework as well as a classroom observation tool for ICT integrated lessons. The conceptual framework utilized the interactive equivalency theorem by Anderson, (2003) which was used to capture the practice and activities of teachers in the classroom while the taxanomy of Affordances as conceptualized by Conole and Dyke (2004) was used to identify and describe the pedagogic value of ICT in teaching and learning. While this study involved high school economics, its main concern was teaching practices used in the instruction of Grade 11 economics when ICT is integrated in teaching.

1.2 Problem Statement

The adoption and integration of ICT into teaching and learning continues to pose challenges in South African classrooms. In a study carried out by Ndlovu and Lawrence (2012) they discovered that most of the schools that have been furnished with ICT infrastructure are not using it or are using the ICT infrastructure in limited ways. While most studies (Wilson-Strydom and Thomson, 2005; Ndlovu, 2015,Padayachee, 2017) acknowledge the central role that ICT plays in increasing access to knowledge as well as improving the teaching and learning experience , high demands are being placed on teachers to integrate innovative practices and technologies into classroom instruction. As the integration of ICT in schools gains momentum with the Integrated Strategic Planning Framework for Teacher Education and Development [ISPFTED] (2014), it commits all stakeholders to invest in digital technologies to support the delivery of the strategy and makes specific reference to the establishment of an ICT support system for delivering Teacher Education and Development, thereby creating an increased urgency to identify and formulate effective teaching practices used in the integration of ICT in teaching FET economics.

The National Senior Certificate technical report (GDE, 2017), reports that economics pass rate in Gauteng Province was 83.5% for the year 2016. This figure is problematic as a majority of the learners who passed only achieved an average of 30%, this indicates a low performance standard. While economics is taken as an elective learning area, the number of Grade 12 learners that dropped the subject in 2017 is of concern, 26 134 registered to write the final examination and 23 778 managed to write the examination with a total of 2 356 learners absconding from examination. Consequently, economics is perceived as a challenging and difficult subject and if this trend continues, the subject risks extinction from the schooling system and questions around how it is taught and the lack of support for the 2 356 learners deserves to be investigated. A Study carried out by Van Wyk (2009) reveal that economics is mainly taught using the lecture method which is predominantly *chalk and talk* (Sekwena; 2014; Visiliki, Panagiota and Maria, 2016). According to Sekwena (2014) most learners are not motivated and find economic concepts to be abstract. The use of ICT in teaching economics is perceived to improve the teaching methodologies used, hence this study attempted to determine if ICT does change the teaching practices and if these practices have any pedagogic value.

1.3 Aims of the study

Main aim:

The main purpose of this study was to ***identify***, ***understand evaluate*** teaching practices used in the teaching of FET economics when ICT is integrated in the teaching process. My objectives were:

- To identify what is evident and to develop an understanding of ICT integration teaching practices used in teaching FET economics.
- Evaluate the pedagogic value of these ICT integration teaching practices used in teaching FET economics.

1.4 Research Questions

Main research question

The main research question of this study: What is the pedagogical value of the teacher's use of ICT on the instructional practices in teaching Grade 11 economics?

Sub-questions

The three sub-questions to be addressed are:

1. What are teachers' understanding of ICT integration in teaching economics in the FET phase?
2. How do these teachers utilise ICT in their practice in the instruction of economics in the FET phase?
3. What is the pedagogic value of ICT integration in their instructional practices in teaching economics in the FET phase?

1.5 Rationale

There is considerable research internationally (Ertmer, 1999; Laurillard, 1999; Koehler and Mishra, 2009; Graham, 2011; Sim and Bee Theng, 2016) on the integration of ICT into teaching and learning. However, there is limited research (Ng'ambi, 2013; Ndlovu, 2015; Tarling and Ng'ambi, 2016, George and Ongunniyi, 2016) in South Africa that has been conducted on the teaching practices used in the teaching of Grade 11 economics when ICT is integrated into the classroom. Most of the research that has been conducted on teaching practices associated with ICT integration have tended to focus on issues pertaining to ICT infrastructure and access (Lim and Khine, 2006; Lawrence and Ndlovu, 2012) while other studies (Du Plessis and Webb, 2008; Graham, 2011) that have attempted to focus on teaching practices have struggled to construct a conceptual framework that is able to capture different facets of teaching practices used in the integration of ICT. Notable study in this regard was Ndlovu (2015) in her PhD thesis where she utilized Laurillard (1999) communicative framework to look into seven teacher practices based on the type of media used. My interest in this study is to identify the objects of teacher practice as they are enacted and developed in a Grade 11 economics ICT integrated lessons.

1.5.1 Methodological Rationale

According to Hennessy *et al.* (2010) most literature in ICT integration is based on large scale investigations which tell us something about the scale of computer use and the types of applications used yet most of these studies are silent about the nature and appropriateness of the use. In addition, Hennessy *et al*. (2010) acknowledge that there is little research in mainstream schools concerning ICT integration at classroom level. This study followed a case study approach where two Grade 11 economics teachers were closely observed and interviewed in order to understand their ICT integration practices in Grade 11 economics teaching.

1.5.2 Policy Rationale

This study interpreted ICT integration based on the existing South African policy documents that assert ICT in education. One major policy document was the White paper (DBE, 2004) which was developed to give guidance on how ICT maybe used to enhance the curriculum. However, the White paper (DBE, 2004) is meant to be read and understood in conjunction with the CAPS (DBE, 2012) document. The White paper (DBE, 2004) makes explicit the importance of acquiring ICT skills for teaching and learning. The Curriculum and Assessment Policy Statement (CAPS) Grades R-12 (DoE, 2012) states as one of its aims to produce learners that can communicate effectively using visual, symbolic and language skills in various modes. In this study the researcher was interested in determining how the CAPS policy in Economics and the White paper (2004) influence teacher practice.

1.5.3 Conceptual Rationale

This study was developed on the assumption that effective teaching and learning are a form of dialogue as conceptualized by Laurillard (1999). This study drew on the interactive equivalency theorem by Anderson and Miyazoe (2010) and the taxanomy of ICT affordances by Conole and Dyke (2004). The researcher developed a conceptual framework intended to answer the research questions posed. The interaction equivalency theorem by Anderson (2003) assisted the researcher in illuminating the kind of interaction and activities that exist in

the classroom by focusing on the following modes of interaction which are, teacher to learner interaction, learner to learner interaction and the learner to content interaction. This study assumed that the use of digital technologies particularly the interactive flat panel display is influenced by affordances provided by the board and its applications, this study used the taxanomy of affordances provided by Conole and Dyke (2004) to identify and justify the use of the interactive flat panel display in teaching Grade 11 economics. A marsh of these concepts aided in the development of an analytical tool which was used to interpret and analyze the data collected.

1.6 Chapter Analysis

Each chapter in this study was organized around the three sub research questions which are: (a) what are teacher's understanding of ICT integration in teaching FET economics? (b) How do teachers utilize ICT in their practice in teaching FET economics? (c) What is the pedagogical value of utilizing ICT in teaching FET economics? This study developed a framework of observing ICT integration practices in the teaching of FET economics.

Chapter 1

This chapter focuses on the identification of the problem and considers the context which lead to the development of the research questions that ground this study. I also present a rationale to justify the importance of doing this study.

Chapter 2

Having presented the overview of the study in Chapter 1, Chapter 2 locates this study within the current discourse of integrating ICT into teaching and learning. This Chapter begins with debates around ICT integration in teaching and learning guided by the three research questions discussed in Chapter 1. The Chapter begins by establishing teacher perceptions which play a crucial role in how teachers understand the use of ICT in teaching and learning. This lead to the exploration of literature around teacher practices in ICT integration as well as in teaching economics. In addition, I discuss how pedagogic value is assumed in the teaching of FET economics. In this chapter I developed a conceptual framework which I later used to develop an analytical tool discussed in Chapter 4 to make sense of data collected in chapter 3.

Chapter 3

I discuss the research design and method adopted in this study and justify why a case study approach was appropriate. This chapter includes the selection of the schools and the participants. Furthermore, I explain why I choose to use face to face unstructured interviews to collect data on teacher perceptions and also the use of observations to collect data on teacher practices. Particularly important in this chapter is the use of content and method triangulation in making sense of data collected.

Chapter 4

In this Chapter, I developed an analytical tool based on the conceptual framework developed in Chapter 2. I present and analyze my data through the use of the analytical tool developed for this study. This chapter is built on three craters which are: (a) development of analytical tool (b) presentation and analysis of interviews and (c) presentation and analysis of lessons observed.

Chapter 5

I discuss the research questions and attempt to answer them through the synthesis of data presented and analyzed in Chapter 4 and the literature review presented in Chapter 2. In this chapter I outline crucial evidence from data analyzed.

Chapter 6

In this Chapter, I present the knowledge contribution of this study based on the empirical evidence presented in Chapter 4. I also present practical recommendations towards meaningful improvement in understanding ICT integration in teaching and learning

CHAPTER 2

LITERATURE REVIEW

2. Introduction

In the previous chapter, I introduced the main research question that sought to ascertain the pedagogical value of teachers' use of ICT on the instructional practices of FET teachers in teaching Grade 11 economics. This research question was subsequently followed by three research questions. The first sub question probes teachers' understanding of ICT integration in teaching FET economics. The second research question intended to discover how these teachers are utilizing ICT in their practice in the instruction of FET economics. The last research question was an evaluative question that intended to identify the pedagogic value of these practices in the teaching of economics at the FET phase. This chapter reviewed the relevant literature on ICT integration drawing specifically from theory and empirical studies conducted in ICT integration in education. It drew upon local and international literature on what shapes the perceptions, attitudes and practices of teachers in integrating ICT in the classroom by interrogating the theoretical perspective on what influences ICT integration and how these conceptual understanding affect the use , perception and practice of teachers. Central to this chapter was the development of a conceptual framework that drew on the interactive equivalency theorem (Anderson, 2005) and the taxanomy of affordances (Conole and Dyke, 2004). The conceptual framework helped in the development of an analytical tool that is developed and operationalized in chapter 4 to make sense of the data presented.

2.2 Teacher perceptions on the use of ICT?

There are several studies (Koc, 2005; Mohammadi, Abrizah, Nazari and Attaran, 2015; Gebremeskel, Kebede and Chai, 2016; Tarling and Ng'ambi, 2016) that have explored teacher perceptions on the use of ICT for teaching and learning, however most of these studies focus on extrinsic barriers that have to do with issues of access to ICT infrastructure, training support and learning environments. These studies seldom focus on intrinsic motivations and perceptions that are related to beliefs, discourse and philosophies held by

teachers. According to Wilson-Strydom and Thomson (2005) locating teacher perceptions on the use of ICT for teaching and learning is a challenging task that requires the conceptualization of the concept integration and why teachers integrate. Furthermore Wilson-Strydom and Thomson (2005) are of the view that teacher perceptions on the use of ICT for teaching and learning are influenced by the teachers' epistemological assumption. Mohammadi *et al.* (2015) concur and indicate that the choices teachers make about the technologies they deploy are a reflection of their skill, pedagogic values and philosophy they endorse. This study will focus on three dominant learning philosophies which are behaviorism, cognitivism and constructivism. I will expand on how these influence teacher perceptions, in other words, this approach challenges us to think and work in light of teacher practice, action and motivation within the classroom on the use of ICT for teaching and learning, which was the main focus of this study. According to Moll (2013) this approach provides an alternative way of thinking about integration, therefore I present these learning theories below and how they affect teacher practice through assumptions they make about the role of the teacher , learning , learners and learner activities.

2.2.1 Behaviorist perceptions on the use of ICT

Gebremeskel, Kebede and Chai (2016) conducted a study on how ICT affected behavioral change in learning. They are of the view that learning exhibits itself as change in behavior and the influence of learning is made by comparing what behavior is possible before learning and behavioral change after learning. The teacher perceives learners as passive and in practice transmits knowledge, skills to learners and seeks to validate learning through the correction of student responses, this correction of responses is designed by the teacher around a series of possible responses and is part of shaping behavior according to Moll (2013).

Within the Smart Notebook use of sorting activities, drag and drop and multiple choice questions with pre-programmed answers maybe viewed as behavioral learner activities and which mirrors Skinners' (1960) teaching machine. According to (Wilson-Strydom and Thomson, 2005) a teacher who holds a behaviorist perception of teaching and learning is likely to use ICT for representational use. The use of ICT in this regards represents a transposition of practice where a teacher would utilize for instance the Smartboard the same

way they would utilize a blackboard. The shortcomings of behaviorism resulted in the development of cognitivist theories that challenged the idea of defining learning solely as change in behavior at the expense of cognitive processes.

2.2.2 Cognitive perceptions on the use of ICT

The cognitivists focused on the mind as a tool for learning through the analysis of memory, focus being the use of the working and long term memory for learning. Cognitivist theorists argue that the child is not passive in the learning process, hence a process such as listening and viewing assume a child to be engaging with content. This notion is also challenged by behaviorists who see cognitivism as a pseudo-science because activities such as thinking are not easily accessible to the eye hence making it difficult to empirically verify such processes. Yet Gebremeskel, Kebede and Chai (2016) argue that cognitivism came as a reaction to the shortcomings of behaviorism. Moll (2013) points us to the assumption that cognitivism encourages the use of ICT by teachers to consolidate new information and develop thinking skills, which is in line with the CAPS (2012) mandate of developing critical thinking skills amongst economics learners. Therefore, concepts learnt must fit in with learner category of processing information. Moll (2013) reports that cognitivism carries with it a significant notion of learner centered instruction and differs with constructivism in that it believes learning processes are innate. Thus learning activities associated with cognitivist learning include individual marking, experimenting and the use of direct experience to allow learners to explore. The pedagogical value of cognitivist approaches lies in their ability to promote autonomy in children's learning and the development of thinking. The pronounced shortcomings of cognitivism lead to the development of constructivism which emphasized both internal cognitive process as well as the external processes of learning through social interaction with other individuals to promote effective learning.

2.2.3 Constructivist perceptions on the use of ICT

Learners in a constructivist classroom are assumed to be active and social. Gebremeskel, Kebede and Chai (2016) state that the focus in constructivism is for the learner to construct their own meaning of new information as they interact with content and other people. Thus constructivism expects a teacher to create a learning environment that allows learners to

construct knowledge and skills through experience, interaction and adult support. Consequently, FET economics (CAPS,2012) requires learners to develop problem solving skills in the process of learning and Moll (2013) concurs and puts forward three distinct tendencies that support constructivism, the first being that knowledge is externally acquired and learnt from experience or audio visual presentations, the second relates to a new understanding of innate factors with regards to the development of reasoning and how it relates to maturation which is viewed as a precondition to learning but not the result of learning. Thirdly constructivism works with the idea of activity based learning therefore more emphasis is placed on the use of technologies or applications that promote interactivity. Thus learner activities should focus on problem solving through a teachers' ability to structure learning experiences and activities that challenge learners to think critically. The pedagogical value of constructivist practices lies in the promotion of collaboration and language development although it assumes that learners are operating at high levels of social and linguistic maturity.

From the above mentioned discussion it is evident that these learning theories hold specific assumptions on learners, teaching practice and how learning should take place. The aim of this study was to explore ICT integration practices as well as their pedagogical value. The discussion above identified different teacher practices inherent in these theories as well as their pedagogical value. In the next section I focused on ICT integration as well as teacher practices used in teaching Grade 11 economics.

2.3 Teacher Practices in the use of ICT

Describing teacher practices is a daunting task, since teaching has several definitions which are located in specific learning theories as discussed above. Teacher practices are driven and influenced by a teacher's beliefs, perceptions and knowledge (Wilson-Strydom and Thomson, 2005). On the other hand Koehler and Mishra (2009) used TPACK to identify knowledge domains required for effective teaching with ICT. According to Koehler and Mishra (2009) TPACK is an acronym that stands for Technological Pedagogical Content Knowledge and is an extension of Shulman (1986) concept of Pedagogical Content Knowledge (PCK). However, they do not make explicit what these knowledge domains are in terms of defining

the kind of knowledge that makes up each component. The shortcomings of the TPACK model reveal that it is easy to conceptualize ICT integration but difficult to identify these domains in teacher practices. However, CAPS (2012) requires teachers to develop strong content, pedagogical as well as assessment knowledge and skills for teaching and learning which has been of interest given the deployment of ICT into schools to promote the later. Thus a more theoretical formulation of the relationship between TPACK knowledge domains and what teachers do in specific learning contexts requires more than one theory to develop the relationship between TPACK and teaching activities. The following practices have been observed;

2.3.1 Orthodox View vs Emerging View in ICT integration

The fields of educational technology and pedagogy are not yet talking to each other. There are two divergent positions that propose two different perspectives in our understanding of technology and pedagogy. Dron (2012) reports that there is an orthodox view of ICT integration and also suggests an emerging view of ICT integration. Dron (2012) is critical of the orthodox view which perceives pedagogy to be a more important aspect than technology in the use of ICT for teaching and learning. In the emergent view Dron (2012) conceives pedagogy to be a form of technology, because both terms relate to the how an individual implement something and hence he sees the two concepts as being equally important in the process of ICT integration. The argument between what should come first pedagogy or technology is dominant in most research literature (Clark, 2005; Moll, 2013; Ndlovu, 2015) that focuses on ICT integration into subject teaching. This argument is seen in the use of product and process approach in ICT integration.

2.3.2 Process Approach vs Product Approach in ICT integration

Most studies in involved in ICT integration (Lloyd, 2005; Henessy *et al.,* 2010; Peeraer and Van Petergen, 2015; Ndlovu, 2015) seldom attempt to define the concept of integration. Lloyd (2005) makes explicit what ICT integration is, while other studies (Henessy, *et al*., 2010; Peeraer and Van Petergen, 2015; Ndlovu, 2015) approached the concept from theories formulated in educational technology hence giving fragmented understanding of the concept. According to Lloyd (2005) to integrate is to seamlessly combine components into a

harmonious whole. Lloyd (2005) uses the metaphor of language and attempts to convince the reader to view integration through the lens of a language which is at times measured against fluency. In this case Lloyd (2005) advocates that we measure integration through technological fluency. It is interesting that Lloyd (2005) views integration either as context and content. The difference between context and content is that context relates to method of teaching while content relates to technological and subject matter knowledge. The didactic interpretation of integration is captured as an argument amongst various studies (Dron, 2012; Peeraer and Van Petegen, 2015; Ndlovu, 2015) where others view integration in the form of levels of adoption while other studies view integration in terms of types (Wilson-Strydom and Thomson, 2005; Ndlovu, 2015). Ndlovu (2015) uses her conceptual framework to explain ICT integration using the process approach which assumes integration to be an invisible operation hidden around dots meant to represent different resources, activities and classroom practices represented in figure 1 below.

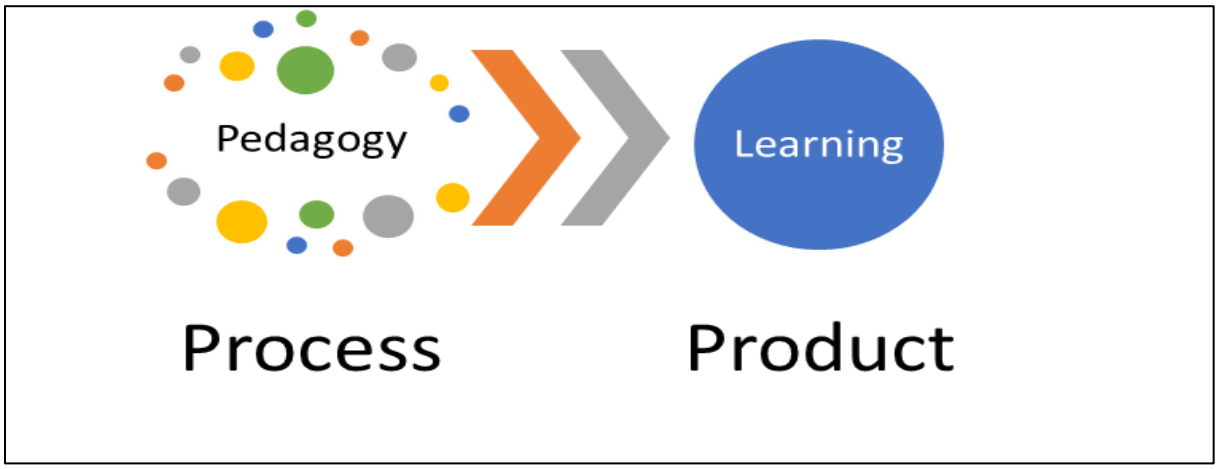

Figure 1: Process vs Product Approach:

Source: Ndlovu, 2015

This understanding is acknowledged by Lloyd (2005) when he describes ICT integration as conditional knowledge which relates to "how" and "when". I would assume that within economics teaching the how relates to the method and medium used to teach a concept or principle while the when will be determined by either teacher wisdom or feedback from learners. This understanding of ICT is the current dominant understanding in South Africa. The challenge with this interpretation is that it does not state explicitly how ICT integration

should take place in practice , this is at odds with the current understanding of the two guiding policy documents the CAPS economics (DBE, 2012) and the White paper (DBE, 2004) whose interpretation has been challenged as not translating to real classroom practice.

2.3.3 Generative use vs Representational Use of ICT

On the other hand Du Plessis and Webb (2008) view integration as transformation in the teaching practice, their view attempts to distinguish between use and integration , where use is interpreted as a form of transposition of old practice into new mediums without change in pedagogy. While transformation relates to change in practice thus Proctor , Watson and Finger (2003) are of the view that ICT integration is a rare occurrence, somehow acknowledging Lloyd's (2005) assertion that ICT integration is easy to conceptualize but empirically difficult to ascertain its existence. Wilson-Strydom and Thomson (2005) distinguish between ICT use and integration, they assert that the acquisition of technical skills and learning about computers amounts to implementation without integration. Furthermore, they view implementation with integration as a situation where learners use ICT to learn and ICT being the center for learning. Wilson-Strydom and Thomson (2005) coined two terms to explain use of ICT in teaching, they assert that representational use of ICT involves using ICT to project content and the assumption is that learners are passive. On the other hand, they assert that generative use of computers involves the use of ICT to facilitate learning and the assumption is that learners are active in the process of teaching and learning. Gauteng province has experienced a lot of success in providing ICT infrastructure to schools according to the GDE close out report on *ICT project* (2016) ICT integration is reported to be very low in practice. The challenge is in identifying what constitutes an ICT integrated learning experience, hence this study seeks to determine teacher pedagogic practices in teaching high school economics in two schools in Johannesburg North district.

2.4 Approaches to teaching Economics

There is limited research in South Africa that has been conducted in economics education in FET classrooms with the aim of improving teaching and learning (Van Wyk, 2009; 2012; Sekwena, 2014). According to Van Wyk (2009) the dominant teaching approach used in teaching high school economics is a lecture method which predominantly involves chalk and

talk. In response Sekwena (2014) attempted to develop an active learning framework in teaching high school economics with the aim of enhancing learner engagement. The study revealed that economics teachers are not willing to adopt learner centered approaches to teaching the subject, although he reports in his findings that learners gain a deeper understanding of economics concepts when teachers engage them in learner centered approaches. From a different perspective, Vasiliki, Panagiota and Maria (2016) explored learner centered approaches to teaching economics in the context of the Greek Senior high school. The two studies mentioned explored similar innovative approaches to teaching high school economics although other approaches were interpreted slightly differently. This study will focus on the dominant approaches mentioned in both studies which will be used as a litmus test to prove teacher innovation in teaching high school economics using ICT. The following approaches have been identified in both studies.

2.4.1 Project Based learning

Sekwena (2014) describes project based learning as an approach that uses problem approach and allows students to solve realistic problems that reflect the decisions and dilemmas that people face on a daily basis. Moreover, Vasiliki, Panagiota and Maria (2016) view this method as an experiential teaching method that helps students develop many skills such as management and implementation of complex plans. The two studies agree that this method allows active learning and participation. Sekwena (2014) argues that most teachers struggle to implement a problem based approach in teaching high school economics.

2.4.2 Cooperative learning

Vasiliki, Panagiota and Maria (2016) state that cooperative learning involves the use of group work to complete tasks. They explain that groups are assigned tasks by the teacher or other students and the key success of this method is the interdependence of students in completing the task. Sekwena (2014) points out that this is a common and preferred method but can be chaotic if not properly managed and structured.

2.4.3 Simulation Games and role play

Van Wyk (2012) looked at the use of games in teaching high school economics and revealed that games encourage active learning. Sekwena (2014) concurs and described the use of simulation as a model that uses a proportion of reality in a controlled way to reproduce the social, political and economic system. He asserts that students assume roles and attempt to understand how a system works. The focus of games and simulations is hinged in the concept of situated learning according to Sekwena (2014).

2.4.4 Use of Experiment

Sekwena (2014) views the use of experiments and demonstrations as an approach to teaching high school economics. He asserts that the use of experiments helps teachers to illustrate concepts and engage learners in the learning process. He does not articulate how experiments are applied in teaching high school economics but describes the benefits of using the approach. Vasiliki, Panagiota and Maria (2016) describe experiential learning as a method in which the teacher purposely engages with students in direct experience and focused reflection in order to increase knowledge, develop skills and clarify values. In their view teaching is designed to engage students with direct experiences which are closely tied to real world problems and real life situations. In this approach the teacher is a facilitator than a director of learning.

This section attempted to get an understanding of teacher practices in ICT integration as well as teacher practices used in teaching high school economics in South Africa. In this section I explored the various conceptions of ICT integration and teacher practices used in the instruction of high school economics. The main challenge identified was defining the concept of ICT integration since the concept takes many forms when applied to teacher practice, however this discussion enabled the researcher to identify concepts that were used to develop a conceptual framework for this study as discussed below.

2.5 Conceptual Framework

Figure 2 shows the conceptual framework that I have developed for this study in light of the research questions posed and the literature review. What most studies have not done is to

provide evidence of teaching practices used in teaching, when ICT is integrated into teaching FET economics and reporting on the pedagogical value of such practices. In determining the evidence required in developing a conceptual framework. I reflected on the main research question which explored the pedagogical value of ICT integration in teaching Grade 11 economics. In attempting to determine the worth of this question, I designed a framework influenced by three components; (a) context ,which is an ICT mediated classroom,(b) teacher practices which were observed through the interactive equivalency theorem (Miyazoe and Anderson,2010), (c) pedagogical value, which was determined by ICT affordances as conceptualized by Conole and Dyke (2004).

The challenges associated with creating an authentic tool to observe and analyze classroom practices on the use of ICT integration prompted the researcher to fuse two theories in creating a framework which was used as a lens of analysis data collected. The conceptual framework consists of three components that are essential for ICT integration, which are an ICT mediated classroom context, the interactive equivalency theorem (Anderson and Garrison, 1998) which was used to identify teacher practices and ICT affordances (Conole and Dyke, 2004) that were used to determine the pedagogic value of teacher practices when ICT is used in the instruction of Grade 11 economics. These components are explained below.

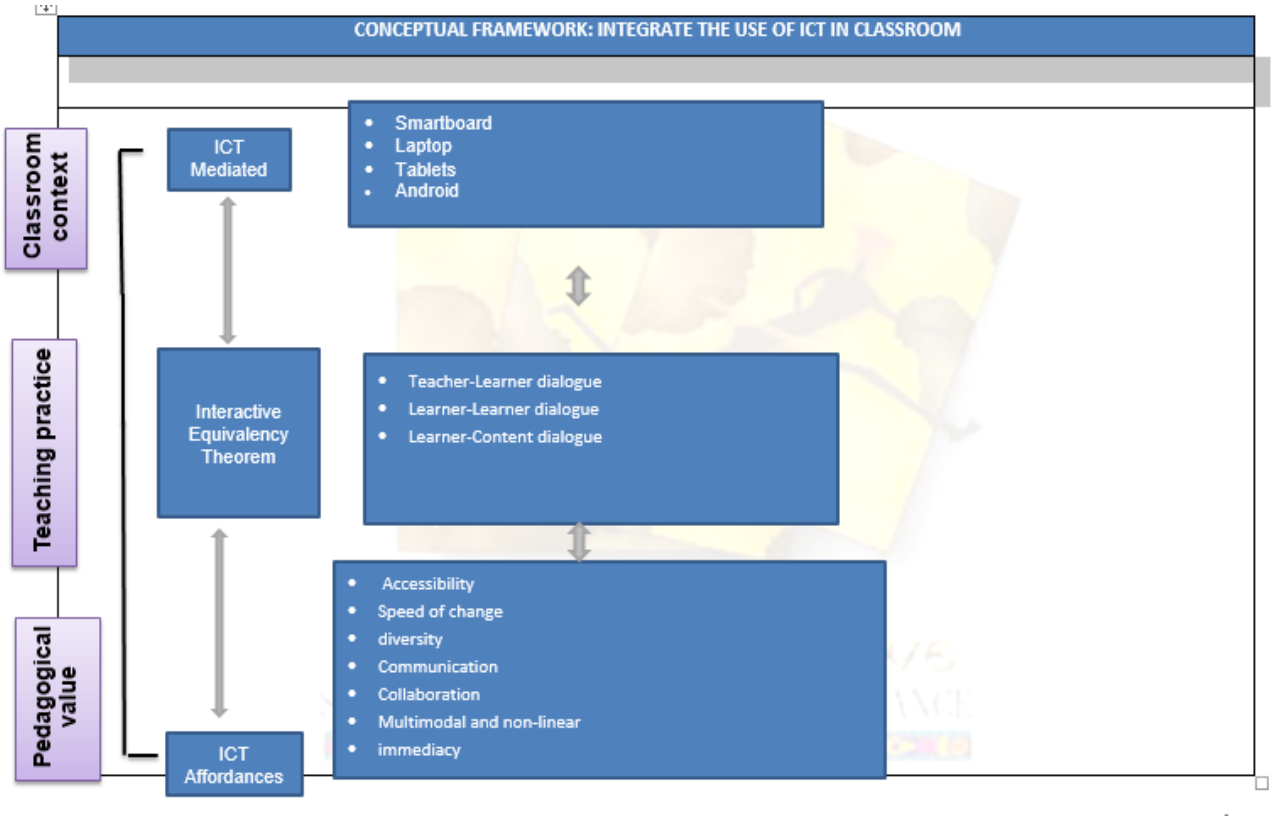

Figure 2: Conceptual Framework

2.5.1 ICT Mediated Classroom

It is not easy to define ICT in education since the concept takes different forms when used by various education practitioners. Clark (2005) uses the concepts of instructional media and multimedia to understand ICT integration and describes instructional media as any vehicle used for presenting and delivering instructions. Examples include computers, interactive flat panel display, books, television, newspapers and people. In contrast to multimedia which refers to the capacity of computers to provide real time representations of nearly all existing media and sensory mode instruction. Both instructional media and multimedia are examples of ICT in education. According to Clark (2005) benefits of media are to be found in the cost of instruction, which he reduced to time and access to a number of instructional designs. Despite the cost advantage of ICT in teaching, Conole and Dyke (2004) are of the view that the kind of affordance that an ICT can offer influences its perceived and real use in the classroom.

2.5.2 Understanding the Interactive flat panel display

The dominant ICT in Gauteng classrooms is the interactive flat panel display. According to Bourbour (2014) an interactive flat panel display is a piece of hardware that looks like a standard whiteboard but it connects to a computer and a projector in the classroom. When connected, the interactive flat panel display becomes touch sensitive and maybe controlled using a mouse, hand or special pen. Interactive flat panel displays maybe used with a special software to enable the projection of images, text and audio. In Gauteng Classrooms the Interactive flat panel display is used with Smart Notebook software which offers a variety of tools and features that maybe manipulated to create a particular learning environment. The Smart Notebook features have been created to accommodate educational activities however most of the tools have not been categorized and packaged in such a way that teachers are able to identify a specific tool in relation to a particular pedagogic activity. This study discusses these tools and features in table 1 and offers possible educational uses of the tools although use is dependent on teacher innovation. Within this study ICT will be used interchangeably with interactive flat panel display.

2.5.3 Teaching Practice

This study adopted this theory because of its ability to capture the essence of learning through interaction. Laurillard (1999) describes teaching and learning as a conversation, placing interaction as a central activity that determines learning. According to Anderson and Miyazoe (2010, p.1) interactions are, "reciprocal events that require at least two objects and two actions. Interactions occur when these two objects and events mutually influence each other". The three types of interactional modes that exist in the classroom according to the interaction equivalency theorem (Moore, 1989) are learner to teacher, learner to learner and learner to content. These three modes of interaction will be used to analyze teacher practices within this study. Anderson and Garrison (1998) expanded Moore (1989) idea of the three-part model of interaction to include teacher to teacher and teacher to content; however, they do not make explicit when these are utilized in practice, I would assume that they are used during lesson preparation however for the purpose of this study the later will not be used, as the focus will be on the three part model of learner to teacher, learner to learner and learner to content. According to Anderson and Garrison (1998) deep and meaningful formal learning is supported as long as one of the three forms of interaction is at a high level in terms of dominance, while the other two maybe offered at minimal levels or eliminated without degrading the educational experience. This study is of the view that in the South African public school context where classes are large and teachers deal with a lot of diverse learners in terms of language, race, culture which in turn the influence learning experience, the three modes of interaction should be visible in various degrees in one learning event in order to enhance deep and meaningful learning of subject matter.

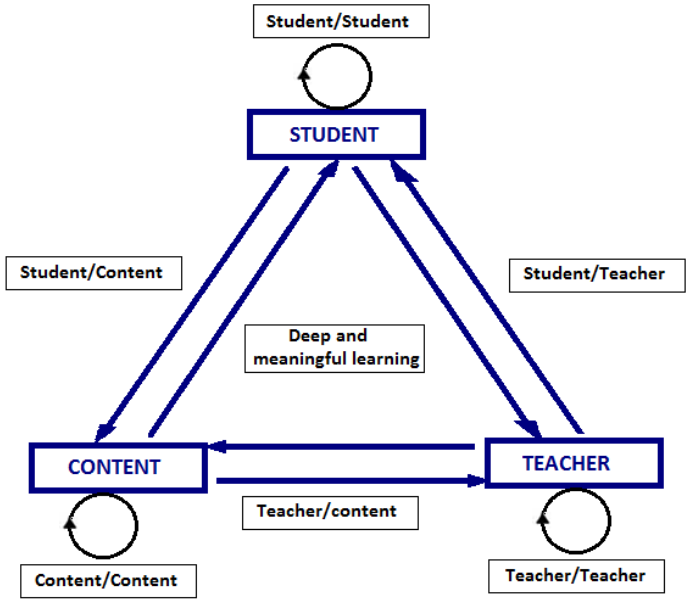

Figure 3: Interactive equivalency theorem

Source: Anderson, 2003

The interactive equivalency theorem as proposed by Moore (1989) does not define the content of these interactions, for example in learner to content interaction, it is not specified what kind of knowledge makes up content nor does it clarify the kind of activities involved in teacher-learner and learner –learner interactions. In the context of economics teaching in South Africa and as adopted in this study content will refer to the subject matter its concepts, procedures, ideas, explanations as well as its domicile where it is found particularly in terms of digital media. Learners interact with content when they participate cognitively, emotionally and physically accessing it through digital media in the context of this study. Learner to learner interactions would involve group and peer learning activities either mediated through ICT or not mediated through technology. The teacher to learner activities would include guided and unguided learning either through teacher transmission of knowledge or mediated through technology.

2.5.4 The Pedagogic Value of using ICT to Teach High Economics

The introduction of ICT into mainstream schooling by the Gauteng Department of Education creates an opportunity for teachers to be innovative and experiment new teaching methodologies a view shared by Henessy *et al.* (2010). The CAPS (DBE, 2012) advocates for constructivist learning approaches that involves active participation amongst learners in the learning experience particularly in the process of meaning making. Peeraer and Van Petegen (2015) perceive ICT to have features that are able to promote constructivist learning approaches.

The learning area economics Grade 11 is offered as a subject in the CAPS document (DBE, 2012) from grade 10-12. The CAPS document (DBE, 2012) is prescriptive and has paced and categorized topics to be taught weekly and termly. Teachers are required to follow the curriculum religiously for the purpose of creating uniformity across South African schools. Although ICT is mentioned in the CAPS document (DBE, 2012) with examples of technologies being suggested for use in teaching, the policy document does not explain how teachers may integrate ICT into teaching and learning.

The CAPS document (DBE, 2012) has identified the following skills and knowledge that should be developed in economics learners. Central to the skills mentioned is the idea of using economics to develop problem solving skills through efficient use of resources, decision making, critical thinking using basic principles that underlie economic processes and practices. Thus this study is interested in determining the influence of ICT integration practices and their pedagogical value in developing the skills mentioned by the CAPS document (DBE, 2012).

Pedagogic affordances of ICTs

Hammond (2010) states that an affordance is a relation between an organism and an object, with the object being perceived in relation to the needs of the organism. Hammond (2010) asserts that the concept of affordances is contested and difficult to apply. I have found little evidence of this idea being taken up; the fields of technology and pedagogy are not yet talking to each other tangibly but theoretically. There is research into technological pedagogy in particular the advantages of using technology to teach and learn yet there is little research that has been conducted on how teachers may use ICT's in their specific contexts as well as subjects or disciplines, this applies to high school economics taught in South Africa. Nevertheless the few articles that I did find Ndlovu (2015) and Padayachee (2017) were very illuminating, both studies show how ICT integration promotes constructivist learning approaches.

Woolgar (1991) looked at how ICT's should be viewed in relation to pedagogies and offered a framework of assumptions of interpreting these ICT's by stating that we should look at the assumptions the tool makes about the user, the activities it encourages and the way it enables or constrains certain activities. Cox, Webb and Abbot (2003) are of the view that the way ICT is used in a lesson is influenced by the teachers' knowledge about their subject and how ICT is related to it. Cox *et al.* (2003) argue that ICTs enable effective collaborative work and teachers are able to give extensive feedback and receive feedback from learners after listening to their explanations via different types of media. Cox *et al.* (2003) contend that whole class use of electronic whiteboards has both positive and negative effects. It promotes pupils' debates and helps learners visualize difficult concepts and processes. The table below provides an interpretation of ICT affordances by (Conole and Dyke, 2004).

Table 1: Taxanomy of ICT Affordances

Affordance	Interpretation
Accessibility	Relates to access to vast amounts of information through a variety of different mechanisms.
Speed of change	This relates to the immediacy of access to rapidly changing information or events as they happen.
Diversity	According to Conole and Dyke (2004) ICT offers adverse experiences that inform teaching and learning.
Communication and Collaboration	These are two distinct affordances and according to Conole and Dyke (2004) ICT is perceived to develop new forms of dialogue and new means of communicating and sharing information.
Multimodal and non-linear	The non-linearity of the web is espoused by hypertext and the use of search engines which is believed to encourage different routes and forms of learning.
Immediacy	The speed with which information can be exchanged via the web and e-mail has led to a shift in user expectations in terms of responses.

Source: Conole and Dyke (2004)

Conole and Dyke (2004) created a taxanomy of affordances in relation to the use of ICT in teaching and learning. They built their taxanomy based on Salomon's understanding of an affordance. Salomon (1993) described an affordance, "as the perceived and actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used" (p. 51). Within this study the concept of affordances has been used to give descriptive language in the interpretation of real and perceived use of the interactive flat panel display using smart applications and to understand teacher activities regarding the use of the interactive flat panel display in the teaching of Grade 11 economics in two full ICT schools in the Johannesburg North district. Table 1 above describes the selected affordances and what the entail for this study.

There are 10 affordances in the taxanomy created by Conole and Dyke (2004). This study has chosen to focus on seven affordances which have a bearing on this study particularly on the

use of the IFP for teaching and learning. This taxanomy is useful for this study as a means of capturing teacher perceptions on the use of the IFP and to understand the reasons why they use certain features the way they do. This study has gone further to categorise features and tools offered by the Smart Notebook, this has enabled the researcher to attach an affordance to the use of a specific tool and feature , the language used in describing affordances offers this study a technical language to describe reasons behind the use of the tool or feature.

2.6 Conclusion

This chapter has reviewed literature on ideas and concepts pertaining to the integration of ICT in teaching and learning economics. The researcher attempted to look at literature that could provide a guide to the research questions posed which lead to the crafting of a conceptual framework of the study and subsequently the development of an analytical tool which will be discussed in chapter 4. Additionally, the literature also aided the researcher in identifying possible data collection instruments which will be discussed in the next chapter which focused on research design and methodology.

CHAPTER 3

3.1 RESEARCH METHODOLOGY

In the previous chapter, I discussed the literature review and developed a conceptual framework. In this chapter, I discuss and describe the research design and methodology that was employed in the study. I present the description of the schools as well as the profiles of participating teachers involved in the study. In addition I describe how data was collected and analyzed, guided by the three research questions, I discuss the use of face to face semi structured interviews which was used to collect data relating to the first research question, "What are teachers' understanding of ICT integration in teaching FET economics?" I proceed to discuss the use of classroom observations as an instrument utilized to collect data responding to the second research question that seeks to establish, how teachers utilize ICT as a mediator for teaching and learning in the instruction of economics at FET phase. Furthermore, the researcher discusses the use of two types of triangulation of data which have been employed in this study which are content and methodological triangulation through the use of interviews, observation and use of the analytical tool which focused on the aim, objectives and research questions posed. Therefore, through the triangulation of data we are able to determine the pedagogic value of the use of ICT in teaching FET economics in the process of exploring the third research question of this study. Lastly, I discuss issues that concern validity, reliability and ethical considerations within the study.

3.1.1 Research Design

This study adopted a qualitative research approach. A qualitative research study according to Johnstone (2000) is concerned with how individuals and groups view, understand the world and construct meaning out of their experiences. A qualitative research tries to explore the perceptions and attitudes of individuals given to certain event and thing. This study has drawn on the qualitative approach because; it is concerned with the teacher practices used when ICTs are integrated in the teaching of Grade 11 economics.

The study was conducted as a case study research. A qualitative case study according to Hatch (2002) investigates a contextualized contemporary phenomenon within specific boundaries bounded in education and this includes a program, an event, a person, a process,

an institution or a social group. This study has used a qualitative case study because it focuses on teacher practices used when ICT is integrated in economics teaching in Grade 11. In particular, the study aims to explore how these teachers use and integrate ICT in teaching Grade 11 high school economics.

3.2 Sampling

A qualitative research study focuses on few people for detailed data; in order to provide a better understanding. Sampling in a case study research deals with selection of participants in the study research. This study used a purposive sampling in selecting the participants in the study. Purposeful sampling involves intentional selection of individuals or sites that will help develop an in-depth exploration of the central issue (Creswell, 2012). In this regard, two schools were chosen where research has taken place. The selection of the school was based on its classification as a Full ICT school in the Johannesburg North District. A full ICT school is endowed with ICT infrastructure in the form of learner tablets and smartboards provided by the Gauteng department of Education. A school is conferred this status by the provincial MEC as a reward for outstanding matric results. The two schools under study are both township schools in Johannesburg North district. This has helped the researcher to gather useful information regarding use and integration of ICT in the teaching of Grade 11 economics.

Purposeful sampling was also used to select the participants in the study. The study selected 2 in- service Grade 11 economics teachers who use ICT in the instruction of Grade 11 high school economics. The in-service teachers were chosen based on economics teaching and their ability to utilize ICT in the teaching of high school economics. This was deliberately done to gain an understanding of their practices in integrating ICT in teaching Grade 11 economics focusing on what ICT is used, how it is used and why it is used.

3.2.1 Background of the school and their participants from the interview

The schools that participated in this study are located in an urban township area in Soweto, Johannesburg. The two schools are in a challenging neighborhood both financially and socially. However, both schools have defied the odds and have managed to acquire the full ICT status based on their previous matric results. The two schools are no-fee paying schools

and have been resourced under the Schools of the Future Project in Gauteng Province (GDE, 2014). The two schools are endowed with similar ICT infrastructure. Table 2 below captures resource and biographic information of school A and school B represented by teacher A and teacher B respectively. A majority of learners in both schools are African and are second language speakers of English which is the language of Teaching and Learning in schools. Economics is offered in English and does not have substitute resources in the 11 official languages except for Afrikaans, a previous dominant language for teaching and learning.

Table 2: School Background and Resources

	Number of Interactive White Boards	Teacher laptops	Connectivity	Number of Teachers	Number of Learners	ICT Policy	Class size for Grade 11	Other technologies
School A	6	16	yes	45	1300	yes	21	▪ OHP ▪ Smart Note book ▪ Television
School B	8	21	yes	52	1400	yes	32	▪ OHP ▪ Smart Note book

3.2.2 Profile of participating teachers

Table 3 below presents the profiles of two participating teachers. The two teachers selected for this study have an age gap of 26 years and 14 years in terms of work experience. Both teachers teach Grade 11 Economics and utilize ICT in teaching. In the next section I discuss the data collection instruments used for this study.

Table 3: Profile of Participating Teachers

Participants	Age	Gender	Experience	Subjects	Qualification
Teacher A	53	Male	15 years	Economics and EMS	B.A. General PGCE
Teacher B	27	Male	1 years	Economics and Accounting	B. Ed

3.3. Data collection instruments

This research study has primarily utilized two data collection instruments which are classroom observation and face to face interviews with teachers. These instruments are discussed in relation to how they have been used to collect appropriate data in line with the research questions posed.

3.3.1 Face to Face interviews with the teachers

Case studies use interviews as a method of data collection. Interviews are special kinds of conversations that are used by the researcher to explore the informant's experience and interpretation (Hatch, 2002, p. 91). Data for this study came from interviews with the two Grade 11 economics teachers of the schools chosen. The study used semi-structured interviews to collect data. Semi-structured interviews are sometimes called formal interviews, whereby the researcher is in charge of leading the interview by coming with guiding questions, setting the length time of the interview and in most cases record the interview (Hatch, 2002, p94). Hatch (2002) also argues that semi-structured interviews are both structured and flexible and are open to follow the leads of informants and probe into areas that arise during the interview. The researcher focused on participants' knowledge and experiences of ICT integration, its benefits, challenges and pedagogic value. Semi-structured interviews were used in this case because of their open ended questions to capture the perceptions of the participants and the enacted practices that are seldom espoused in lesson delivery.

3.3.2 Observations of ICT Mediated lessons

Data was also collected through classroom observations which facilitate the collection of rich data in natural settings. According to Silverman (1994) richer data means a better description and understanding of what goes on in a particular context. Two lessons were observed in each school, the ICT mediated lessons were in Grade 11 economics. During the lesson observation the researcher kept a record of the espoused teacher practices. The researcher also took a careful note on the strategies used in teaching various aspects of economics using ICT. The two observed lessons used the interactive smartboard as a dominant technology through the use of videos and presentation application.

3.4 Validity and reliability

Validity in a qualitative research study refers to the degree in which there is congruence between the interpretation of the participants and the researcher (Mcmillan and Schumacher, 2010). In ensuring validity, the transcripts of the interviews were taken back to the participants to verify the information collected by the researcher during data collection; to ensure that they were no misunderstandings and misinterpretation of information. According to Maree (2007) reliability has to do with the consistency of an instrument to give the same results if the research is repeated. In ensuring reliability, the research study used two data collection instruments to validate the extent of complementarity of these data sets. The study was conducted as a case study, which means its findings are meant to provide an understanding of class observation and not be generalized.

3.6 Data analysis

This is a case study of two in service teachers utilizing ICT in teaching high school economics, the analysis process, on the whole, tended towards the descriptive with teaching practices, methods and strategies being a focus. The interviews with the two teachers including classroom observations, the literature reviewed and data interpreted using the analytical tool were used to further enrich the description of teacher practices. The researcher brought the two data sources together in a condensed form. Analyzing the methods, strategies and practices that is subsumed within the pattern, as well as patterns themselves, allowed preliminary inferences to be made about the environment under study. To begin the final data analysis, the researcher had to be selective, and put into the same category all material from both observations and interviews that spoke to one theme, e.g. to categorize the data.

Data collected from the instruments used was interpreted qualitatively by means of content analysis. It basically, entails arriving at an assessment of what the results mean, and discussing how they relate to other relevant studies. Substantive statements were identified, in terms of whether they actually make a point, answered a question, added to the conversation and information gathered. This was done by, firstly, highlighting all the substantive statements and doing away with repetitions and other clearly irrelevant material. Secondly,

the researcher compared material within categories derived from the highlighted statements, to look for variations and similarities in meaning. Then the researcher compared across the categories, to discover connections between themes. This was a way of making sure that the research results were reliable and valid. The goal was to integrate the themes and concepts, into a theory that offers an accurate, detailed interpretation of the research data. In this study the researcher used two types of triangulation which are theory and methodological triangulation. According to Denzin in Bryman (2008; p. 542), "theory triangulation employs a number of different theories to explain the conclusions of research, while methodological triangulation utilizes a combination of more than one method for gathering information. By using theory and method triangulation the researcher relied on interviews, observations and the analytical tool. All of these methods focused upon the requirements of the research questions, aim and objective of the study. Once all the transcripts of the recordings of specific data were classified, and summarized, revealing various patterns in the data, the research questions and objectives of the study were used to initiate the discussion. Below the researcher discusses the limitations of the study.

3.7 Limitation of study

The study was conducted within certain limitations and must be read with those limitations in mind. The first limitation to this study is in terms of the available literature on ICT teacher practices in South Africa. There is a well-articulated conceptualization on what ICT integration entails, the challenge is in creating a credible observation tool that will guide an observer in terms of what practices to capture in an ICT integrated Grade 11 economics lesson and determining the pedagogic value of such practices.

Time constraint is another limitation to this study as it was conducted within a short period of time. Data collection time was shortened due to the fact that the researcher is a part time student and full time teacher at the time data was collected. This led the researcher to shadow two teachers from two full ICT schools.

3.8 Ethical issues

The researcher gained permission from the Gauteng Department of Education, Johannesburg North District to have access to the school. Letter from the district was granted to access the school before collecting data. Permission was also granted from the University of the Witwatersrand ethics committee before this research study. The study also ensured anonymity of the participants. The names of the participants, their school and subject areas they teach were not disclosed to ensure anonymity and confidentiality. Participation in the study was also voluntary and the participants were informed about the study before data collection. Information letter and consent forms were given to the participants to indicate their participation. The participants were assured that the information they provided will not be used for any other purpose other than the one stated.

3.8 Conclusion

This chapter has discussed the research approach adopted as well as the data collection instruments intended to collect data that is aligned to the research questions posed. The literature review discussed in chapter 2 was a guide in determining appropriate tools for collecting data pertaining to teacher perceptions and understanding of ICT integration in the teaching of high school economics. The literature also provided a framework of observing teacher practices and a means of evaluating the pedagogic value of these practices. In the following chapter, I present both the interpretation and analysis of data collected.

CHAPTER 4

4.1 DATA PRESENTATION AND ANALYSIS

4.1.1 Introduction

In this chapter, I present the analytical tool I alluded to towards the end of chapter two which draws from the conceptual framework. Before presenting the data aligned with the analytical tool, I found it important to present this tool to help the reader make sense of the data I have analyzed and presented in subsequent sections. The research questions guiding how I do these are as follows. i) What are teachers' understanding of ICT integration in teaching FET economics? ii) How do these teachers utilize ICT as a mediator for teaching and learning in the instruction of economics in the FET phase? iii) What is the pedagogical value of ICT integration in their instructional practices in teaching economics? These research questions aligned with the data that I present and analyzed helped to develop the sections in this chapter. The key sections below that will form the crater of this chapter are as follows :(a) development of an analytical tool (b) presentation and analysis of interviews, (c) presentation and analysis of lessons observed.

4.2 Development of Analytical tool

According to Maree (2007) qualitative data analysis is an ongoing process; whereby data collection, processing, analysis and reporting are intertwined. The processing and analysis of data for the study was an ongoing process since the beginning of data collection process. This was necessary for the study as it allowed the researcher to capture responses on time, verify conclusion and collect additional data where it was necessary. Qualitative data analysis aims to examine meaningful content of the data collected by establishing how participants make meaning of a specific phenomenon in this case economics teaching (Maree, 2007).

In this research study semi-structured interview data was sifted using the analytical tool developed into categories based on similar ideas and concepts that emerged from the data in relation to the literature review as well as the research questions. This helped the researcher to link similar ideas and concepts that emerged from the data. As already alluded to in the preceding discussion in this chapter, one of the challenges faced by most studies is their

inability to construct a tool that is able to capture teacher practices used when ICT is integrated into teaching and learning. The researcher has adapted and developed further an analytical tool used by Ndlovu (2015) part of the reason is to create dialogue around the conversational framework developed by Laurillard (1999) and adapted by Ndlovu (2015) with the aim of interrogating learner participation advocated by constructivists on the use of ICT which is not explicit in Ndlovu (2015) study. Ndlovu (2015) attempted to capture in a reasonable way the practices of teachers but does not distinguish medium used for teaching from the teaching methods used. The horizontal dimension used by Ndlovu (2015) focuses on media forms and affordances but does not specify the practices used by teachers. This study has utilized the interactive equivalency theorem through the use of the three modes of interaction which are teacher-learner, learner to learner and learner-content to capture teacher practices. This study has also adopted the pedagogical value descriptions used in Ndlovu (2015) to make sense of possible pedagogical value of teacher practices in the teaching of Grade 11 economics.

Table 4: Ndlovu (2015) Analytical tool

Media forms	Affordances ⟶	Evidence ⟶	What pedagogical value does it add?
Narrative	Non-linear	Multimodality	Apprehending structure/ connections
Interactive	Immediacy	Immediate feedback	Exploring: misconceptions amended
Communicative	Collaboration	Discussion: class/ group	Re-descriptions of concepts
Adaptive	Diversity	Reproduction: experiment/ role play	Concretising theory: practice
Productive	Articulation	Product: animation/model	Knowledge construction

4.2.1 Categorization of smartboard tools and feature affordances

Since the concept of ICT affordance is multifaceted and takes different forms when used. I decided to operationalize Smart notebook tools and features based on the perceived use for teaching and learning. This was necessitated by the decision earlier to focus on the Smart Notebook which is the dominant ICT used for teaching and learning in this study. I went through the Smart Notebook tools and features manual and created a criteria of use within the

classroom based on content, pedagogy and assessment which are the main knowledge components emphasized by the CAPS (DBE, 2012) for effective teaching and learning. This helped in ascribing pedagogical value on the different tools and features as they were used by the teachers. The table below provides a synopsis of the main tools and features of the Smart Notebook and their perceived pedagogical value.

Table 5: Interpretation and categorization of Smart Notebook tools and features

PACK Component	Features and Tools	Value of the feature and tool affordance
Pedagogy	Smart Import	This feature allows the teacher to convert files created with other applications to smart e.g. PowerPoint presentations maybe converted to smart presentation.
	Smart pages	Pages maybe used as a workspace similar to a black and whiteboard. A teacher may utilize optional digital pens or use that fingers to glide and write on the page. Additional formatting tools are available for manipulating and animating lesson presentation
Assessment	Drag and Drop	An example of an interactive activity that may be configured to give immediate feedback. Learners drag an identified item onto a selected destination usually in answering a question. Learners may drag using a selected pen or a finger.
	Smart Response	This tools comes with templates that allow the user to develop questions that may give immediate feedback and this feature requires connectivity.
	Smart lab	Creating interactive lesson activities Teacher may utilize it as a repository Certain activities require connectivity while others may be done offline
	Fill blanks	An interactive activity where a learner may drag and drop on the smart page, however fill blank activities maybe completed using smart mobile devices.
	Multiple choice Questions	This form of activity may be completed on or offline. Learners identify a correct answer from given options or choices. This may be automatically marked if responses are configured to give feedback.
	True or False	Similar to MCQ, learners identify the correct response by choosing either of the two given responses. Automatic feedback maybe given if responses are configured.
	Sorting Activity	This form of activity requires learners to categorize different items in a given activity. Responses maybe given if the responses are configured
	Labelling diagrams	This form of activity requires learners to identify certain components and name them. Responses maybe given if the task is configured
Content	Smart gallery	This is a repository of resources e.g. Images, voice threads. The gallery also possesses lesson activity toolkit. A teacher may also access themes and backgrounds for display
	Smart exchange	This is a repository for content and lesson already developed in smart notebook.
	Google Connective	Requires the user to have an access account with google. It allows the user to have access to online open education resources such as google classrooms, webquests, cyberhunts and cyber schools.

The table above will be useful in understanding teacher use and practice on the use of the Smart Notebook for teaching and learning. In the next section, I develop the analytical tool and give my justification for adapting a tool that was previously developed by Ndlovu (2015) in her study on the ICT pedagogical integration of seven teachers in South Africa.

4.2.2 Analytical tool for study

Table 4 below gives a diagrammatic representation of the analytical tool developed. The tool has two components of note, the vertical axis represents the application, feature or tool used for teaching and learning. The horizontal axis represents three dimensions the first being the identification of technology as well as the assumed affordances which point to teacher conceptions. The second dimension looks at the interactive equivalency theory which was utilized to determine teacher practices based on interactive modes, where focus was on how technology facilitates each mode of interaction. The third dimension was utilized to determine the pedagogical value of ICT integration practices in the teaching of FET economics. It is important for the reader to note that the main ICT used for mediation purposes is the interactive flat panel display which has been used in lessons observed in this study.

The literature review of this study (Conole and Dyke, 2004) revealed that affordances inherent in ICT determine utilization and adoption of ICT for teaching. In this study seven affordances articulated in the study by Conole and Dyke (2004) were utilized as discussed in chapter 2.

The above discussion explored reasons for the development of the analytical tool and how it has been operationalized in the study. In the next section I present and analyze the interviews and lessons observed from the two teachers.

4.3 Presentation of the analysis of interviews

4.3.1 How do teachers understand the use of ICT for teaching and learning?

The interview questions were structured into three parts with the aim to understand teacher perceptions, practices and if ICT's have pedagogic value when used for teaching and learning.

Table 6: Analytical tool for study

Teacher	Identification of Technology			Interactive equivalency theorem			Pedagogic value
	Application feature and tools	Affordance	Evidence	Teacher-Learner interaction	Learner-Learner interaction	Learner-Content interaction	
Teacher A and B	Slides Videos Images Voice thread Smart lab Smart Gallery Smart exchange Drag and drop Fill blanks Multiple choice True and False Sorting activity Labelling diagrams	Non-linear Diversity Collaboration Articulation Immediacy	Multimodality Reproduction: Role play Discussion/class/ group Product/animation Immediate feedback	How does the use of technology enhance this form of interaction	How does the use of technology enhance this form of interaction	How does the use of technology enhance this form of interaction	Apprehending structure Concretizing theory Re-descriptions Knowledge construction Exploring misconception and amending

Teacher A

Teacher description

The teacher is 53 years old and has been teaching for 14 years. He has learnt how to integrate ICT from his PGCE studies. The teacher is very enthusiastic about the use of ICT and has made it his mandate to teach himself how to utilize ICT for teaching and learning. This is evident in his response to a question that sort to establish how he came about knowledge of using ICT. *"Yes I did! I studied at university and I had most of it being self-taught at University ICT was integrated to PGCE."*

The teacher convincingly answered the question with an emphatic yes and went on to elaborate how he came to the knowledge of ICT integration, which he acquired as a pre-service teacher. One of the themes that emerged during the interview of teacher A was the perception that ICT is able to motivate learners in the process of teaching and learning.

Motivational tool

The teacher perceives ICT to be a very useful tool that stimulates learner interest in learning. He is of the view that ICT brings the world to the classroom. The ability of the interactive flat panel display to project content visually is seen by the teacher as a means of stimulating learner interest to the content taught. The teacher asserts that;

"It's a very useful tool unfortunately most teachers stick to old ways of teaching. I find ICT to stimulate learner interest."

Presentation tool

In the quote above the teacher bemoans other teacher for sticking to old practices of teaching and proceeds to emphasize the ability of ICT to stimulate learning. Furthermore, the teacher views the use of slides as a means of driving a lesson. Slides have been identified as having the ability to structure and sequence knowledge (Ndlovu, 2015). The teacher's confidence in using slides for teaching affirms the strength of slides in presenting knowledge. According to

the analytical tool presented in Chapter 2 and devised for lesson observations, slides have a pedagogic value of sequencing and creating structure of content to be presented.

"You can use a PowerPoint as a way of driving the lesson or as a supplementary tool."

The teacher states in one of the questions that he views ICT as a helper in delivering his lessons affirming the quotation above, but maintains that the use of ICT is dependent on his knowledge and innovation. It was interesting to hear the teacher assert that his use of ICT is influenced by the kind of learners he is dealing with. For the lower classes he tells his learners to view ICT as a toy, he deliberately does this in order to encourage his learners to adopt and experiment use of ICT for teaching and learning.

Use of ICT is dependent on innovation

While the aforementioned question related to perception it also gave a direct interpretation on how the teacher utilizes these devices. A follow up question sort to determine if the teacher is aware of ICT related teaching practices. The teacher responded,

"Maybe I don't understand the question, not directly they rely on one's innovation."

It is worth acknowledging that the response given to the above question attempts to answer the research question on what practices are evident in the use of ICT in teaching high school economics. The teacher was not able to identify a specific practice but projects a deep understanding that the use of ICT relies on his knowledge and teaching innovation. The literature review section attempted to understand ICT practices associated with teaching and learning and what was evident from the review was that literature is conflicted and presents various interpretations of what ICT integration entails. While the teacher did not explicitly provide practices associated with his use of ICT, he was able to identify applications and devices that he uses for teaching and learning, such as the smartboard, cellphone and laptop.

"Eeh, I use the Smartboard and integrate with iPad or cellphones, eeh with a smartboard you get learners to participate and make them an integral part of learning. As they go and touch and inter act with the board they enjoy that and they don't realize that they are being exposed not only to economics but to ICT."

Active learning

The need to improve learner participation in the process of teaching and learning was identified as a reason for the integration of ICT in teaching FET economics.

The teacher's response was insightful in that he identifies the pedagogic value of utilizing ICT for teaching and learning as providing an expanded opportunity of not only learning content but the technology which he believes learners enjoy when they interact with the smartboard in teaching and learning. This aspect is captured by an affordance associated with the provision of diversity whose pedagogic value lies in the reproduction of knowledge and opportunities of role playing in the learning process.

Table 7 provides an analysis of the interview using the analytical to design for the study. The data reveals that teacher-learner interaction will be driven by presentation software in the form of slides and video. The teacher was silent on the use of ICT to promote learner-learner interaction. Learner-content interaction is visible because teachers perceive ICT to be an innovative content and lesson projection tool.

Table 7: Interview interpretation for Teacher A

Teacher	Identification of Technology			Understanding PCK			Pedagogic value
	Application feature	Affordance	Evidence	Teacher-Learner interaction	Learner-Learner interaction	Learner-Content interaction	
Teacher A	Slides	Non-linear	Multimodality	Used to sequence content	n/a	Projects real world examples	Apprehending structure and articulation
	Videos	Diversity	Reproduction: Role play	Supplement content	n/a	Used as a source of content	Concretizing theory

4.3.2 Teacher B

Description of Teacher B

The teacher is 27 years old and has been teaching for at least a year. He graduated with a bachelor of Education. He utilizes ICT often and was taught and introduced to the use of ICT as a pre-service teacher.

Interpretation of interview

The structure of the questions remained the same as that of Teacher A, the purpose being to determine teacher understanding of use of ICT through the establishment of teacher perceptions and how he determines pedagogic value in teaching FET economics. The questions slightly differed depending on aspects raised in response to questions, this is in line with what happens in semi-structured interviews.

The initial response of the teacher suggests his passion and level of adoption of ICT for teaching and learning. When the teacher was asked about his perception on the use of ICT for teaching and learning, he responded by giving benefits of use and asserted the following,

"For learners to understand better and to see the information clearly and for myself it makes my work a little less eeh! Everything benefits the teacher and learner."

Perceives smartboard as a convivial tool

The teacher views ICT as having a potential of reducing his workload and reports that use of ICT makes his work easy, but also asserts that it makes it easy for learners to understand concepts. From the above mentioned quote teacher B shares the same sentiments with teacher A in that he affirms that ICT are a good content projection tool which influences learner understanding. A follow up question attempted to establish if the teacher experiences or has identified barriers in the use of ICT for teaching. In the teacher's response regarding challenges that he faces when using ICT, he responded,

"Eeh! Challenges, sometimes you find that electricity shutdown, but I don't struggle with technology."

The response indicates that the teacher does not perceive ICT use for teaching and learning as a challenge but identifies an external limitation which he has no control over which is the availability of electricity. The immediate answering of this question asserts the teachers' confidence in using ICT reveals his positive attitude towards the use of ICT for teaching and learning.

ICT used to Project content

The teacher was asked to identify ICT technologies that he uses for teaching and learning and he responded, *"Smartboard, cellphone and I use smartboard when I teach economics especially graphs, it makes it clear, I use the smartboard for clarification. Cellphone I use for internet since my school does not have internet."* The smartboard is used to project economics content mainly graphs and it makes the content easy to read because of the powerful visual presentation. This is affirmed by the multimodality affordance whose main pedagogic value lies in its ability to articulate content. The analytical tool affirms and reveals that certain ICT's like the interactive flat panel display have the potential to present information in various ways and the pedagogic value being the ability to articulate content.

The second question attempted to understand how the teacher uses the smartboard. The teacher asserted that, *"the smartboard, I use my laptop and link to the smartboard. I create knowledge on the smartboard."* The teacher mentions how he fuses the laptop to the smartboard and creates knowledge but does not explain to the interviewer what and how he creates content. In addition, the teacher was asked how often he uses ICT, *"I use these technologies every day."* This response reveals that the teachers' uptake of ICT is positive as already alluded to above, since the teacher acknowledges frequent use and this is in sharp contrast to most research literature (Ndlovu and Lawrence, 2012; Sekwena, 2014; Ndlovu, 2015) that claims low uptake levels of ICT in South African schools.

Pedagogic value

In answering the question on the benefits of ICT for teaching and learning the teacher identified the visual representation of content as an affordance for using the smartboard because it allows him to articulate his content.

The table below presents an analysis of this interview and reveals a similar pattern of proposed use of ICT. The use of slides and video dominate tools to be used for content projection. Learner-learner interaction was not mentioned and the ICT has been restricted to teacher-learner interaction and learner-content interaction.

Table 8: Interview interpretation for Teacher B

Teacher	Identification of Technology			Interactive equivalency theorem			Pedagogic value
	Application feature	Affordance	Evidence	Teacher-Learner interaction	Learner-Learner interaction	Learner-Content interaction	
Teacher B	Presentation application	Non-linear	Multimodality	Used to sequence content	n/a	Projects real world examples	Apprehending structure and articulation
	Videos	Diversity	Reproduction: Role play	Supplement content	n/a	Used as a source of content	Concretizing theory
	internet	Non-linear	Multimodal	research	n/a	Source of content	Construction of knowledge

The analysis of the teacher interviews reveals similar conceived patterns of use and understanding on how ICT should be used in teaching high school economics. The interviews also reveal the use of slides and video as dominant tools perceived to improve learner centered approaches to teaching. The following discussion presents data from classroom observations on how teacher enact ICT integration in teaching FET economics.

4.5 Presentation and analysis of lesson observations

4.5.1 How do teacher use ICT for teaching and learning?

Common descriptive observations

In the two lessons observed it is worth noting that both lessons took a similar structure even though the content of the lessons were different. In both lessons teachers used PowerPoint presentations as a source of projecting content, the video was also used slightly different, in the lesson observed for Teacher A, the video was used as a means of providing additional

content and to concretize theory, while teacher B used the video to address diversity by attempting to relate concepts to learner everyday experience. The slides used in both lessons differed in that teacher A had colorful slides that had text and images, while teacher B slides were linear and were text based without images.

Teacher A

Story telling Approach to teaching

The teacher began the lesson by stating the lesson objectives and outcomes which were projected through the smartboard. The teacher introduced the topic on the functions of money using well – designed slides. The text was bold and visible with eye catching images of different denominations of money, giving learners concrete experiences with the concept of the function of money.

The teacher was well spoken and appeared to have a thorough understanding of the topic. Learners were kept captivated by the story telling approach to teaching. The teacher spoke to the presentation that was a mix of text, images and illustrations. The teacher used a video as a means of deepening the conceptual understanding of learners. The video became a source of enquiry as learners began asking clarity seeking questions. The teacher utilized group work were learners were given an activity of identifying different currencies of the world and matching them with an appropriate country. The activity was a source of motivation and talk. The learners were given an opportunity of presenting their lessons to the class. The lesson proceeded with additional concepts on the main functions of money and the teacher used hide and reveal activity to identify misconceptions. The lesson concluded with learners being given homework.

Teacher B

Discussion Approach to teaching

The lesson began with a recap of the previous lesson on Poverty. Most of the learners were able to respond to the questions asked by the teacher. The teacher used a PowerPoint presentation exported to Smart Notebook. The teacher used slides to drive the lesson discussion on the effects of poverty. The slides in the beginning of the lesson were mostly text based. The teacher used a video documenting the effects of poverty in one of South Africa's biggest township: Gugulethu in Cape Town. While this video was playing there was

deafening silence in the classroom as learners concentrated on the activities of the video. The teacher asked a question, "how do you feel" and learners responded in a chorus, "sad". The teacher opened a page on Smart Notebook to write responses of questions asked to learners on the main effects of poverty in Gugulethu and drew a table differentiating economic and social effects. After the video learners were grouped into groups of six and were given a task to create a poster presentation which required them to identify a cause of poverty and find a solution to it. The time given for the group work was 10 minutes and the teacher kept the time and learners presented their work. As the bell rang learners requested the teacher to save the video on the smartboard.

4.5.2 Lesson observation interpretation and Analysis

Lesson observation Teacher A

The lesson observed had three distinct parts, mainly the introduction, lesson delivery and summary of lesson. The graphic below presents a summary of activities that occurred during the lesson observation, a thorough interpretation and presentation is given below. The use of graphics enabled the researcher to populate the analytical tool.

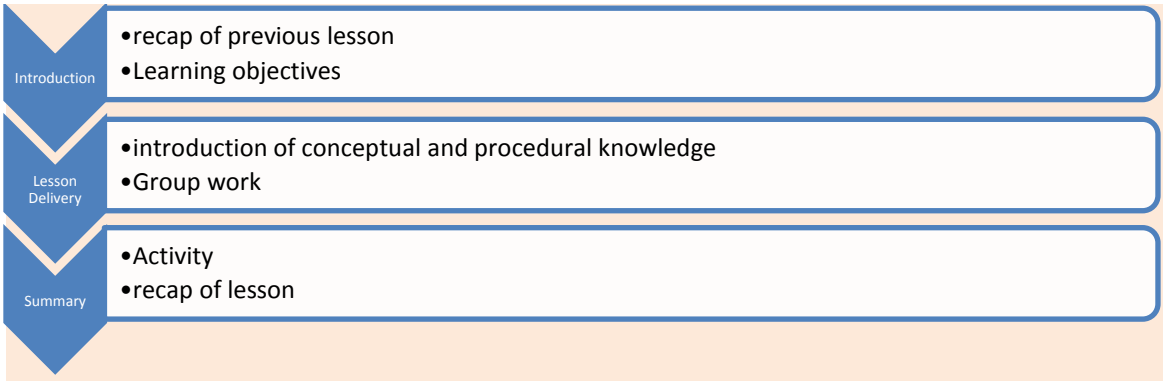

Figure 4: Observed lesson structure

Teacher-Learner interaction

The teacher used the PowerPoint slides as a starting point to introduce concepts before explaining to the learners. At that stage there was not much teacher-learner interaction as the focus was on disseminating the conceptual knowledge on the functions of money. The technology was used in a narrative form to articulate content.

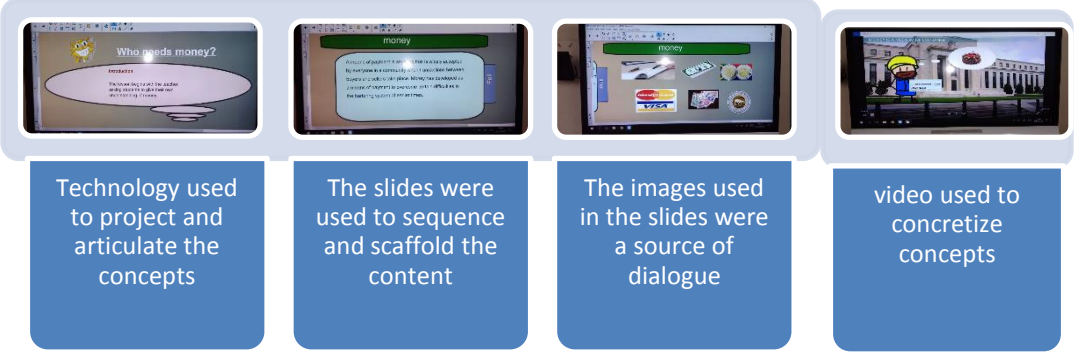

Figure 5: Graphic presentation of ICT integration

He also used the slides to sequence his content. The slides facilitated the apprehension of structure to the teaching and learning experience. As he scaffolded the concepts he continuously interacted with learners to determine if learning was happening. While the slides gave a visual view of the content and ideas, it gave learners a common view of what they were learning and that enabled the teacher to operate from the same understandings. Learner responses demonstrated this for instance, when learners were asked to respond on the functions of money, most answers were restricted to money as a medium of exchange based on the experiential use of money by learners. The teacher used his images and slides to drive the other two concepts of the use of money as a store of value and unit of account which were abstract for learners.

The slides consisted of text and images which were very colorful. The teacher used images of different currencies, stocks to get learners to think about the different functions of money. The teacher would resort back to the PowerPoint slides that had notes on the new concepts and it appeared as if the teacher used the images to bring the concepts of the functions of money to the level of the learners, for example the image with livestock was used to depict the function of money as a store of value or wealth. The teacher went on to show the image of minerals and metals to explain the function of money as a unit of measure through a carefully thought out narration, this provided additional descriptions and the teacher used it well to link to new information. The slides generated a lot of dialogue and the teacher used them to introduce a concept and to re-describe the concepts. There were a lot of clarity seeking questions during the teacher –learner interaction. The teacher used the PowerPoint slides well

by taking into consideration what the learners already knew through the use of the South African rand currency of which he circulated various notes that have been used.

Table 9: Interpretation of lesson observed

Teacher	Identification of Technology			Interactive equivalency theorem			Pedagogic value
	Application feature	Affordance	Evidence	Teacher-Learner interaction	Learner-Learner interaction	Learner-Content interaction	
Teacher A	Slides	Non-linear	Multimodality	Used to introduce content Used to sequence content	n/a	Used as a source of content	Apprehending structure
	Videos	Diversity	Reproduction: Role play	Used to provide expanded opportunity	n/a	Used as a source of content	Concretizing theory
		Collaboration	discussion	Used to explore misconception	n/a	Clarity seeking questions	Explore misconception and amendment
	Images	Articulation	Re-descriptions Knowledge	Used to co-construct knowledge	n/a	Used to bring concepts to learner understanding	construction
	Drag and Drop	Immediacy	Immediate feedback		Used as whole class activity	Used to assess learner understanding	Exploring misconception and amending

Learner-Learner Interaction

The teacher formulated a group activity where learners attempted to match a specific currency to a country, this group discussion was followed by a whole class discussion in which individual group members were asked to participate in a class activity on smart lab where learners dragged and dropped a currency on a country in a given world map projected on smart note book. This was followed by presentations on the uses of money, although this activity did not utilize the IWB it became useful in giving structure to the lesson content as the learners used the opportunity to clarify concepts. This activity lasted for 15 minutes and time was well managed.

Learner-Content interaction

Learners attempted to meet the teachers' goals by watching a video on the uses of money. The video was downloaded from YouTube and the teacher showed it to the learners who engaged with it silently and were able to draw differences on the functions of money in different eras and learners were able to explain the transition from money as a medium of exchange to it being used as a store of value and unit of standard.

Interpretation of Lesson Observation

The following analytical tool makes clear the interactions and their value through the use of the IWB

4.5.2 Lesson observation: Teacher B

The lesson is divided into four: the description of the content; the video; group work; and learner presentations. Detail on the group work will not be captured at this stage as that is learner-learner interaction.

The above was the lesson structure that helps to bring focus to the lesson which we can use to understand the interactions that took place between the teacher and learners in the process of teaching and learning through the use of the IWB.

Teacher-Learner interaction

The teacher began the lesson by recapping on the previous lesson taught on the concept of poverty using Smart Notebook presentation. The presentation was text based without images.

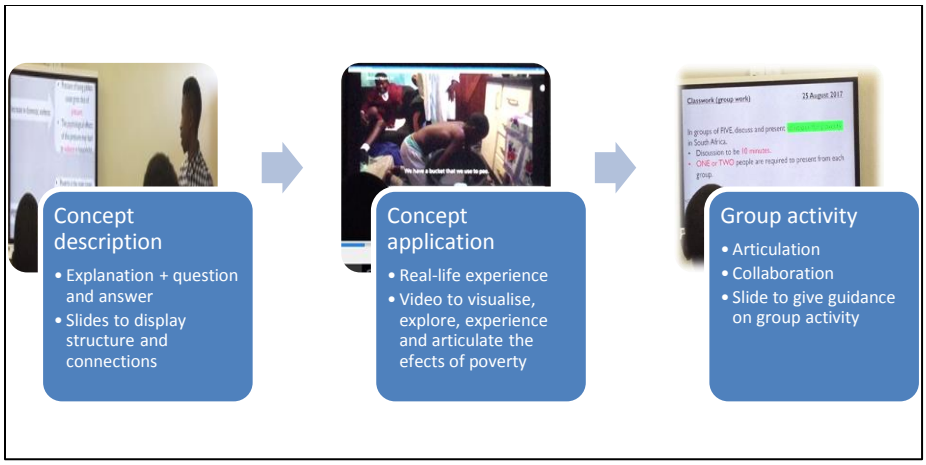

Figure 6: Graphic presentation of ICT integration

The teacher used the recap as a starting point to introduce his lesson. Learner responded to the teachers' questions on the definition of poverty. The teacher introduced his lesson objectives using smart lesson on the effects of poverty and continued to clarify misunderstandings on the definition of poverty and how it is measured using a story telling narration. The teacher begins by introducing a concept through a lecture method and reverts to the technology. Most slides are in text form, the teacher uses shape, contrast and bullets to provide them with key understandings and interpretations of the concepts. The slides are used to clarify concepts, in addition the teacher opened a smart page and began writing learner responses on the smart page and keeping his discussion structured as per the learning objectives. The teacher uses slides to keeps learners on suspense by using the reveal and hide function on Smart Notebook. The following slide is an example of the design the teacher used:

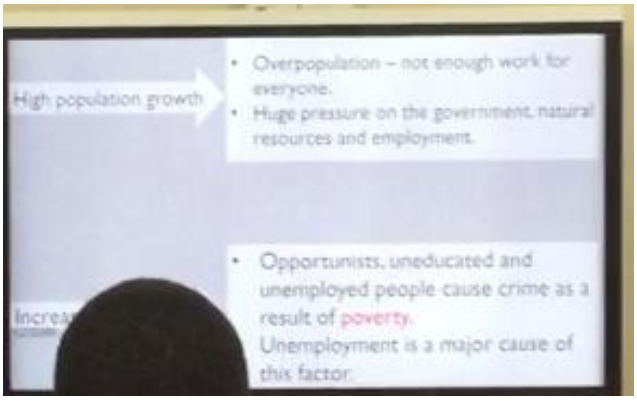

Figure 7: Graphic presentation of text based slide

Like Teacher A, the learner teacher interaction begins with the conversation which could be in the form of a question and answer and is followed by the revelation of the content on the slide at the swipe on the screen. The following diagram illustrates the teacher-learner interaction that takes place during lesson on the effects on poverty.

Learner-Learner interaction

Learners were given an opportunity to work in groups, the group activity required learners to identify a cause of poverty and for the learners to come up with a solution for the identified cause. Learners worked in groups of six and made oral presentations in class.

Learner-Content interaction

Most of the notes taken by learners where projected in the presentation projected on Smart Notebook. The lesson was made richer by the use of a very emotional video on poverty in Gugulethu Township in Cape Town. There was a link between the content matter of the lesson and the documentary that the learners watched. When the video ended, learners felt sad as they responded to the teacher's question on how they felt after the lesson. The video allowed learners to adapt new information as they could concretize the concepts they were learning. The teacher used a fill blanks activity where different learners were given the opportunity to fill in the correct concept on the smart note book, this was a whole class activity at the end of the activity the teacher automatically scored and marked the activity giving immediate feedback to the learners.

Interpretation of lesson observation

The following analytical tool makes clear the interactions and their value through the use of the IWB

Table 10: Teacher B interpretation of lesson observed

Teacher	Identification of Technology			Interactive equivalency theorem			Pedagogic value
	Application feature	Affordance	Evidence	Teacher-Learner interaction	Learner-Learner interaction	Learner-Content interaction	
Teacher B	Slides	Linear	Mono-modality: written text	• Content projection • Sequencing content	To project guidelines for group activity	• Source of content	Apprehending structure
		Collaboration	Group work	• Teacher gave instruction to learners and they responded by following instructions (limited interaction)	• Reference point for the group activity	• Reference point for the group activity	Minimal pedagogical value in the use of ICTs as it only supported the learning occurrence
	Videos	Diversity	Reproduction: representation of content through a documentary	n/a	n/a	• Cognitive participation: link of everyday experience with concepts covered • Emotional participation: experience in line with the mood created by the video	Concretizing theory
	Fill blank activity	Immediacy	Immediate feedback	• Assessment task: Misconceptions identified	n/a	• Response to assessment task: Misconceptions identified	Misconceptions not amended

Conclusion

In the section presented in this chapter, I have presented, analyzed and reported back on the data empirically through the conceptual framework I developed in chapter 2. Various tables have been presented in sections 4.3 and 4.4 to present each data set of interviews and lesson observations to succinctly present the empirical data. The next chapter I will be discussing the data analyzed here and how this has helped me answer the three research questions, I set forth in the beginning of this study. In doing this further I shall draw on the literature review I have previously presented in the second chapter.

CHAPTER 5

5.1 Discussion

This chapter seeks to first answer the three empirical questions and then the overall research question of this study. This will be achieved through triangulation of data which will acknowledge the perceptions of teachers against their practice as observed by the researcher and compared and contrasted against research literature on questions raised.

5.1.1 Empirical research question 1: What are teacher's understanding on the use of ICT in teaching FET economics?

To answer this research question I drew on data presented in chapter 5 as well as the conceptual understanding on teacher perceptions developed in the literature review. Of particular value is Moll (2013) understanding of how teachers conceive their perceptions regarding the use of ICT for teaching and learning in which he utilized the three dominant and primary learning theories of behaviorism, cognitivism and constructivism which are assumed to be teacher driven in practice. Based on these learning theories discussed and how teachers perceive the use of ICT, I make two claims on teacher perceptions.

5.1.2 The need for learner centered approaches to teaching high school economics is a central factor in how teachers perceive the use of ICT for teaching and learning. The analysis of the interviews for Teacher A and Teacher B reveal that the use of ICT for teaching and learning revolves around the need for active learner participation which drives the use and adoption of ICT in teaching and learning. Learner centred pedagogies are a component of the constructivist philosophy involving how people learn. Teacher A sees use of ICT as a motivation for learning and expresses the following, ". *eeh with a smartboard you get learners to participate and make them an integral part of learning .*" The use of learner centred pedagogies is perceived by both teachers as a measure of effective teaching and learning where ICT is conceived as an enabler to learner centred pedagogies. The three key components identified around learner centred pedagogies are content projection where both teachers see the use of ICT as firstly enabling multiple ways of presenting content, secondly

ICT are perceived as having the ability to enhance learner understanding and thirdly ICT are perceived to promote learner participation.

5.1.2 The second claim that I make about ICT integration in teaching high school economics is that, use of the smartboard is perceived as a powerful content projection tool. Teacher A is of the view that the smartboard is able to project real world experiences of knowledge and states the following, *"It brings the world into the classroom. "Teacher* B concurs and gives a contextual use of the smartboard in the teaching of FET economics and reveals the following, "*I use smartboard when I teach economics especially graphs, it makes it clear, I use the smartboard for clarification."* We can ascertain that the Smart Notebook has a potential to assist in concretizing abstract concepts as well as providing content re-descriptions as presented in the analytical tool in chapter 4. In the next section I attempt to answer the question regarding ICT teacher practices in teaching FET economics.

5.2 Empirical research question 2: How do teachers utilize ICT in the instruction of FET economics?

In responding to this question, I drew on the lesson observations presented in Chapter 5. Central to the analysis of teacher practices is the use of the interactive equivalency theorem by Anderson (2005) which emphasizes on the three types of interaction modes that are essential for effective teaching and learning. The three interactive modes are teacher to learner, learner to learner and learner to content have been used in this study to capture the role of ICT in teaching FET economics with specific focus on teacher practices. Teaching is assumed to be that which makes learning happen through the use of various interaction modes. Teaching and learning are assumed to be a conversation as articulated by Laurillard (1999). The interactive equivalency theorem gave the researcher a structure to observe classroom interaction and the following was observed.

5.2.1 Teacher to learner interaction

An analysis of this type of interaction reveals that ICT use enhances teacher to learner interaction. ICT was primarily used by both teachers to project content. This form of dialogue was used as a means of teaching economics concepts as well as a platform to explain, elaborate and clarify misconceptions. ICT in the form of smart board was the dominant

device used in teaching through the Smart Notebook by Teacher A and B respectively. The presentations were used differently precisely because of the differing content taught by both teachers. Teacher A used a lot of images with text as a means of presenting concepts on the functions of money. The videos used in both classes were a source of dialogue, however the videos were too long such that they took a huge chunk of the lesson time. The effect of the videos was huge judging from learner reaction in both instances. The video in Teacher A allowed learners to focus and it created a means of concretizing abstract concepts such as explaining the function of money as a unit of account as well as store of value.in the case of Teacher B the video provided a relational experience of poverty and learners were kept focused and emotional by the levels of poverty in Khayelitsha and most learners could relate to the conditions presented based on their context. This form of interaction seems to enable the integration of ICT, probably because it is the most common form of teaching and is a direct transposition of talk and chalk.

5.2.2 Learner to Learner dialogue

This form of dialogue is used to promote cooperative learning amongst learners and usually takes the form of peer teaching, group work and pair work. In both classes the teachers utilized this strategy which is also a component of socio constructivism as conceptualized by Vygotsky (1987). The smartboard was used to project instructions and activities for group work by Teacher B. Teacher A did not utilize ICT to facilitate this form of interaction. However, the ICT did not feature prominently in this type of interaction. I assume, it is because this form of approach to teaching and learning is not yet common; thus teachers did not have innovative ways of using ICT to promote this type of dialogue in the classroom.

5.2.3 Learner to Content

The lesson presentations presented on the smartboard were a source of content for learners, which was used for note taking and presenting different forms of economic content in both classes. Learners also engaged in activities such as sorting presented in Table 5 which was used by Teacher A and the drag and drop activity also presented in Table 9 used by Teacher B. In the sorting activity Teacher A was able to identify misconceptions and amend them during the process of teaching and learning, while Teacher B observed learner misconception in the drag and drop and activity and did not amend the misconception. The activity in the

case of Teacher B ended up being a game because the learner would drag and drop to the wrong point which was rejected by the application and the learner would continue dragging until they find the right answer which became a futile exercise. The videos used in both classes were a source of content as they provided a platform to concretize abstract concepts. In the next section I provide a graphic presentation of the class interaction and technology used.

5.3 Teaching Approach Analysis Teacher A

In this section the researcher through the triangulation of data collected as well as the research literature discussed in chapter 2 presents a diagrammatic interpretation of classroom practice adapted from Driver (1990) through the use of the interactive equivalency theorem by constructing a possible illustration of the mode of interaction in the classroom. The diagram below presents a flow of interaction between the teacher and learner which was the dominant mode of interaction facilitated by the technology. The interaction is behaviorist and teacher centered because it involves probing for misconceptions and amending misconceptions based on the response and behavior of learners.

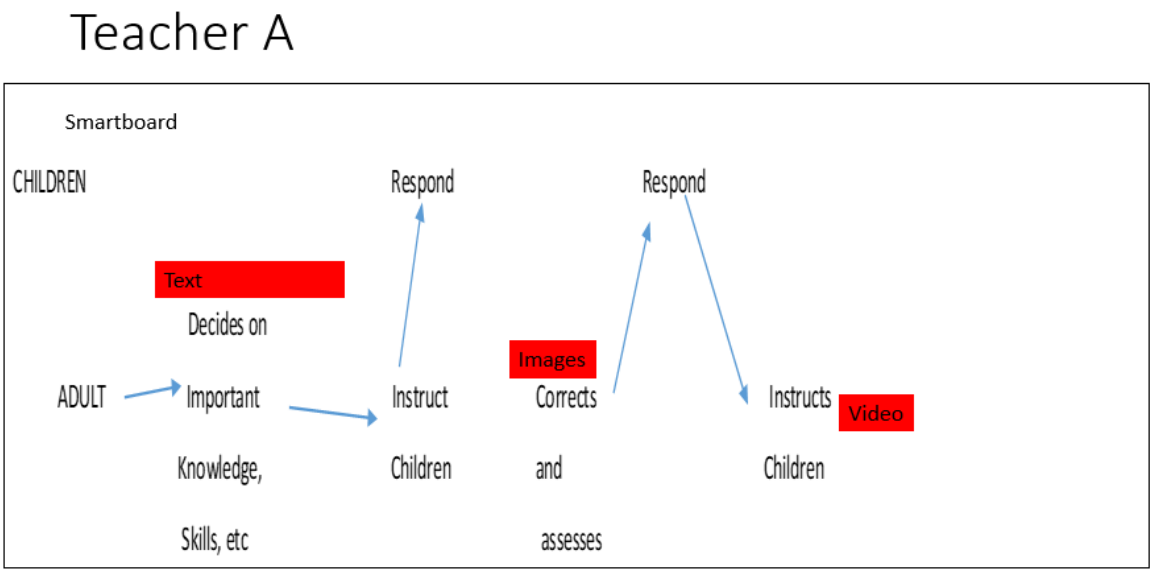

Figure 8: Teacher A mode of interaction

Teacher A strongly believes that ICT drive the lesson and views slides as a tool not limited to content projection but one that guides learning. Despite the lesson being teacher centered

there are elements of learners being active and social through the use of video and images which were a source of dialogue and support. The diagram above has arrows that point and end nowhere to indicate learner to content interaction. The pedagogic value of the ICT lies in content projection and ability to present content in multiple ways to appeal to diverse learners.

5.3.1 Teaching Approach analysis for Teacher B

This representation shows an attempt to create a learner centered environment for teaching and learning, however as shown by this diagrammatic representation of a section of a lesson, the teacher is still heavily in control of the learning process but utilizes context and experience to encourage learners to understand economic concepts. The guided slides with text provide a structure of understanding these concepts and assumes that learners will make sense of concepts.

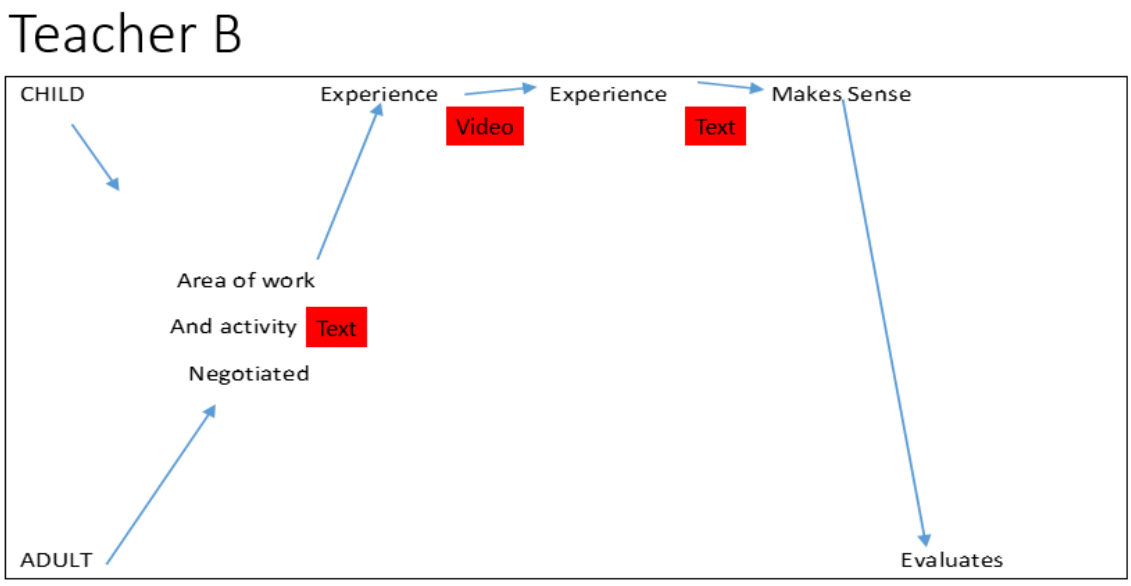

Figure 9: Teacher B Mode of interaction

The teacher attempted to teach economic concepts in a logical and linear approach as depicted by text based slides. The slides did not motivate all the learners in the classroom as the structure of the lesson was difficult to adapt to all the learners. The above diagram presents the child as a learner while the adult is the teacher. The Smart notebook is assumed to be an area of work or negotiated activity were clarification of concepts takes place through the use of slides and video. The visual presentation of images, videos and slides offers conceptual

experience and is followed by concrete experience of content that might be closer to the learners' own experience which is followed by a process of meaning making and evaluation of concept to bring about understanding. The use of a video on poverty from Gugulethu Township in Cape Town made learners to reflect which resulted in deafening silence at the end of the video. Consequently, there are two possible classroom interactions presented by the above reflective hypothesis, the first one being Teacher-Learner where the teacher presents content using a form of presentation to project content and the second type of interaction is Learner-Content which appears to be dominant in the above diagram where a learner views a presentation as a source of content and a tool that is able to clarify concepts and bring about understanding. This relates strongly to the teacher's use of ICT in presenting economic lessons that may present content requiring interpretation of graphical information as revealed in the interview.

5.4 Empirical research question 3: What is the effect of the teachers' use of ICT on their instructional practices in teaching economics?

The replacement of the chalkboard with the smartboard has reshaped the context of practice for the two economics teachers. The smartboard presents a new framework for teacher classroom practice which has significantly changed patterns of action in teacher methods irrespective of approach. The use of ICT in teaching economics has enabled both teachers to reflect deeply about their practice, as they have to carefully choose a medium to you in teaching specific concepts. The use of ICT in teaching economics allows teachers to plan thoughtfully on how to use specific applications and technologies. The observation of both teachers reveals that slides were used as a means to structure the content that was to be taught. The pedagogic value being in the structuring of concepts, procedural knowledge as well as economic ideas being taught. The use of videos and images enabled multiple representation of content and its pedagogic value lay in addressing diverse educational needs of learners. The videos and slides were a source of content and dialogue for the learners. The use of Smart Notebook activities enabled immediate feedback to be given to both the teacher and learner and allowed the teacher to identify misconceptions.

5.5 Conclusion

This chapter has attempted to answer the three research questions given the data presented in chapter 4. This chapter identified the need for learner participation as a central motivation for the adoption of ICT in teaching FET economics. This chapter revealed that learner to teacher interaction is the dominant mode of interaction facilitated by the use of technology. The pedagogical value of using ICT for teaching FET economics lies in the ability of the technology to manipulate the presentation of content in such a way that it appeals to diverse learners. In the next chapter I discuss the main contribution of this study and offer practical recommendations.

CHAPTER 6

6.1 Summary, Conclusion and Recommendations

The aim of this chapter is to give recommendations on the use of ICT for teaching and learning which has implications for policy, curriculum and teacher development. The recommendations are based on literature and findings based on this study.

6.1.1 Summary

This study intended to determine the pedagogical value of the teacher practices on the use of ICT in teaching FET economics. Van Wyk (2009) perceives economic to be an abstract subject which is mainly taught using a teacher centered approach. The deployment of ICT devices into Full ICT schools prompted the researcher to explore how ICT may influence teacher practices in the teaching of FET economics and if these practices have any pedagogical value. This lead to the development of three sub- research questions in Chapter 1. The first research question sort to establish teacher understanding on the use of ICT for teaching FET economics, the second research question identified teacher practices on the use of ICT in teaching FET economics. Furthermore, the third question was an evaluative question that sought to identify the pedagogical value of teacher practices.

Chapter 2 attempted to locate this study within the dominant studies in this discourse and established that teachers conceive the use of ICT using three traditional learning theories (Moll, 2013) of behaviorism, cognitivism and constructivism. Insights into how teachers utilize ICT were very illuminating with a conceptual argument based on the application of mediums or ICT in teaching and the other being methods of teaching economics. Central to this argument is weather technology determines teacher practice or teacher practices determine how the technology is used. The aforementioned arguments enabled the researcher to develop a conceptual framework for the study which was used as a lens to make sense of the data presented and analyzed in chapter 4 using and analytical tool developed from the conceptual framework. Chapter 3 justified why a case study approach was appropriate for this study which required in-depth analysis of teacher practices through data which was collected using semi structured interviews and classroom observations. Chapter 5 discussed the findings and triangulated the data using content and method triangulation. In the next section

I discuss the knowledge contribution of this study based on the empirical findings in light of the research questions.

6.2 Answering the research questions

6.2.1 What are teachers' understanding of the use of ICT in teaching Grade 11 economics?

The synthesis of data collected and presented in chapter 4 as well as the discussion chapter reveal that teachers conceive their practice through learning theories. ICT is perceived by both teachers as having the ability to promote learner centered pedagogies, Teacher A's response is evidence of this assertion as noted in the following response;

"With a smartboard you get learners to participate"

Teacher A is of the view that the use of ICT motivates learners to learn through participation. On the other hand, Teacher B's response did not mention participation, however he is of the view that ICT improves learner understanding of economics concepts as stated in the following quotation;

"For learners to understand better and see clearly"

Teacher B is of the view that ICT presents content in such a way that learners are able to understand abstract concepts. The two responses given by the teachers are somehow deceptive in their ability to appear too shallow to merit the scrutiny of what results in the pedagogic value of these devices. The question that was not answered is how ICT brings pedagogical value to their practice, the answers seem to suggest that the devices have an ability to bring about learning without teacher intervention in the process of meaning making.

6.2.2 How do teachers utilize ICT in the instruction of Grade 11 economics?

The use of ICT did not change the practice of both teachers as observed by the researcher. The practice was a transposition of the traditional teacher centered pedagogy as presented in table 3 and 4 in chapter 4. This does not mean the methods employed for integrating ICT in teaching Grade 11 economics were not effective. It is worth observing that both teachers advocate for a learner centered pedagogy yet it was difficult to conceptualize it practically. The use of the interactive modes adopted from (Miyazoe and Anderson, 2010) provided a

framework of analyzing teacher practice. Teacher-Learner interaction was the most dominant form of interaction facilitated by the use of ICT in teaching Grade 11 economics. The technology was mostly used to project content and to sequence concepts and subject ideas. Learner-learner interaction was the least form of interaction facilitated by the technology probably because it is an uncommon form of interaction used for teaching economics. Learner –content interaction was equally high just like the teacher-learner interaction because the technology was utilized as a source of content.

6.2.3 What is the pedagogical value of using ICT to teach Grade 11 economics?

In answering this question, the researcher decided to utilize an appraisal approach that did not involve a form of measurement such as using time to record patterns of practice. To facilitate this exploration, the analytical tool acted as a checklist of identifying a technology and monitoring the mode of interaction promoted. The ICT affordances discussed by (Conole and Dyke, 2004) provided a language to describe the pedagogic value of practices identified. This study revealed that ICT has a potential of presenting content in various forms in order to appeal to the different learning preferences of learners, which could be audio, visual or oral. The use of slides enabled teachers to sequence that knowledge and create a structure for presenting economic concepts. The use of digital assessment tools enabled teachers to identify misconceptions, however Teacher A failed to amend the misconception as presented in table 9. The use of images and video created an opportunity for the teacher to concretize abstract concepts and facilitate alternative ways of describing content.

6.3 Main argument of Study

My main argument on the basis of my findings are that there is a rhetoric and a reality about the integration of ICT in teaching FET economics. The rhetoric stems from assumptions and ideas that ICT carries about teaching whose pedagogical value is not easily realized in teaching. The reality is that ICT has a potential to design and promote an effective learning environment through its ability to present economics content in various ways that suit different learner preferences such as visual, audio and aural. The challenge identified in constructing the conceptual framework for this study reveals that teacher practices are a reality in their enactment, while the pedagogical descriptors are based on assumptions about what an ICT is capable of doing and ignores issues of appropriateness of use.

6.4 Limitations of Study

The main limitation of this study is that this is a case study of two teachers and two schools which are fully endowed with ICT infrastructure. The results of this study may not be used to make generalizations about the use of ICT in teaching FET economics in other contexts. This study has also narrowly defined teaching as a conversation adapted from Laurillard (1999) definition of teaching in her conversational framework.

6.5 Recommendations

In this section I provide practical recommendations based on the empirical data presented and analyzed in chapter 4 and 5.

6.5.1 Research

More research needs to be done on ICT integration on teacher practices based on specific school subjects, so that a more objective theoretical understanding of integration may be constructed and enable the development of objective tools for monitoring and evaluating lessons. On the surface this appears simple yet that is not the case as discussed in this study given the complexity of defining ICT integration. A good observation tool will inform the design and development of effective learning materials on ICT integration.

6.5.2 Teacher Development

Teacher development programs on the use of ICT for teaching should focus on offering a practical guide in empowering teachers with knowledge and a framework for integrating ICT in specific subjects. Strong evidence from this study reveal that teachers require integration knowledge to create learner centered activities and lessons. ICT should not be viewed as an additional tool for use in the classroom but as an enabler for other pedagogic approaches. Teacher development programs should seldom focus on training solely on technological skills but should rather focus on knowledge acquisition and how technology may enable different practices. In my observation I did not find a distinct approach to teaching, however technology was used in conjunction with various approaches to teaching and learning. Teacher development should focus on introducing innovative models that will enable teachers to plan and reflect on their practices, these will have a potential to harness teacher innovation in the use of ICT for teaching. The adoption of ICT is influenced by prior knowledge of ICT, in this case both teachers had prior training as pre-service teachers in ICT integration. Subject

specific training on ICT integration will be ideal as opposed to devise driven approaches to technology use and adoption for teaching.

6.5.3 Policy implications for ICT integration

The main argument of this study is that there is a rhetoric and a reality about the use of ICT in teaching FET economics. Therefore, the design and use of ICT for teaching FET economics should be viewed as a site of struggle whose use and adoption should be determined by pedagogical value. ICT policy should adopt a conceptual framework that is clear and can be followed when various master plans are used. A flawed policy framework will result is several interpretations on classroom use, since there is always a translation of policy when it is adopted and used by various individuals. ICT policy should be based on the contextual conditions of where ICT will be used for teaching and learning, this is important in evaluating the role of ICT in teaching and learning. It is unfair to use a borrowed framework that was developed with a different context in mind to measure ICT use for teaching and learning.

References List

Anderson, T. (2003). Getting the mix right: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning, 4*(2). Retrieved 10 16, 2017, from http://www.irrodl.org/content/v4.2/anderson.html

Anderson, T., & Garrison, D. R. (1998). Learning in a networked world: New roles and responsibilities. *In C.Gibson (Ed.)Distance learners in higher education*, 97-112.

Bourbour, M. (2014). Preschool teachers' reasoning about interactive whiteboard embedded in mathematics education in Swedish preschools. *Journal of Nordic Early Childhood Education Research Tidsskrift for Nordisk Barnehageforskning*. Retrieved February 8, 2017, from https://journals.hioa.no-nbf-download

Bryman, A. (2008). *Social Research Methods:3rd Edition.* New York: Oxford University Press Inc.

Clark, R. (2005). Five common but questionable principles of multimedia learning. *In Meyer,R.Cambridge Handbook of multimedia learning*.

Conole, G., & Dyke, M. (2004). What are the affordances of information and communications technologies? *Research in Learning technology, 12*(2).

Cox, M., Webb, M., Abbott, C., Beauchamp, T., & Rhodes, V. (2003). ICT and Pedagogy. *A Review of the Research Literature*.

Cresswell, J. W. (2012). *Qualitative inquiry & research design:choosing among five approaches (4th Ed).* Thousand Oaks,CA:SAGE.

Denzin, N., & Lincoln, Y. (1994). *Handbook of Qualitative Research.* Calif:SAGE: Thousand Oaks.

Department of Basic Education, R. (2004). *White paper on e-Education: transforming Learning and Teaching through Information Communications Technologies.* Pretoria: Government Printing.

Department of Basic Education, R. (2011). *Integrated Strategic Planning Framework for Teacher Education and Development.* Pretoria: Government Gazette.

Department of Basic Education, R. (2012). *Curriculum and Assessment Policy Statement:FET Economics(Grade 10-12).* Pretoria: Government Printing.

Department of Basic Education, R. (2016). *Professional Development Framework for Digital learning.* Pretoria: Government Gazette.

Driver, R. (1990). Constructivist approaches to science teaching. *Paper presented at the University of Georgia,Mathematics Education Department as a contribution to the seminar series"Constructivism in education"*.

Dron, J. (2012). The Pedagogical-technological Divide and the elephant in the Room. *International Journal on e-Learning, 11*(1), 23-38.

Du Plessis, A., & Webb, P. (2008). Generative use of computers:promoting critical outcomes of the South African curriculum. *Education as change, 12*(1), 15-27.

Dyke, G. C. (2004). What are the affordances of information and communications technologies? *Research in Learning Technology, 12*(2), 113-124.

Ertmer, P. (1999). Addressing first and second order barriers to changing strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

Floden. (1981). *Chapter 2: The Logic of information processing psychology.* Sage.

Gauteng Department of Education, R. (2014). *The Five Year 10 Pillar Education Programme: Presentation of the MEC consultative meetings.* Pretoria. Retrieved 6 11, 2016

Gauteng Department of Education, R. (2017). *National Senior Certicate Technical Report.* Pretoria: Government Press.

Gauteng Department of Education, R. (2017). *National Senior Technical Report.* Pretoria: Government Press.

Gebremeskel, G. B., Kebede, A. A., & Chai, Y. (2016). The Paradigm Role of ICT for Behavioural and Educational Psychology:The case of Developing Countries. *International Journal of Information and Educational Technology, 6*(4).

George, F., & Ongunyi, M. (2016). Teacher perceptions on the use of ICT in a Computer Assisted Learning Environment. *Universal Journal of Educational research, 4*(1), 151-156.

Graham, R. (2011). Theoretical Considerations for understanding technological pedagogical content knowledge(TPACK). *Computers and Education*, 1953-1960.

Hammond, M. (2010). What is an affordance and can it help us understand the use of ICT in education. *Education and Information technologies, 15*(3), 205-217. Retrieved February 5, 2017, from http://dx.doi.org/10.1007/s10639-009-9106-z

Hatch, J., & Wisnieski, R. (2002). *Life History and Narrative.* London: Falmer.

Henessy, S., Onguko, B., Harrison, D., Ang'ondi, E. K., Namalefe, S., Naseem, A., & Wamakote, L. (2010). *Developing the use of Information Communication Technology to Enhance Teaching and Learning in East African Schools:Review of Literature.* Centre for Commonwealth Education & Aga Khan University. Institute for Educational Development-Eastern Africa.

Johnstone. (2000). *Qualitative Methods in Sociolingustics.* Oxford University Press.

Koc, M. (2005). Implications of Learning Theories for Effective Technology integration and pre-service Teacher Training:A critical Literature Review. *Journal of Turkish Science Education.*

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary issues in Technology and Teacher Education*. Retrieved June 20, 2017, from http://www.citejournal.org/vol9/iss1/general/article2.cfm

Koehler, M., Mishra, P., Bouck, E., DeSchryver, M., Kereluik, K., Shin, T., & Wolf, L. (2011). Deep play:developing TPACK for 21st century teachers. *International Journal of Learning Technology, 6*(2), 146-163.

Krauss, & Nkula. (2014). The integration of ICT in marginalized schools in South Africa: Considerations for understanding the perseptions of in-service teachers and the role of training. *8th International Development Informatics Association Conference.*

Laurillard, D. (1999). A conversational framework for individual learning applied to the learning organization and the learning society. *Applying Systems Thinking to Higher Education, 16*(2).

Lawrence, D., & Ndlovu, N. (2012). The quality of ICT use in South African classrooms. Retrieved June 11, 2016, from http://www.carnegie3.org.za

Lim, C. P., & Khine, M. (2006). Managing teacher's barriers to ICT integration in Singapore schools. *Journal of Technology and Teacher Education, 14*(1), 97-125.

Lloyd, M. (2005). Towards a definition of the integration of ICT in the classroom. In AARE 2005 ,AARE ,Eds. *Proceedings AARE 05 Education Research.* New South Wales. Retrieved from http://eprints.qut.edu.au/3553/1/3553.pdf.

Maree, K. (2007). *Planning a research proposal.* Pretoria: Van Scaik.

Miyazoe, T., & Anderson, T. (2010). The Interaction Equivalency Theorem. *Journal of Interactive Online Learning, 9*(2), 94-104.

Moll, I. (2013). Learning and Computing:theoretical perspectives on the pedagogic integration of ICT's. *In McCabe,K.& Van Wyk,K.(Eds) Teaching and e-Learning in South African Schools*.

Moore, M. G. (1989). Editorial:Three Types of interaction. *American Journal of Distance Education, 3*(2). Retrieved April 5, 2017, from https://www.tandfonline.com-doi-abs

Ndlovu, N. S. (2015). *The Pedagogical Integration of ICT's by seven South African Township Secondary school teachers.* Johannesburg: University of the Witwatersrand.

Ng'ambi, D. (2013). Effective and ineffective uses of emerging technologies. Toward a transformative pedagogical model. *44*(4). (B. J. Technology, Compiler) London.

Retrieved March 20, 2018, from http://onlinelibrary.wiley.com/doi/10.111/bjet.12053/full

Padayachee, K. (2017). A snapshot survey of ICT integration in South African Schools. *South African Computer Journal, 29*(2).

Proctor, R., Watson, G., & Finger, G. (2003). Measuring information and communications (ICT) curriculum integration. *Computers in the schools, 20*(4), 67-87.

Schumacher, & Mcmillan. (2010). *Research in Education:Evidence based inquiry 7th Edition.* Pearson.

Sekwena, G. (2014). *Active Learning in a high school Economics class:A framework for learner engagement.Master of Education Dissertation.* University of Free State.

Shulman, L. (1986). Those who understand knowledge growth in teaching. *American Educational Research Association, 15*(2).

Silverman, D. (1994). Competing Strategies for Analysing the contexts of social interaction. *Sociological Inquiry, 64*(2). Retrieved September 25, 2016, from https://onlinelibrary.wiley.com

Sim, J. &. (2016). *Teachers' perceptions of the use of ICT as an instructional tool in Mathematics and Science.* Malaysia: Swimburne University of Technology,Sarawak Campus.

Skinner, B. (1960). Teaching Machines. *Review of Economics and Statistics, 42*(3), 189-191.

Tarling, I. a. (2016). Teachers pedagogical change framework:a dialogue tool for changing teacher's uses of emerging technologies. *British Journal of Educational Technology, 47*(3), 554-572. Retrieved March 3, 2018, from http://onlinelibrary.wiley.com/wol1/10.1111/bjet.12454/full

Van Petergen, P., & Peeraer, J. (2011). *How to address integration of ICT in teaching practice?Research on factors influencing use of ICT in Education.* Retrieved April 28, 2017, from http://www.formatex.info//ICT?book/237-244.pdf.

Van Wyk, M. M. (2009). *Cooperative Learning as a Strategy for the classroom:A practical guide for economics teachers.* VDM Publishing.

Van Wyk, M. M. (2012). Measuring Students' Attitudes to Economics Education:A Factorial Analysis Approach. *Journal of Social Sciences, 31*(1), 27-42.

Visiliki, B., Panagiota, P., & Maria, S. K. (2016). A New Teaching Method for Teaching Economics in Secondary Education. *Journal of Research & Method in Education*, 86-93.

Vygotsky, L. S. (1987). Thinking and Speech.In R.W. Rieber & A.S. Carton (Eds.),The collected works of L.S.Vygotsky,Volume 1. *Problems of general psychology*, pp. 39-285.

Wilson-Strydom, M., & Thompson, J. (2005). Understanding ICT integration in South African classrooms. *Research:Information Communications Technology*.

Woolgar, S. (1991). Configuring the user:the case of usability trials. Retrieved November 21, 2016, from www.academia.edu/7255577/configuring_the_user_

Yin, R. K. (2009). *Case Study Research: design and methods. 4th Edition.* Newbury Park: Sage Publishing.

Appendix A

Wits School of Education

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16 November 2018

Student Number: 388360

Protocol Number: 2017ECE018M

Dear Handson Fingi Mlotshwa

Application for Ethics Clearance: Master of Education

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate, has considered your application for ethics clearance for your proposal entitled:

Exploring ICT integration in the teaching of high school economics in a marginalised school in Soweto

The committee recently met and I am pleased to inform you that clearance was granted.

Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

M Mabeta

Wits School of Education

011 717-3416

cc Supervisor – Dr Emmanuel Ojo

Appendix B

Interview transcription

Teacher A

1.	Q	**Did you get exposed to ICT knowledge as a pre-service o in-service teacher?**
	A	*Yes I did I studied at university and I had most of it being **self-taught** at University ICT was integrated to PGCE.*
2.	Q	**Which technologies do you use in your classroom?**
	A	*Smartboard **integrate** with iPad or cellphones, with a smartboard you get learners to **participate and make them an integral part of learning**. As they go and touch and inter act with the board they enjoy that and they don't realize that they are being exposed not only to economics but to ICT*
3.	Q	**How do you utilize these technologies?**
	A	
4.	Q	**How often do you utilize these technologies?**
	A	
5.	Q	**What are the benefits of utilizing ICT?**
	A	*It's a very useful tool unfortunately most teachers stick to old ways of teaching. I find ICT to **stimulate learner interest*** ***It brings the world into the classroom** , if for example you using the textbook and you are teaching about the different sectors of the economy , you teaching about extraction or modifying goods to finished goods , at times if you get into an environment where children are not well exposed outside their very day life in Soweto or rural area , ICT helps in showing videos and sharing experiences of different parts of the world compared to written words or one still picture it becomes difficult to imagine beyond what you have never seen. You can use a PowerPoint as a **way of driving the lesson** or as a supplementary tool. With small group activities ICT may complement activity that the learners are doing*
6.	Q	**What challenges do you often face when integrating digital technologies to teaching and learning?**
	A	*One of the most common problems eee. is umh is power outage and normally resort to using my small laptop although it's a challenge with bigger groups. The other problem that I found is that of USB tools that import virus and you are not able to access other files and normally I have back up in case of a virus. Children play with these tools when they are not being used. They bring music*
7.	Q	**Is the South African CAPS curriculum clear on how technologies ought to**

		be integrated into teaching and learning?
	A	*Not quite eeh, it talks about. When you get to the issue of lesson plans , it talks of the* ***different tools for integration in a lesson , in most instances I find it repetitive where it says you can use textbooks , videos and so on and I think its problematic for the new teacher and I think it would be*** *much better to suggest certain areas in which you can use videos because not everything there can work with one strategy and there are those that encourage learners to participate more because it brings the message home as it brings it almost immediately and they catch it. I think if the CAPS document can go that extra mile and suggest how these maybe used*
8.	Q	H**ave you read the department of Education policies in ICT or your school policy?**
	A	*Yes, I am aware of the department's position and policy regarding the use of IT eeeh.. , it is* ***futuristic*** *in approach of what they want to achieve and how they see the role of ICT as a disruptor that can actually enhance eeh the learning experience and environment that children learn in* Which policy have you read *When you look at the Gauteng Department of Education on of their policies wants to look at in the next 5 years they want all teachers to have access and utilize it optimally. They even say people who don't want to utilize ICT must move and allow those that can use.*
	Q	**Are you aware of any teaching practices associated with use of ICT**
	A	*Maybe I don't understand the question, ok we speak of talk and chalk ,Not directly they rely on one's innovation,*
	Q	**Can you describe your use of ICT**
	A	*I view ICT as a helper and the helper is fast and innovative eeeh and it relies mostly on me. i always tell my learners that ICT cannot do the work on its own and with the lower classes I refer to it as a toy because grade 8 are still in the play mode , so I make them aware that they can play and receive it better*

Appendix C

Interview Transcripts Teacher B

Q	**Did you study ICT at college or you were exposed somewhere else?**
A	*I did not study it as a course, I did it at wits and that is how*
Q	**Did you study ICT as a Pre- service or in -service teacher?**
A	*Eeh I did it as a preservice and as a teacher*
Q	**Which technologies do you use for teaching and learning?**
A	*Smartboard, cellphones and I use smartboards **when I teach economics especially graphs it is clear**, I use the smartboard for clarification. Cell phone I use for internet since my school does not have internet*
Q	**How do you utilize these technologies?**
A	*The smartboard, I use my laptop and link to the smartboard. **I create knowledge** on the smartboard*
Q	**How often do you use these technologies?**
A	*I use these technologies everyday*
Q	**What are the benefits of using the smartboard?**
A	***For learners to understand better and to see the information clearly** and for myself it makes my work a little less eeh everything benefits the teacher and learner*
Q	**What challenges do you face in using the smartboard?**
A	*Eeh challenges, sometimes you find that electricity shuts down, but I don't struggle with technology*
Q	**Is the curriculum clear on how you should integrate ICT?**
A	*The curriculum is not clear , it states that you should use technology but does not tell you how to use it*
Q	**Have you read the DBE policies on ICT or your school policy?**
A	*I haven't*

Appendix D

LETTER TO THE PRINCIPAL

DATE: 04/04/2018

Dear Sir/Madam,

My name is Handson Mlotshwa. I am a Master of Education student (M.Ed.) in the School of Education at the University of the Witwatersrand. The title of my study is *Exploring ICT Pedagogic Integration of Economics Teachers in Two Johannesburg Schools'*.

My research involves identifying , understanding and exploring teaching practices used in the teaching of high school economics in an ICT school in Soweto, Johanensburg. From the literature reviewed it is clear that there is limited research that has been done on schools categorized as Full ICT by the Gauteng Department of Education. In addition there are few or no studies in South Africa that have focused on teacher practices used in the teaching of high school economics when ICT is integrated to the lesson. Most studies appear to focus on challenges , experiences and affordances of ICT while ignoring the teacher practices in the classroom which are a primary avenue to teaching and learning. My study will involve two teachers in two different schools in Soweto. The teachers have been purposely chosen based on economics teaching in Grade 11 . The researcher intends observing and interviewing one teacher who has been oriented through professional development workshops on the use of smartboards and currently teaching economics. In addition the researcher will interview and observe one teacher who teaches economics without ICT this will eliminate bias in the study.

The reason why I have chosen your school is because it is fully endowed with ICT infrastructure. Your school also meets the criteria of my research sample in that economics is offered as a high school subject in Grade 11. I am inviting your school to participate in this research whose findings will be beneficial to the school and the Department of Education.

The research participants will not be advantaged or disadvantaged in any way. Face to Face interviews and classroom observations will be used to collect data. A video camera will be used to record lesson proceedings and learner faces will be blurred and the video will not be used for any other purpose except for this study. Participants will be reassured that they can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study. The names of the research participants and identity of the school will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project. Please let me know if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,

Handson Mlotshwa
Unit 44 Tropicana Flat
Cnr St. Georges and Bedford
Bellevue East, 2198
handsonmlotshwa@yahoo.co.za
0743868368

Appendix E

INFORMATION SHEET LEARNERS

DATE:04/04/2018

Dear Learner,

My name is Handson Mlotshwa. I am a Master of Education student (M.Ed.) in the School of Education at the University of the Witwatersrand. The title of my study is *Exploring ICT Pedagogic Integration of Economics Teachers in Two Johannesburg Schools'*. While you will not be directly involved in this study, I will be observing your Economics teacher while teaching you in the classroom. The interest of my study is to find out how they use ICT in the classroom in teaching Economics as an FET subject.

My research involves identifying , understanding and exploring teaching practices used in the teaching of high school economics when ICT is integrated in the teaching process. I would like to video record a lesson during which your Economics' teacher will be teaching you. Should you feel uncomfortable in the course of my presence in your classroom to observe the teacher, you are at liberty to excuse yourself and leave the classroom.

You face shall not be shown in the video. Should by any chance it happens that the angle of the video mistakenly captures your face, I shall use Google editing tools to blur out your face during my data analysis. All information about you will be kept confidential in all my writing about the study. Also, all collected information will be stored safely and destroyed between 3-5 years after I have completed my project. Your parents have also been given an information sheet and consent form. However, it is your decision since you will be in the classroom when I come to observe your teacher.

I look forward to working with you!

Please feel free to contact me if you have any questions.

Thank you.

Handson Mlotshwa
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Appendix F

LEARNER CONSENT FORM

Please fill in the reply slip below if you agree to participate in my study called:

My name is: _____

Circle Yes/No

Permission to observe your teacher in class, while you participate in the teaching

I agree to be involved in the teacher's session, while the researcher is in class. YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview or observation lesson	YES/NO
I know that the audiotapes will be used for this project only	YES/NO

Permission to be interviewed

I would like to be interviewed for this study.	YES/NO
I know that I can stop the interview at any time and don't have to Answer all the questions asked.	YES/NO

Permission to be videotaped

I agree to be videotaped in class.	YES/NO
I know that the videotapes will be used for this project only.	YES/NO

Informed Consent

I understand that:

- My name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotape
- All the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign_____ Date_____

Appendix G

INFORMATION SHEET PARENTS

DATE: 04/04/2017

Dear Parent,

My name is Handson Mlotshwa. I am a Master of Education student (M.Ed.) in the School of Education at the University of the Witwatersrand. The title of my study is *Exploring ICT Pedagogic Integration of Economics Teachers in Two Johannesburg Schools'*. While you will not be directly involved in this study, I will be observing your Economics teacher while teaching you in the classroom. The interest of my study is to find out how they use ICT in the classroom in teaching Economics as an FET subject. My research involves identifying , understanding and exploring teaching practices used in the teaching of high school economics when ICT is integrated into teaching.

Your class is a member of the classroom; in which I will be observing the teacher teach. Your child is NOT the focus of the study, but the teacher that is teaching the class. The lesson will also be video recorded to allow the researcher to analyze and reflect on teacher practices. Your child will not be advantaged or disadvantaged in any way. S/he will be reassured that s/he can withdraw her/his permission at any time during this project without any penalty. There are no foreseeable risks in participating and your child will not be paid for this study. Your child's name and identity will be kept confidential at all times and in all academic writing about the study. His/her individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project.

Please let me know if you require any further information.

Thank you very much for your help.

Yours sincerely,

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Appendix H

PARENT'S CONSENT FORM

Please fill in and return the reply slip below indicating your willingness to allow your child to participate in the research project called:

I, _____ the parent of _____

Circle	**one**
	YES/NO
Permission to allow your child sit in class as I observe his/her teacher teach	
I agree that my child may be observed in class.	YES/NO
Permission to be audiotaped	
I agree that my child may be audiotaped during interview or observations.	YES/NO
I know that the audiotapes will be used for this project only	YES/NO
Permission to be videotaped	
I agree my child may be videotaped in class.	YES/NO
I know that the videotapes will be used for this project only.	YES/NO

Informed Consent

I understand that:

- My child's name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- He/she does not have to answer every question and can withdraw from the study at any time.
- he/she can ask not to be audiotaped, photographed and/or videotape
- All the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign_____ Date_____

Appendix I

INFORMATION SHEET TEACHERS

04/04/2018

Dear Sir/Ma,

My name is Handson Mlotshwa. I am a Master of Education student (M.Ed.) in the School of Education at the University of the Witwatersrand.

The title of my study is *Exploring ICT Pedagogic Integration of Economics Teachers in Two Johannesburg Schools'*. While you will not be directly involved in this study, I will be observing your Economics teacher while teaching you in the classroom. The interest of my study is to find out how they use ICT in the classroom in teaching Economics as an FET subject. My research involves identifying , understanding and exploring teaching practices used in the teaching of high school economics when ICT is integrated into teaching in a Full ICT school in Soweto

From the literature reviewed it is clear that there are limited studies that have been done on teacher practices in the use of ICT for teaching and learning. Most studies appear to focus on challenges, experiences and affordances of ICT while ignoring the teacher practices in the classroom. I consider this to be a primary avenue to teaching and learning. My study will involve two teachers in two different schools in Soweto. The teachers have been purposely chosen based on economics teaching in Grade 11 . The researcher intends observing and interviewing one teacher who has been oriented through professional development workshops on the use of smartboards and currently teaching economics. In addition the researcher will interview and observe one teacher who teaches economics without ICT this will eliminate bias in the study.

The reason why I have chosen your school is because it is a full ICT school. In addition to this, your school offers Economics in Grade 11, which is one of the criteria for my study. I am humbly inviting you to participate in this study as one of the two teachers to be observed and interviewed. Your name and identity will be kept confidential at all times and in the writing of the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project.

You will not be advantaged or disadvantaged in any way. Your participation is voluntary, so you can withdraw your permission at any time during this project without any penalty. There are no foreseeable risks in participating and you will not be paid for this study.

Please let me know if you require any further information.

Thank you very much for your help.

Yours sincerely,

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Appendix J

TEACHER'S CONSENT FORM

Please fill in and return the reply slip below indicating your willingness to be a participant in my voluntary research project called:

I, _____ give my consent for the following:

Permission to observe you in class

I agree to be observed in class.	YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview or observation lesson	YES/NO
I know that the audiotapes will be used for this project only	YES/NO

Permission to be interviewed

I would like to be interviewed for this study.	YES/NO
I know that I can stop the interview at any time and don't have to Answer all the questions asked.	YES/NO

Permission to be videotaped

I agree to be videotaped in class.	YES/NO
I know that the videotapes will be used for this project only.	YES/NO

Informed Consent

I understand that:

- My name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotape
- All the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign_____ Date_____