DISSERTATION

**Integration of smart board technology in business studies classrooms in secondary schools in Tshwane West District.**

By

Khosa. CE (61951412)

Submitted in partial fulfilment of the requirements for the degree of

Master in Education

in

Curriculum Studies

in the

College of Education

at the

University of South Africa

Supervisor: Dr AR Molotsi

January 2020

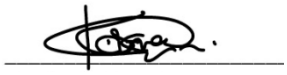
## Acknowledgements

I give my praises to the mighty God who gave me wisdom, courage and super-strength throughout my life; the one who gave me light through the darkness and created for me a clear path to educational success. I also want to acknowledge a special thanks to the following people:

- To my daughter Shantel who is my reason to work so hard.
- To my sister, Assistance Mdlhovu, who has been supportive in my educational career from my junior degree and even in this study. She has always motivated me to do better.
- My parents, Gedron and Fauxtino Khosa, who have made me the person I am today, prioritising my education, among other things, and gave me so much love, which always motivated me.
- My mother and father-in-law, Faith and Johnson Mukanda, for their continuous encouragement in completing this study.
- To my dear husband, Knowledge Mukanda, who has been the pillar of my strength; his love, support, and inspiration kept me going. He has always been by my side and motivated me to source extra strength whenever I felt tired.
- My supervisor, Dr Abueng Rachael Molotsi, who has given up her time and took effort to guide me throughout the journey of completing this study. She sacrificed her peaceful nights and holidays by being there for me whenever I called out for guidance. Her kind heart and patience, her precious words of encouragement and motivation are the reasons I completed this study.
- The teachers and school principals who welcomed me in their schools and allowed me to do this study.
- The Division Student Funding and the University of South Africa who trusted my capabilities and funded this study.
- Lastly, my editor Belinda Cuthbert, who made a significant contribution to the success of this study.

## Declaration

I, Conny Ephasi Khosa, with student no: 61951412, declare that this research on INTEGRATION OF SMART BOARD TECHNOLOGY IN BUSINESS STUDIES CLASSROOMS IN SECONDARY SCHOOLS IN TSHWANE WEST DISTRICT is my original work and that I have acknowledged all sources that were used in this study on the reference list. This study has not been submitted to any other educational institution and by any other person, except by me, for educational or any other purpose.



C.E. Khosa

January 2020

## Dedication

This study is dedicated to my beloved parents, Fauxtino Khosa, and Gedron Dzombeni-Khosa as well as my loving husband Knowledge Mukanda who gave me courage to overcome every obstacle that I came across during my academic journey. He made this journey look simple even though it wasn't.

## Abstract

Information and Communication Technology (ICT) has been used widely across the globe for the purpose of improving the quality of both basic and higher education. Lately, different kinds of technologies, such as smart boards, have been incorporated into the teaching and learning process with the aim to contribute to the effectiveness of teaching and learning outcomes. The main aim of this study was to investigate the integration of smart boards by secondary school teachers in the Tshwane West district (Gauteng province) in their business studies teachings. The study focused on the teachers' perspectives, the challenges they experienced, and the support they required for the integration of smart boards in the classroom.

The study used a qualitative research approach to gather and analyse data. Using a multiple case study design, 5 business studies teachers were purposive sampled based on their experience on the use of smart boards. Both semi-structured interviews and non-participant observations were used to collect evidence. Technological and Pedagogical Content Knowledge (TPACK) was used as a framework by which to understand the study.

The four pillars of trustworthiness (credibility, transferability, confirmability, and dependability) were applied to ensure trustworthiness of the study results. The ethics guidelines (voluntarily participation, anonymity, confidentiality, and informed consent) were also taken into consideration and applied.

The main research question for this study was: How do secondary school teachers integrate smart boards in teaching business studies in the Tshwane West district? The findings suggested that business studies teachers have positive perspectives on the integration of smart boards with the belief that smart boards make their teaching easier and allow them to incorporate a variety of audio and visual material into a lesson.

The findings also revealed that teachers face various challenges, such as smart board malfunctioning, computer viruses, and limited time given for the integration of smart boards in the classroom. From the findings, it was clear that teachers had

received professional development training on smart board integration, but that the training was inadequate. Despite the challenges that business studies teachers face during the integration of smart boards, the findings of this study indicated that teachers still had an interest in and were willing to integrate smart boards into the classroom.

The study recommended that teachers should be provided with sufficient professional development on the integration of smart boards in a business studies classroom, which would improve the level of competency of teachers on smart board integration in the teaching and learning process.

**Keywords:** *ICT Integration, Smart board, business studies, Secondary school, Teachers, and Subject.*

## Definition of acronyms

| | |
|---|---|
| ICT | Information and communication technology |
| FET | Further education and training |
| GET | General education and training |
| GDE | Gauteng Department of Education |
| DOE | Department of Education |
| DBE | Department of Basic Education |
| TPACK | Technological and pedagogical content knowledge |
| TK | Technological knowledge |
| TCK | Technological content knowledge |
| TPK | Technological pedagogical knowledge |
| CK | Content knowledge |
| PK | Pedagogical knowledge |
| PCK | Pedagogical content knowledge |
| EFL | English Foreign Language |
| HOD | Head of Department |
| E-learning | Electronic learning |
| No. | Number |
| RQ | Research question |

## Definition of key concepts

| Key concept | Definition |
|---|---|
| ICT Integration | The amalgamation of different technological tools, like tablets and smartphones, with various teaching strategies to make an educational instruction that will allow for better understanding of content by both learners and teachers (Dooley, Lewis Ellison, Welch, Allen & Bauer, 2016). |
| Smart board | A smart board is a large whiteboard that is linked to a computer and projector. The computer projects the content of a computer's desktop onto the surface of the board and users can control the content on the board using a special pen, finger, or a gadget, as if they were controlling the content on the computer screen itself (Gruber, 2011). |
| Business studies | A subject with content that combines the gaining of the theoretical and practical knowledge that is fundamental for the work environment (Sithole & Lumadi, 2016). |
| Quintile | South Africa Department of Basic Education's (DoBE) categorisation of schools according to the degree of poverty existing in the community local to the school (Smith, 2011). |
| Secondary school | A school that creates teaching and learning environments that are collaborative in nature for Grade 8 to Grade 12 learners (Silins, Zarins & Mulford, 1998). |
| Teachers | Individuals who are trained to apply their knowledge and share their experiences and ideas with learners (Sherbino et al., 2010). |
| Subject | A subject refers to a learning criteria that provides a particular knowledge that is studied in schools (https://www.scribd.com/document/206943812/meaning-scope-functions-of-philosophy-of-education). |
| Peri-urban | Areas located immediately at the edge of the urban areas |

| | |
|---|---|
| | and found between urban areas and rural areas (Douglas, 2012). |

**TABLE OF CONTENTS**


**ACKNOWLEDGEMENTS……. i**

**DECLARATION……. ii**

**DEDICATION……. iii**

**ABSTRACT……. iv**

**DEFINITION OF ACRONYMS …… vi**

**DEFINITION OF KEY CONCEPTS……. vii**

**CHAPTER 1: INTRODUCTION**

**1.1 Introduction and background……..…… 1**

**1.2 Research problem statement…….……..... 3**

**1.3 Research questions……. 4**

**1.4 Rationale……. 5**

**1.5 Aims and objectives of the study……. 5**

**1.6 Brief introduction to literature……... 5**

**1.7 Brief introduction to theoretical framework……. 8**

**1.8 Brief introduction to research methodology and design……. 10**

1.8.1 Research approach and design**……. 10**

1.8.2 Population and sampling**……. 12**

1.8.3 Data collection instrumentation**……. 13**

*1.8.3.1 Semi-structured interviews*****……..... 13**

*1.8.3.2 Non-participant observations*****……..... 14**

1.8.4 Data analysis and interpretation**……. 14**

**1.9 Planning of the study and chapter outline……. 16**

**1.10 Conclusion……. 17**

## CHAPTER 2: LITERATURE REVIEW


**2.1 Introduction……... 19**

**2.2 Related literature……. 21**

2.2.1 The use if ICT in the developing countries…… **22**

2.2.2 The use of ICT in the developed countries…… **27**

2.2.3 ICT integration in education…… **30**

2.2.4 Smart board integration in education…… **34**

2.2.5 Teachers perspectives and challenges on the integration of ICT in education…… **35**

2.2.6 Teachers support on the integration of ICT in education……... **44**

**2.3 Theoretical framework…… 46**

2.3.1 Technological Knowledge…… **47**

2.3.2 Technological Content Knowledge……..... **49**

2.3.3 Technological Pedagogical Knowledge…… **49**

2.3.4 Technological and Pedagogical Content Knowledge…… **51**

**2.4 Conclusion……. 52**


## CHAPTER 3: METHODOLOGY


**3.1 Introduction……... 53**

**3.2 Main research aim and objectives restated……. 53**

**3.3 Research methodology and design……. 53**

3.3.1 Qualitative research approach……... **55**

3.3.2 Population and sampling……. 57
3.3.3 Recruitment of participants……. 59
3.3.4 Data collection instrumentation……..... 59
3.3.5 Data collection procedure…… 61
3.3.6 Data analysis and interpretation……..... 62
**3.4 Trustworthiness of the study……...** 64
3.4.1. Credibility…… 65
3.4.2. Confirmability…….. 67
3.4.3. Transferability…… 68
3.4.4. Dependability……. 69
**3.5 Ethical issues……...** 69
3.5.1 Informed consent……..... 69
3.5.2 Voluntary participation……. 72
3.5.3 Confidentiality ……..……. 72
**3.6 Conclusion……** 73

**CHAPTER 4: THE ANALYSIS AND DISCUSSION OF THE FINDINGS**

**4.1 Introduction……..... 74**
**4.2 The context of the study……** 74
**4.3 Findings from semi-structured interviews…….** 77
**4.4 Findings from non-participant observations……** 91
**4.5 Conclusion……** 99

**CHAPTER 5: SUMMARY, LIMITATIONS AND RECOMMENDATIONS**

**5.1 Introduction……... 100**
**5.2 Summary of chapters……** 100
**5.3 Summary of findings……..……** 101
5.3.1 Semi-structured interviews findings……..... 102

5.3.2 Non-participant observations findings……. **103**
**5.4 Limitations of the study……. 104**
**5.5 Recommendations……... 104**
**5.6 Conclusions……. 105**
**REFERENCES…… 107**
**APPENDICES……..……. 128**

## LIST OF FIGURES AND TABLES

### FIGURES

Figure 1: Technological and Pedagogical Knowledge framework..... **47**

### TABLES

Table 3.1: Description of study participants..... **58**
Table 3.: Criteria for trustworthiness of qualitative research..... **65**
Table 4.1: Description of selected schools..... **74**
Table 4.2: Description of participants according to gender, age and experience on the use of smart board..... **76**

# CHAPTER 1: THE INTRODUCTION AND BACKGROUND OF THE STUDY

## 1.1 Introduction and background

Information and Communication Technology (ICT) is widely used across the globe with the intention to improve the quality of education (Tosuntaş, Karadağ & Orhan, 2015). New technologies are perceived as catalysts for social change and economic development as well as in the process of teaching and learning (Assan & Thomas, 2012; Chigona, Chigona & Davids, 2014), which is one of the reasons that governments all over the world have made investments for ICT integration into schools (Savasci, 2014).

Research indicates that learners prefer learning and sharing information through the use of ICT (Bester & Brand, 2013; Mills & Angnakoon, 2015). Teachers have an essential part to play when it comes to the transformation of the education system (Ghavifekr et al., 2014; Kayalar, 2016) and they must become acquainted with technological skills and be prepared to use different ICTs in schools (Kayalar, 2016). For that purpose, it is vital to ensure that teachers understand their role in integrating ICT in education in general. Educational institutions strive to provide the latest technologies to schools to provide better learning opportunities to learners (Mihai, 2017). The education system of the 21st century is introducing more practical methods of teaching where traditional blackboards are being replaced by visually oriented gadgets such as laptops and interactive whiteboards. These ICTs assist in the transformation of traditional education to e-learning (Tobail, Crowe & Arisha, 2016).

Interactive whiteboard also known as smart board, is a modern technology used in education and training environments (Tatli & Kiliç, 2016). Nichols (2015) defined an interactive whiteboard as a screen that can be used simply by touching; has projector capabilities; and is usually attached to a wall. Gashan and Alshumaimeri (2015) provide a similar definition by saying an interactive whiteboard is a big screen which senses when someone touches it and uses the functions of both the projector and a computer. From these definitions, the researcher understands a smart board to be a considerable-sized screen panel that allows the user to touch, scroll, write, view objects, save, as well as search materials on the internet. Research reveals

that a smart board can keep the attention of learners to the lesson (Nejem & Muhanna, 2014).

Lately, various kinds of technologies have been integrated into the teaching and learning process (Gashan & Alshumaimeri, 2015). Some countries in Africa, like Rwanda, Kenya, South Africa, and Senegal, have made a great improvement when it comes to the accessibility and the use of ICT resources like computers and connectivity in schools (Adam, Butcher, Tusubira, Sibthorpe, & Souter, 2011). However, some developing countries still experience challenges in integrating these technologies in education. For example, Uganda has multiple initiatives to promote ICT in education but hasn't figured out effective ways in which they can coordinate the implementation (Adam et al., 2011). Many laptops have been purchased for learners in countries such as Uruguay and Rwanda, but teachers do not use them as they do not have the necessary technical skills and they are cautious about the safety of the gadgets (Buckner & Kim, 2014).

The need to provide quality education has motivated developing countries to adopt and use ICT in schools (Adam et al., 2011). Chigona et al. (2014) states that there is a growing body of research on the effectiveness and efficiency of educational ICT in enhancing the process of teaching and learning. South Africans find themselves on a technological path where ICT intelligence and its use to solve day-to-day problems is taking centre stage. The South Africa Department of Education (DoE) e-education goal aspires that all learners, teachers, and educational managers in South Africa would be ICT capable in both Further Education and Training (FET) and General Education and Training (GET) by 2013 (South Africa, 2004 August). The South African government encourages teachers to integrate technology into the delivery of the curriculum. It is doing so by equipping schools with technological gadgets and organising training programmes to capacitate teachers on how to successfully integrate the provided ICT tools into the diversified methods of teaching that they use in their classrooms (Tiba, Condy & Tunjera, 2016).

The South Africa, DoE is further supporting its goal by facilitating the construction of computer labs, moving towards paperless boards, and issuing tablets to FET and GET bands to most schools. Some schools are, however, located in previously

disadvantaged townships where there is a lack of basic facilities and this is a disadvantage to their learners (du Plessis & Webb, 2012); and there are still inequalities amongst South African public schools when it comes to technology access (Assan & Thomas, 2012). Despite the exceptions, South African public schools, in general, continue to have increased access to ICTs aimed at the contribution to the efficiency and effectiveness of teaching and learning. This is evident in statistics that report an increase in access to ICT in South African public schools from 12.3% in 1999 to 26% in 2002 (Assan & Thomas, 2012). Research has highlighted a correlation between the availability of resources and learners' performance; many resourced schools in Gauteng, South Africa, achieved a higher pass percentage in matriculation results than poorly resourced schools (Pienaar & McKay, 2014). ICT will lead to improved performance in education (Adam et al., 2011).

Some South African provincial departments, such as the Western Cape Department of Education, have already equipped its schools with technological gadgets through the Khanya project and trained teachers on the integration of the ICTs in education (Chigona et al., 2014). Being a teacher in a school in Gauteng, the researcher observed the distribution of different technological gadgets to both teachers and learners in Gauteng schools starting with the "Gauteng Online" programme, which the Gauteng Department of Education (GDE) commissioned by equipping every school with a computer lab (Waspe, 2013). The GDE has supplied many of its secondary schools with smart boards; the Tshwane West district in Gauteng province is one of the districts where most schools have the services of a smart board. Despite the Gauteng Online laboratories learning and the training provided to teachers on using the laboratories, the expected results in terms of its integration to teaching were not achieved (Waspe, 2013).

Using a smart board is believed to have significant potential to change teaching and learning from the traditional methods to interactive methods which that better suit the needs of a 21st century classroom (Gashan & Alshumaimeri, 2015). Even though the South African government continues to invest in ICT in education, the acceptance of ICT in South African schools is progressing at a very slow pace (Tiba et al., 2016).

## 1.2 Research problem statement

As a business studies teacher, I have realised that smart boards are not effectively integrated in the teaching and learning of business studies. The problem of this study emanates from the less usage of smart board technology by business studies teachers during their teaching. South Africa has invested a great deal of funds in order to provide ICT infrastructure to schools and gadgets such as smart boards. Teachers are expected to integrate smart boards in the process of teaching and learning (South Africa, 2004 August) and are trained to use them. This study sought to investigate the integration of smart board in teaching business studies subject by grade 11 teachers. Similar studies have been conducted but from a different perspective. Bıçak (2019). Investigated the views of teachers toward using smart boards, Minor et al., (2013) focussed on professional development of teachers using smart board, Momani et al., (2016) looked at the obstacles of using smart board in teaching English, Nejem and Muhanna (2014) investigated the effect of using smart board on mathematics achievement and retention of seventh grade students, Raman et al., ( 2014) explored teachers' acceptance of smart board as a digital device and Aktas and Aydin (2016) focussed on the effect of the smart board usage in Science and Technology Lessons.From the literature review, the main aim of this study has not been tapped by other researchers. This is the gap that this study has addressed. In addition, Dlamini and Mbatha (2018) argued that there is a shortfall in terms of professional development programmes that can allow teachers' development of technological confidence to easily integrate smart board in their teaching.

## 1.3 Research questions

The main research question of this study is:

**How do secondary school teachers integrate smart boards in teaching business studies in the Tshwane West district?** Out of this research question, emerges the following sub-questions:

1. What is the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning?
2. What challenges do secondary school business studies teachers experience when integrating smart board technology in their teaching?

3. How are secondary school business studies teachers supported in the integration of smart board technology in their teaching?

## 1.4 Rationale

This study presented a summary of basic, sound, documented views about smart board technology in education at secondary school level. As teachers move from traditional methods of teaching and learning to e-learning, schools strive to develop strategies that will allow them to adapt to the needs of a technologically driven classroom. ICTs such as smart boards are capable of cultivating education standards and to assist on the achievements of learning objectives. A smart board is believed to have the ability to positively impact the way in which instruction is carried out. It is proven that the use of smart boards on instruction delivery rises the level of learner retention and academic achievement (Aktas & Aydin, 2016). Teachers also believe that when smart boards are used in the teaching and learning situation, learners become motivated to learn and are eager to participate in the classroom lesson (Bıçak, 2019).

## 1.5 Aim and objectives of the study

The main aim of this study is to investigate the integration of smart board technology by secondary school teachers in their teaching of the business studies subject in Tshwane West district in Gauteng province.

The objectives of this study are to:

1. Explore the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning
2. Determine the challenges that secondary school business studies teachers experience when integrating smart board technology in their teaching.
3. Examine the support that secondary school business studies teachers receive in the integration of smart board technology in their teaching.

## 1.6 Brief introduction to literature

A literature review is a process of searching for, reading, evaluating, and

summarising current and published information that relates to the proposed study (Bezuidenhout, Davis & Du Plooy-Cilliers, 2014). It is conducted in order to find out what other researchers have previously published on the topic and to find materials that are relevant and can be useful to enhance the current research (Bezuidenhout et al., 2014). There is a recent increase in the awareness that ICT can significantly enhance the level of education in East African countries (Tedla, 2012). Many countries have integrated ICT into their curriculum frameworks, whether starting in primary or secondary level education (Voogt, Knezek, Cox, Knezek & ten Brummelhuis, 2013).

ICT is regarded as a powerful instrument that can bring the broader reality of the world into the classroom and assist learners to develop various skills like communication, cooperation, and problem-solving (Tedla, 2012). Various educational institutions around the world integrate ICT into their educational processes (Singh & Chan, 2014). ICT can be integrated to existing teaching strategies to enhance the quality of instruction, and it is regarded as an important tool that can be used to develop new ways of teaching and learning (Singh & Chan, 2014). School managers and other stakeholders can work in collaboration to guarantee that ICT is successfully incorporated in the classroom (Kayalar, 2016).

However, teachers are the primary variable that can warrant the success on an endeavour to integrate ICT (Singh & Chan, 2014). Even if a school has an essential ICT infrastructure, the integration success will depend on the readiness of teachers (Singh & Chan, 2014). Teachers are regarded as important success factors when it comes to ICT programmes meant to improve the integration of ICT in education (Singh & Chan, 2014). For successful ICT integration, teachers require the necessary ICT skillset. ICT skill is the ability to access, manage, integrate, describe, and evaluate information need through the integration of ICT tools and networks (Singh & Chan, 2014:876).

ICT provides both teachers and learners with the freedom to productively interact with different communities (Tedla, 2012). ICT integration is perceived as a crucial factor in providing different learning opportunities for learners (Singh & Chan, 2014) and Voogt et al. (2013) argue that the integration of ICT positively directs learners'

practices towards 21st century learning. Teachers can use ICT to help develop the reading and writing skills of learners (Momani, Alshaikhi & Al-Inizi, 2016).

ICT grants teachers the ability to modify and redesign available teaching resources to improve teaching and learning outcomes (Kayalar, 2016). It is believed to be influential in how the process of instructional delivery unfolds (Tedla, 2012). According to Tedla (2012), ICT has great potential to change our day-to-day lives and improve ways in which information is accessed and processed, change the education system to the better, while preparing and equipping learners with the appropriate skills they will need for the work environment. Tedla (2012) further argued that ICT can improve the standard of education and promote an effective atmosphere for learning if it is effectively integrated into the curriculum by individuals with utmost interest.

Tedla (2012) indicates that most teachers in numerous African countries are holding back when it comes to ICT use during teaching because of skills, ICT knowledge, availability of ICT resources, beliefs, teacher commitment, age, gender, educational and computer experience, as well as external support. Modern technologies have been championed into mainstream education so that the education level can be improved (Hockly, 2013). Research conducted by Nichols (2015) indicated that interactive whiteboard technology is one of the technologies that is approved by many schools; and the most popular and leading interactive whiteboard used is a smart board.

A smart board is a large white board that displays information that is generated from a computer and transferred to a screen through the built-in projector (Alfaki & Khamis, 2014, Nichols, 2015). Jwaifell and Gasaymeh (2013) defined a smart board as a tool that uses multimedia to display information. A smart board offers a multimodal atmosphere that enables the user to insert images, writings, and subject-related software programs that can be used by more than one person, viewed, and operated on the screen (De Vita, Verschaffel, and Elen (2017). According to De Vita et al (2017), a smart board is furnished with well-designed software and can be considered as a modernised hub in which the internet and other types of hardware resources could be integrated into a lesson.

A smart board has built-in applications that are designed specifically for effective lesson delivery in the classroom (Bakadam & Asiri, 2012). It combines the capabilities of the projector, computer and a whiteboard to form a system that allows the user to perform the functions of both keyboard and mouse using touch control and then display information on the large board where all learners in the classroom can see (Martin, Shaw & Daughenbaugh, 2014). The touch-sensitive board has features that enable both teachers and learners to write on and save the information, to undo mistakes to make corrections as well as creating an interactive and entertaining visual lesson by combining the written material with videos, sounds, animations and pictures (Yapici & Karakoyuni, 2016).

Jelyani, Janfaza, and Soori (2014) indicated that smart boards allow the user to use colour pens or highlighters to edit documents, take notes, plan, and proofread drafts with all the learners in the classroom. A user can search the internet for information and bring the outside world into the classroom (Alfaki & Khamis, 2018).

A smart board has replaced a traditional blackboard in the classroom where classroom activities are conducted differently with the hope for overall educational improvement (Mihai, 2017). Mihai (2017) also claimed that teachers believe that the use of a smart board in teaching help learners to easily understand and recall information. Alfaki and Khamis (2018) indicate that a smart board raises the level of learner-engagement in the classroom and motivates and promotes learners' eagerness to learn. However, Mihai (2017) argues that learners' eagerness and increased motivation cannot be enough on its own; teachers also need to integrate the smart board into appropriate teaching methods to improve learner results.

Mihai (2017) also asserted that learners enjoy using smart boards because they are allowed to write their ideas on the board during the lesson, and both learners and their teachers are motivated by the use of smart board in the classroom. However, Mihai (2017) indicated that teachers need necessary training in order to effectively integrate smart board in their teaching. The integration of a smart board is believed to be beneficial but, as this is a new technological tool in the education environment, the manner in which this technology is incorporated in the classroom should be

reviewed (Alfaki & Khamis, 2018).

## 1.7 Brief introduction to theoretical framework

The researcher used the technological and pedagogical content knowledge (TPACK) theoretical framework (Mishra & Koehler, 2006) as a lens though which to understand the study. TPACK is a type of knowledge required by teachers to integrate different technologies in the teaching of specific content (Harris & Hofer, 2011). It involves three bodies of knowledge which are content, pedagogy, and technology (Mishra & Koehler, 2008). In this study, TPACK was used to assess the level of knowledge that business studies teachers have that enabled them to successfully integrate smart boards in their teaching. The three knowledge bodies of pedagogy, content, and technology were combined to produce three components of TPACK, namely technological knowledge (TK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK). TPACK components were used to refine the questions on the non-participant observation checklist to guide the answering of the questions of the study. The TK of teachers was tested in order to explore the level in which business studies teachers integrate smart boards in their teaching.

The researcher also considered content knowledge (CK), pedagogical knowledge (PK) as well as the pedagogical content knowledge (PCK) (Shulman, 1986) as the initial components of TPACK. Ekrem and Recep (2014) define CK as a teacher's knowledge on a specific subject while PK refers to a teacher's knowledge about teaching strategies, classroom management as well as understanding ways in which learners learn (Ekrem & Recep, 2014). It is clear that teachers will use technology when they teach if they have knowledge of the content they teach as well as appropriate strategies of teaching the content. In other words, all of the above knowledge components are imperative for teachers who wish to successfully teach using technology. One's TK depends primarily on the content to be taught while PK provides a suitable strategy or method of instructional delivery (Benton-Borghi, 2013). The researcher also examined the ability of business studies teachers to represent the content and to present lessons using technology. The TCK involves delivering content using technology (Benton-Borghi, 2013). In this study, business

studies teachers' TPK was also tested in order to explore the integration of smart boards in a business studies classroom. Business studies teachers were observed while teaching using a smart board and lesson presentation during which they demonstrated their TPK. TPK is the aptitude to strategically use technology to deliver a lesson (Benton-Borghi, 2013).

The combination of the above-mentioned knowledge components produces what we call TPACK (Jang & Tsai, 2013). TPACK refers to the combination of different skills that give teachers the ability to be able to use given technological tools to carry out classroom activities (Benton-Borghi, 2013). As a lens, TPACK was used to guide the process of development of questions where all the its components were considered.

## 1.8 Introduction to research methodology and design

The researcher located the study in the interpretive paradigm. A qualitative research approach was employed in this study.

### 1.8.1. Research approach and design

This study followed an exploratory qualitative paradigm. A qualitative approach is a methodology that suggests that researchers listen to the opinions of participants through interviews and observation of participant behaviour to produce descriptive data (Taylor, DeVault & Bogdan, 2016). Creswell (2013) indicated that qualitative approach takes place in a state where the views of participants are considered to produce the meaning of a phenomenon. Qualitative research is an organised investigation of a phenomenon where certain behaviour is witnessed from the environment in which it happens, which could include the behaviour of a group of people and ways in which they carry out their daily events (Teherani, Martimianakis, Stenfors-Hayes, Wadhwa & Varpio, 2015). Unlike quantitative research, which is based on the view that researchers can only discover one reality through the use of appropriate experimental methods (Creswell & Creswell, 2017), a qualitative research allows the researcher to investigate different perspectives from different people in the community on a particular field of study (Choy, 2014). Creswell and Creswell (2017) defined the qualitative approach as the kind of research that makes

it possible for researchers to gather data and draw conclusions based on the experiences of participants and thereby generate themes to explain the data.

A qualitative research approach provides a variety of interpretations that may differ from one participant to another based on participants' views and practices that are determined by their settings (Anguera, Portell, Chacón-Moscoso, & Sanduvete-Chaves, 2018).

Qualitative researchers can pay attention to the meaning of a phenomenon by collecting and analysing exploratory data using various methods (Noble & Smith, 2014). Qualitative approach is mostly used when detailed information about a phenomenon is needed as a result of limited research conducted on that phenomenon, or only numeric data is available for research purpose (Bazeley & Jackson, 2013). In this study, the researcher listened to the views of participants and interpreted what they shared.

The current study used a multiple case study design. A multiple case study design gives researchers a chance to listen to participants' views from different groups and explore different contexts in which the participants experience the problem of the study (Cronin, 2014). Unlike a single case study design, which is likely to produce too little information for researchers to draw emerging data patterns because there are too few data points (Kratochwill et al., 2013), a multiple case study design allows the researcher to repeat the same process of data collection for several cases which gives the researcher enough insight and understanding into the research phenomenon so that emerging data patterns can be identified (Anderson, Leahy, DelValle, Sherman & Tansey, 2014). By using a multiple case study design, the researcher can collect comprehensive data from numerous sources from various settings (Unluer, 2012).

In this study, different sites were selected as case studies where the researcher sampled the study participants. The process of data collection was conducted in a natural setting, namely the schools in which participants experienced their daily activities. When a research is conducted in a natural environment, a natural behaviour which is not affected by extra variables is recorded unlike the research

done in an artificial setting (Anguera et al., 2018). Studying the day to day routine gives an understanding of different behaviours and activities that are associated with the life of a participant. Although the daily activities may appear to be of different formats, the related and common aspects could be identified and studied through observation (Anguera et al., 2018).

### 1.8.2. Population and sampling

A target population is defined as people or organisations that can be branded by using a specific research criterion specified by the researcher for the purpose of the study (Alvi, 2016; Hartas, 2015). A target population includes all research subjects or cases (Etikan, Musa & Alkassim, 2016). The population target for this study was business studies teachers from secondary schools in the Tshwane West district in Gauteng province. The researcher used sampling methods to choose individuals to represent the target population (Sharma, 2017).

Sampling is when the researcher extracts a certain number of participants from the entire population for the research purpose (Alvi, 2016). Sharma (2017) described sampling as a strategy carried out by researchers to critically choose a manageable number which is just enough to represent the population and will be regarded as the source of evidence during investigation conducted according to the reason for the study. Sampling is necessary because it is usually impossible for researchers to collect data from every individual that meets the criterion specified for the research (Alvi, 2016; Sharma, 2017). The sample chosen by the researcher must always be large enough for the researcher to collect enough data that will produce accurate and reliable results that represent the full target population (Sharma, 2017).

A non-probability sampling technique where not everyone who has the specified characteristics is given the opportunity to participate in the study was used (Alvi, 2016). Unlike probability sampling, which is usually used by researchers who seek to understand a certain population, non-probability sampling is used when researchers need to explore a phenomenon to produce innovative ideas (Alvi, 2016). This sampling technique reduces bias in terms of participant selection as it is usually impossible to give equal chance for participation to every element of the population

in the universe (Etikan & Bala, 2017). On the other hand, probability sampling methods such as random sampling concentrates on aspects such as age, cultures, and backgrounds (Alvi, 2016).

A purposive sampling strategy was used to select participants. This technique allows the researchers to select only the individuals that they believe are required and suitable for the investigation purpose (Alvi, 2016). This technique concentrates on specific characteristics that participants must have for them to provide relevant information requires by researchers (Alvi, 2016; Bezuidenhout et al., 2014; Etikan et al., 2016). The judgement of the researcher in purposive sampling is the determining factor in selecting relevant elements of the population (Sharma, 2017). Purposive sampling can be useful and is an ideal technique for researchers who have insufficient resources and cannot generalise the findings to the entire population (Alvi, 2016; Etikan et al., 2016).

In this study, the sampled individuals were the business studies teachers from five secondary schools in the Tshwane West District in Gauteng. According to Creswell (1998), when conducting phenomenological studies, the ideal sample size should be between five and twenty-five; therefore, five was considered as a sufficient sample to do the analysis.

### 1.8.3. Data collection instrumentation

The collection of data was done by conducting semi-structured interviews and non-participant observations. Non-participant observations were conducted first with all the participants individually. After non-participant observations were made, semi-structured interviews were conducted with individual participants.

- *Semi-structured interviews*

A semi-structured interview is a discussion between two people where the answer to each question does not simply require a choice from a list of pre-determined answers, but requires a deliberation on the respondent's experiences (Jamshed, 2014). The purpose of semi-structured interview is to collect responses from participants about their experiences on a research topic (McIntosh & Morse, 2015).

Unlike unstructured interviews, where participant responses are not controlled, semi-structured interviews direct participants' responses to a specified topic of study (McIntosh & Morse, 2015). In semi-structured interviews, the researcher can probe the responses of participants to get more information (McIntosh & Morse, 2015).

The researcher developed a guiding document with questions which were open-ended for semi-structured interviews in preparation for the collection of data. All participants were asked the same set of questions; and participants could freely respond to the questions (McIntosh & Morse, 2015). Open-ended questions in semi-structured interviews were asked in the same order to all participants, which allowed for easy comparison of participants' responses (McIntosh & Morse, 2015).

- *Non-participant observations*

The researcher used non-participant observation to collect data. This type of observation implies that the researcher plays no role other than watching what is happening (Urquhart, 2015). Bless, Higson-Smith, and Sithole (2013) defined non-participant observation as the recording of actions by someone who is from outside, who only records the actions without interacting with the person observed. Jamshed (2014) described observation as a data collection method which includes, among other things, ethnography, and field research where the researcher can involve multiple case study sites. Through observation, the researcher has the opportunity to record events as they happen, in the environment which is natural, without being influenced by artificially created variables (Cohen, Manion & Morrison, 2011). In this study, the researcher observed the participants in their natural settings which were the schools where their everyday experiences on the research topic occurred.

### 1.8.4. Data analysis and interpretation

Data analysis is a procedure where researchers continuously review the available information to develop understanding and meanings in order to draw conclusion from the ideas as they arise from the data (Noble & Smith, 2014). A qualitative analysis of data was applied to this study in analysing collected data from semi-structured interviews and non-participant, classroom observations. A qualitative analysis can be

defined as the process where researchers link their research ideas or concepts with a specific phenomenon (Graue, 2015). De Vos, Strydom, Fouché, and Delport (2011) defined qualitative data analysis as an inductive reasoning process where researchers refrain from using technologies but use their thinking to interpret meanings of first-hand information collected from participants. In qualitative analysis, the researcher presents data in themes which simplifies the process of interpretation of results (Bengtsson, 2016).

The process of data analysis includes coding where researchers assign labels to actions and responses of participants (Petty, Thomson & Stew, 2012). The recordings from semi-structured interviews were transcribed to prepare for data analysis. Before the analysis, the researcher listened to the recordings to transcribe the semi-structured interviews and checked the transcripts for any errors (Mabuza, Govender, Ogunbanjo & Mash, 2014). The researcher followed the data analysis steps outlined by Mabuza et al. (2014) which include familiarisation, development of a thematic index, charting, interpretation, and confirmation. The data analysis steps are described below:

- *Familiarisation*

Familiarisation is a process where the researcher reviews the raw data multiple times before beginning with analysis. During this process, the researcher read all the field notes collected during observations and listened to the tapes recorded during interviews to familiarise themselves with the available data (Mabuza et al., 2014; Petty et al., 2012). The checklist completed during non-participant observations and the transcripts from semi-structured interviews were also previewed by the researcher for the purpose of familiarisation (Mabuza et al., 2014).

- *Development of a thematic index*

In this stage, researchers develop a list of codes from the transcripts and the observation notes and arrange the data in relevant categories which enables the researcher to easily organise data (Mabuza et al., 2014). The developed codes should then be labelled for the researcher to clearly see the inclusion and exclusion criteria for each code (Mabuza et al., 2014; Petty et al., 2012). This labelled list of

codes is called the thematic index. In this study, the researcher created codes that were guided by the familiarisation process where the same or similar data was arranged under the same relevant code.

- *Charting*

Mabuza et al. (2014) specified that the construction of charts is directed by the developed thematic index and should be associated with the theoretical framework that was used to guide the study to accomplish the intentions and goals of the study. Mabuza et al. (2014) further asserted that a chart can be made of both columns and rows where the cells should contain codes and highlighted quotations that should be traceable to the original source. In this study, the researcher used a word document to develop a coding chart (Appendix C) where the rows contained the questions posed to participants and the highlighted summary of their responses and the columns contained the labels of each participants and the emerged themes.

- *Interpretation*

The interpretation of the coded data depends on the aims and purpose of the investigation; where researchers may choose to interpret data according to the participants' explanations of key concepts or the patterns of responses given by participants (Mabuza et al., 2014). According to Mabuza et al. (2014), researchers should not avoid any contradicting information as it may provide the guideline for further research. The researcher in this study interpreted the highlighted quotations according to the themes that emerged from participants' responses. The researcher also quoted other authors who revealed similar results in similar studies.

- *Confirmation*

The process of confirmation was done through member checking. Thomas (2017) described member checking as the process where the researcher sends the interview transcripts or the copy of findings to the participants so that they can review and make corrections or comments. Participants have the opportunity to compare their understanding with the findings to ensure the trustworthiness of the results (Birt, Scott, Cavers, Campbell & Walter, 2016). The researcher personally took the transcripts and the research findings to each participant where they confirmed that

the transcripts were the true reflection of what they said, and that the findings were also based on their experiences.

### 1.9. Planning of the study and chapter outline

- **Chapter 1- Introduction**

Chapter 1 provided the contextual background of the study by including the problem statement, the research questions, research aims and objectives, study significance, an outline of the methodology and research design, preliminary literature review, introduction to research methods, and a brief explanation of key concepts used in the text.

- **Chapter 2- Literature review**

Chapter 2 describes current, established literature on smart board integration in education, which was reviewed and detailed to gain insight into the topic.

- **Chapter 3- Research design and Methodology**

In chapter 3, the researcher will discuss the research design and methodology that was used. This will include the population and the sampling methods; the development of instrumentation used to collect data; techniques of collecting data; analysing; as well as interpretation of the data. This chapter will furthermore discuss ways in which trustworthiness was ensured and details of issues regarding ethics of the study.

- **Chapter 4: Results**

Chapter 4 will present the findings concurrently with the discussion of the findings generated from data analysis. Findings will be arranged in terms of the transpired themes.

- **Chapter 5: Conclusion and Recommendations**

Chapter 5 will focus on the summary of the study, the limitations, and recommendations. The chapter will end with a clear conclusion summarising the importance of the findings of the study.

## 1.10. Conclusion

The continuously changing environment of education from the use of the traditional blackboard to ICT-based education is inevitable. In these modern days, the blackboard is being replaced by visually oriented technologies such as laptops and smart boards. The level of education is becoming more practical as ICT contributes to the transformation from traditional education to e-education. Even though there are still inequalities in terms of the availability of these technologies in some schools, there is a substantial improvement of the accessibility of ICTs in schools in many countries. South African is one of the countries where most schools enjoy the services of technologies such as the smart board.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

A literature review is the process of searching for, reading, evaluating, and summarising current published information that relates to the proposed study (Bezuidenhout et al., 2014). Bezuidenhout et al. (2014) further stated that the objective of a literature review is to uncover what other researchers have already published on similar topics and then to realise materials that are relevant and that can be used to enhance the current research. In this literature review, the researcher reviewed, summarised, and compared materials already developed and associated with the integration of ICT in education.

Khan, Hasan, and Clement (2012) described ICT as any technology that consists of electrical gadgets, such as computers, radios, telephony, and televisions, that can make leaning possible and provide guidance during classroom teaching. Beyond that, ICT can be implemented during training and teaching sessions. According to Sarkar (2012), ICTs are different groups of technological equipment and materials that comprise of hardware, software, different forms of networks, and a collection of media; and that can be used to send, share and present information that can change our everyday lives. The technology acts as a provision of information in all disciplines (Niebel, 2018).

Most importantly, when resources are channelled to ICT, they have the potential to reduce the managerial load on institutions. With ICT at their disposal, both small and medium enterprises can save on the costs incurred during business dealings such as saving on the time it takes to travel from one place to another. Niebel (2018) also highlighted that most developing countries may not be familiar with some ICT services and devices, nevertheless, ICT offers services that were previously not accessible in most sectors of these countries.

In this chapter, literature was reviewed for ICT integration by teachers during the learning process in both developing and developed countries. The smart board was a focal point as one of the new technologies in the educational sector.

Technology has changed the way of doing things; the operations, and instruments that we use to perform various tasks. ICT is about the modern methods in which people can connect, make inquiries and choices, and solve problems (Sarkar, 2012). ICT is believed to improve the quality of education and enable learners to acquire the complex skills necessary for their future work environment through learner motivation (Sithole & Lumadi, 2016). Technology in modern society is used increasingly widely, especially for teaching and learning purposes (Tosuntaş et al., 2015). Rabah (2015) claims that ICT integration is a tool that has become very essential in schools. Research indicates that some developing countries, such as Malaysia, strategically plan for ICT integration to ensure an effective ICT-based curriculum (Ghavifekr et al., 2014) while educators in other developing countries, such as South Africa, are encouraged to innovatively incorporate technology in such a way that the learning experience is improved across the curriculum (Chigona et al., 2014).

Many educational technologies have been adopted into teaching and learning, including various kinds of smart boards. A smart board has a build-in computer and a projector which work together to project the information from the computer screen to the board. The user can simply touch to surface of the board to work with the projected information as the board is touch-sensitive (Maher, Phelps, Urane & Lee, 2012). Teachers can use a finger to scroll and write on the smart board or the palm of the hand to erase information. A smart board is supplied with a software package that has functionalities which enable the user to type, highlight specific information, as well as enlarge or reduce the size of font characters and pictures for all learners in the classroom to see (Hennessy & London, 2013).

When using a smart board, the teacher can take advantage of the various pens available on the smart board to display only a specific part of the content, for example, a magic pen to highlight certain information which automatically disappear after a short time. The software installed on a smart board is designed specifically for teaching and learning and allows teachers to present information to learners in such a way that teachers can link text, pictures, and videos and then record the content for future reference (Maher et al., 2012). Teachers have an advantage of saving teaching materials and lessons that can be used for the purpose of revision in future

(Hennessy & London, 2013). According to Hennessy and London (2013), the functionalities of a smart board can draw learners' attention to the lesson as both teachers and learners directly witness the interactive experience of using a smart board.

A study was conducted to investigate both the benefits and difficulties experienced when using a smart board in the educational system. The results indicated that a smart board has educational potential despite the fact that it is slightly more complicated to integrate into teaching and learning when compared to other educational technologies (Karsenti, 2016). Moreover, learners have a positive attitude towards smart boards regardless of the technical challenges experienced during integration (Han & Okatan, 2016). The incorporation of different ICT tools, such as a smart board, during teaching and learning in classrooms, enhances collaborative learning because learners can use a digital pen to write notes on a paper and then use the smart board to display the notes to other learners (Alvarez, Salavati, Nussbaum & Milrad, 2013).

Although the integration of smart boards points towards the possibility of improved collaborative and individualised learning, it also poses a design challenge from the functional perspective and requires that learners must have the capability to track the flow of ideas through digital and analogue media (Alvarez et al., 2013). This section of the research presents an argument from available literature and research already conducted on the incorporation of smart board in the pedagogy of business studies as a subject.

## 2.2. Related literature

In this section, six main aspects were reviewed, which were the use of ICT in developing countries; the use of ICT in the developed countries; integration of ICT in education; integration of smart boards in education; teachers' perspectives and challenges on the integration of ICT in education; and teachers' support on the integration of ICT in education. A comparison was made between developed and developing countries regarding their use of ICT in educational sector. During the comparison, developing countries were given more preference than developed

countries. That was due to the season that the current study was conducted in South Africa which is also on the process of development. The researcher believed that investigating the use of ICT in education in different developing countries gave an indication of the way in which South Africa as a developing country integrate ICT in education and the challenges that South African schools experience when using ICT for teaching and learning. The researcher randomly selected any country when comparing ICT use in developed and developing country.

### 2.2.1 The use of ICT in the developing countries

Developing economies are not as advanced in the use of ICT in institutions or business operations as a developed country would be (Soja & Cunha, 2015). It seems like, in developing economies, the major challenge rests upon removing the negativity of the cultural bestowal of collectivism. The ICT world in changing economies is positively affected by ICT-related external investments (Soja & Cunha, 2015).

For ease of reference, the literature was organised to show the use of ICT in various country contexts.

- **Vietnam**

In developing countries, such as Vietnam, ICT is perceived as a platform to integrate into a proliferation world. It is supposed that ICT assists in global transition in teaching methodologies (Sarkar, 2012).

The study by Peeraer and Van Petegem (2011) inquired about the state of ICT integration in Vietnam's education system, which is one of the developing countries that has incorporated ICT in education. The study revealed that five Vietnamese schools and 783 teachers were asked to complete a questionnaire. The study reported that teachers had good basic ICT skills, whereas other skills with regards to the internet, how to maintain electronic devices, and security skills were reported to be average (Peeraer & Van Petegem, 2011). It is evident that Vietnam teachers were given a chance to use ICT in the education sector as they had access to ICT devices in most of the schools Vietnamese teachers have moderate skill to use

computer programs such as Word processing or creating electronic presentations. The study also reported that more than half of the study participants had limited capabilities with regards to internet use, computer maintenance, and computer security skills. The Vietnamese teachers were not assertive in using computers. This shows us that, most of the time, it is the teachers' ICT capabilities and confidence in using computers that influences their ICT usage in teaching. Teachers with a better knowledge and capability often apply a wider range of ICT tools on a daily basis than teachers whose ICT skills are lower (Peeraer & Van Petegem, 2011).

It is important to provide teachers with ICT skills through training, especially skills to use complex applications from the internet. ICT education should be part of ongoing teacher development. Training can also result in increased confidence in computers and the ability to apply a wide range of ICT technologies in the local educational system. Vietnam and other developing countries could shift from mere usage of ICT and a skills-based approach to one where the application of ICT in the field of education can lead to a significant improvement in teaching (Peeraer & Van Petegem, 2011). Policy makers and managers who oversee education should make ICT a focal point, not only as a tool for administration in education, but also as an efficient teaching tool. At the teacher's level, ICT training should incorporate an insight into teaching instructions, and the trainees should be given a chance to use the acquired skills in teaching practice (Peeraer & Van Petegem, 2011).

- **Bulgaria**

Terzieva, Paunova, Kademova-Katzarov and Stoimenova (2014) conducted a study regarding the integration of ICT in Bulgarian schools, with Bulgaria being another developing country. According to Terzieva et al. (2014), ICTs provide a broader training skill in comparison to old-fashioned teaching methods and applications, so they may be a determining factor for improving teaching practices. ICT can transform not only the climate of the education and available knowledge, but also the system of teaching and learning in all subjects. In addition, the prevalence of teachers using ICT at their workplaces has been significantly increasing with 46 % using some of the applications and gadgets and 36% using ICT resources during lesson implementation.

The main hindrance is lack of training, and this shows that computer-training courses that were completed in the past did not improve the capabilities and skills of the teachers because newer ICT tools found in the schools are more challenging to use. It is important for teachers to use a variety of ICT teaching and learning resources when teaching because it helps learners find it easier to understand a specific learning area. In addition, ICT offers teachers and learners a rich environment of learning, which can, therefore, lend support to different curricula and other teaching methods (Terzieva et al., 2014).

When ICT is integrated in the education sector, it will not change the way in which the teaching transpires in classrooms, but it will modify how the information is transferred from this new active medium compared to the older types of docile communication mediums. It influences a teacher's teaching style to become more organised and concept focused. On the other hand, the Bulgarian study revealed that the country was still not effectively incorporating ICT in teaching to its full capacity (Terzieva et al., 2014).

- **Malaysia**

In Malaysia, another developing country, Ghavifekr et al. (2014) investigated the level of computer literacy of primary school teachers and their incorporation of ICT in teaching. Ghavifekr et al. (2014) argued that teachers need to be both confident and competent in integrating different ICT tools to build their trust in the technology otherwise ICT will not be successfully integrated into instructional delivery. Educators need to incorporate different ICTs in teaching and keep abreast with the continuously changing society (Bahadur & Oogarah, 2013).

- **Saudi Arabia**

A study by Albugami and Ahmed (2015) in Saudi Arabia revealed that there is significant gap when it comes to the ICT availability in Saudi Arabian schools and the implementation thereof. From the findings, ICT was viewed as a vital tool in enhancing performance, integration, learning exposure, and learning outcomes. Nevertheless, some of the drawbacks that influenced the implementation of ICT in Saudi Arabian schools at the time of the study were unavailability of space, lack of

resources, maintenance challenges, and lack of adequate skills and training among teachers (Albugami & Ahmed, 2015).

With digital technology becoming more appreciated across the globe for positively adding value to the accession of second language, Saudi Arabia has focused on the provision of digital equipment so that it can integrate technology in education and classrooms. This advancement has led to smart boards being incorporated during English classes in Saudi Arabian schools (Ahmad, Ali, Sipra, & Hassan Taj, 2017). Ahmad et al. (2017) indicated that teachers in Saudi Arabia are trained to improve their technological competency and, as a result, the teachers are better equipped than before to embrace the available technologies installed in their classrooms (Ahmad et al., 2017).

- **Sudan**

Ahmed (2015) conducted a study in ICT management focusing on secondary schools in Khartoum State in Sudan and reported that most Sudanese secondary schools had computers and internet access, however, there was no technical support provided to these schools and most of the schools struggled to manage the ICT devices in their classrooms. Ahmed, therefore, recommended that support at various levels of the organisation of the school was especially important for positive ICT implementation of digitalisation in the educational system. This would only materialise if the principals of the schools acknowledged ICT as a positive change towards education. A successful ICT implementation relies on the top management being actively involved in the promotion of modern technologies. Ahmed (2015) postulated that when ICT is introduced in the teaching field, necessary training, resources and support should be rendered to the teachers, otherwise, it will cause frustration in the teaching environment and the programme will not produce the intended outcome. Ahmed (2015) further argued that school principals who had a well-structured ICT policy and a positive attitude towards ICT were able to improve the learning in their schools as they could keep track of the learners' performance.

Although ICT is said to improve quality in the educational system, countries that are still developing are yet to see the rewards due to the fact that they are still dealing with difficulties such as limited materials, availability of space, and poor skills and

technical support (Khan et al., 2012).

- **Nigeria**

Mustapha (2018) conducted an exploratory study in Nigeria to determine the perceptions of teachers about smart board integration in the classroom. Mustapha (2018) a that smart board features can create a collaborative classroom, encourages teamwork among learners, and brings about various learning opportunities for learners if effectively integrated in the classroom. Teachers demonstrate positive attitude towards the integration of smart boards in the classroom, however, the shortage of manpower and lack of ICT skills appear to be the main challenges that impact ICT integration in schools in Nigeria (Mustapha, 2018). The study revealed that teachers who had computer literacy skills, demonstrated a positive attitude towards the use of smart boards. In another study, Oye, Salleh, and Iahad (2011) argued that policies and e-learning programmes implemented by the government of Nigeria lacked financial support and public funding; this had a negative impact on their secondary school education.

- **Brazil**

Esteves, Fiscarelli, and Bizelli (2015) conducted a study on the integration of smart boards as a new teaching resource in primary schools in Brazil. Their study indicated that smart boards allowed teachers to effectively present the lesson while moving around the classroom to create interaction between learners and maintain discipline in the classroom as learners became curious and concentrated when they are taught with new technology. Teachers could combine videos with animations to create a lesson which would have been impossible in a traditional classroom (Esteves et al., 2015). The study revealed that the major challenge for smart board use was the unavailability of teaching applications that were suitable for the purpose of the content being taught (Esteves et al., 2015).

Kayalar (2016) reported that some schools in developing countries has limited resources as they would only use four iPads in their classrooms and that created a challenge to some of the learners who could not afford to have their own devices and it hampered the effectiveness of learning in some of the classrooms. If technology is

applied correctly and properly, it will assist learners to prepare for their future careers. Moreover, technology will also make it easier for teachers to equip leaners to deal with the challenges that they may encounter in the future (Kayalar, 2016).

Bidaki and Mobasheri (2013) assert that teachers who participated in their study believed that a smart board can save them teaching time as they were able to save material to reuse or review at a later stage without having to retype the content. They could also link the current lesson with previous and upcoming lessons. Revising past lessons with the learners becomes easy, which helped learners to master difficult concepts. Teachers with computer literacy skills were confident in the use of smart boards as they were familiar with some operational aspects that were common to both a computer and a smart board (Bidaki & Mobasheri, 2013). The findings of the study indicated that smart boards can positively impact the teaching and learning process through increased investment and a comprehensive integration of smart boards in the classroom (Bidaki & Mobasheri, 2013).

Diakou (2015) argued that teachers must make use of interesting activities to sustain learner attention. Teachers need to incorporate smart boards in appropriate teaching strategies to improve learner performance (Mihai, 2017). However, Diakou (2015) also argued that learners could get carried away using ICTs and cause unnecessary noise, which may disrupt the process of teaching and learning. Learners may demonstrate unwelcomed behaviours due to the excitement of the exposure to modern technologies like a smart board.

The belief that smart boards may improve learner performance is a call for action for those developing countries that wish to improve the quality of education (Lewis, 2010).

### 2.2.2 The use of ICT in developed countries

A study on the expenditure and the outcome for integrating ICT in developed countries by Aristovnik (2013), revealed that there were various levels of output-oriented efficiency of ICT in the United States of America, Bulgaria, Iceland, Norway, Slovakia, Finland, and Korea. The evaluation also found evidence that most of the

countries had an ability to boost the effectiveness of ICT and enhance lesson delivery. The study findings also revealed that some of the less developed European Union countries like Slovakia and Poland showed a significant degree of ICT efficiency simply because of exceptionally low costs and good management of the ICT. This, however, implies a higher expenditure on ICT programmes in these countries. Countries such as Romania, Italy, and Portugal, are said to be the least efficient because of their poor educational outputs and outcomes (Aristovnik, 2013).

One of the most crucial factors that must also be considered is the standard of the infrastructure in telecommunications and the availability of broadband. A powerful ICT infrastructure and how it is used is very influential when it comes to the efficiency of ICT and its advancements but may not guarantee a better achievement in education. Policy makers together with the government should not only focus on establishing technology in educational schools, but also strive to assist teachers and learners to use the ICT effectively, and this may improve the educational system (Aristovnik, 2013).

Rabah (2015) argued that, in developed countries such as Canada, the incorporation of ICT in English Schools in Québec helped grasp learners' interest and helped teachers plan and offer a diversified instruction style to learners. According to Rabah (2015), teachers could use ICT to develop their paperless lesson plans. The study revealed that learners' engagement levels increased through the integration of ICT.

In Cyprus, Diakou (2015) examined the motivation that ICT provides to young English Foreign Language (EFL) learners during their language practice. He argued that using ICT during teaching of EFL offered learners a break from traditional learning methods. ICT created a conducive learning environment for learners.

Wastiau et al. (2013) conducted a study in European schools about ICT use in education and reported that it was of great value for the teachers to acquire the necessary skills and knowledge for using ICT. Teachers would be able to implement those skills in their teaching practice to use their ability to its full potential and improve leaners' ability to use technology. In the same study, the technological abilities of teachers and learners, confidence, and frequency of ICT use were

investigated. It was discovered that most participants were used to having ICT at their respective schools, but the teachers could only use the ICT during teaching and just a few used it for other purposes outside work (Wastiau et al., 2013). The study also reported that both teachers and learners used various ICT methods in classes, they were confident about their technological skills, and very positive about ICT's outcome in the educational system. ICT expertise development programmes must merge teaching and learning activities, showing teachers how ICT may be incorporated to strengthen a better learning environment.

In another study, Gil-Flores, Rodríguez-Santero, and Torres-Gordillo (2017) asserted that secondary schools in Spain had upper-class ICT resources and an accessible internet connection, however, it lagged behind in terms of classroom integration when compared to other European countries. According to Gil-Flores et al. (2017), large amounts of ICT resources available in schools did not mean that teachers would automatically integrate ICT during teaching. The findings of the study indicated that teachers might not fully integrate ICT in their teaching if they did not have ICT skills and confidence about ICT integration. Lack of, or limited teamwork among teachers was also a hindrance.

Research conducted in countries such as United Kingdom and United States, indicated that visual or physical interaction with ICTs such as smart boards benefit learners and contribute to their different sensory learning needs (Jelyani et al., 2014). Many schools in Turkey have been provided with smart boards and teachers are encouraged to integrate the boards to enhance the standard of their teaching (Günaydin & Karamete, 2016). In another developed country, Sweden, a study by Bourbour, Vigmo and Samuelsson (2015) revealed that the integration of smart boards improves both learners' reasoning and problem-solving skills. However, an explorative study conducted by Savasci (2014) on the use of instructional technologies used by science teachers in Turkey, indicated that teachers avoid using a smart board during their lesson planning (Savasci, 2014). Savasci (2014) further stated that chemistry and biology teachers mostly use the PowerPoint program as their preferred instructional technology during lesson preparation. The effectiveness of smart boards depends primarily on the way it is integrated into the classroom (Jelyani et al., 2014).

In yet another developed country, De Vita et al (2017) conducted an explorative study to investigate the potential of smart board to stimulate mathematics learning. Their study revealed that the integration of smart boards encourages problem-solving tasks with mathematical or geometrical software. For Tosuntaş et al. (2015) teachers must be motivated to use smart board technology to improve the effectiveness of their teaching; and the increased awareness about smart board use would serve as a motivation (Günaydin & Karamete, 2016).

Innovative teaching and learning will only be achieved if available ICT tools are used purposefully (Oshima & Muramatsu, 2015). To simply bring ICT into the classroom to replace a pen and paper will not result in achieving the intended purpose (Oshima & Muramatsu, 2015). According to Oshima and Muramatsu (2015), teachers can use ICT to achieve individualisation of education to suit the needs of each learner by modifying teaching into the kind of instruction that caters for each learner. Teachers can keep learning records using ICT, which will help them determine different learners' conditions and guide them on how to alter the lesson in a manner that will be best understood by each child (Oshima & Muramatsu, 2015).

Policy makers should be committed to the formulation and adoption of well-structured quality technological resources in learning, and this may boost ICT use by teachers and learners during lesson deliberations (Wastiau et al., 2013). According to the survey conducted by Wastiau et al. (2013), policies and processes associated with infrastructure are required in order to equip all the school learners in every grade technologically. The policies in question should aim at providing laptops, tablets, notebooks, and interactive whiteboards that will assist teachers and learners during class. However, these policies are still not in place in most developing countries; consequently, teachers and learners are still lagging in terms of their ICT skills and confidence.

### 2.2.3 Information and Communication Technology (ICT) integration in education

The push towards the integration of educational technology into teaching and learning is putting pressure on educational stakeholders including teachers, parents, administrators, and even politicians to transition from an outdated way of teaching to a modernised one (Minor, Losike-Sedimo, Reglin & Royster, 2013). ICT integration in education is a critical factor that could enhance both teachers' and learners' performance (Aslan & Zhu, 2015). In Turkey, schools implement ICT educational policies through a programme called Movement of Enhancing Opportunities and Improving Technology which is known as the FATIH project (Tosuntaş et al., 2015). This programme values infrastructure as one of the crucial aspects of ICT integration in education (Adam et al., 2011; Aslan & Zhu, 2015). Effective ICT integration is controlled by the infrastructure availability such as access to computers, software, and hardware (Buabeng-Andoh, 2012). Buabeng-Andoh (2012) claimed that teachers cannot integrate ICT in their teaching if they cannot acquire ICT resources.

In the future, ICT may be a crucial model to harness effective teaching in most of schools (Khan et al., 2012). ICT stimulates international collaboration, educational networking, and expertise development, which is made possible through videoconferencing on web sites that enable teachers to share information about the challenges they face and also to share solutions. ICT offers a straightforward and effective way for the development of modern teachers, resulting in teachers and learners being technologically empowered (Khan et al., 2012). However, Buckner and Kim (2014) warn that, in teaching practice, having a device for each learner reduces the chances of learners collaborating and sharing information with other learners in classrooms. They also warn that these kinds of programs are deemed expensive in most of the developing countries.

The study conducted by Buckner and Kim (2014) revealed that teachers and management were positive about the introduction of computers and tablets in their classrooms as they could prepare their e-lessons for effective teaching. The pilot study of e-lesson plans had its challenges that led to the development of the programme called Stanford Mobile Inquiry-based Learning Environment. The programme's lessons offered better interactive learning between teachers and learners. Although the learners were used to the tablets, the operation of these gadgets was still sometimes a challenge to them, and this called for a more skills

development among the learners. Sarkar (2012) also highlighted that online learning in schools is increasing significantly and this has led to extensive growth of digital educational system where learners could easily access valuable information about the subjects that they will be studying, making it very convenient for the learners to understand concepts in their own time.

According to Sarkar (2012), ICT in 21st century education offers more a learner-centred environment, and this may create a rivalry between teachers and learners as some learners may not pay attention to what is delivered in the classrooms because they believe that with ICT in the classroom, they do not have to do most of the work as ICT will make all the necessary notes for them. However, if there are well-structured ICT policies, schools will also move into media and information that is digital at the same pace as the changing world. If this is done, then the positive impact of the ICT can be witnessed by most schools.

E-learning has been introduced in this 21st century to cater for both learning at school and away from school. The introduction of ICT has bridged the gap that was created by distance and to some extent, the costs for distance learning has dropped significantly, which has opened doors to a better education for institutions that have embraced ICT (Sarkar, 2012). Nevertheless, it is still premature to acknowledge the role that ICT has played in the teaching environment, but eventually, ICT will transform and remodel teaching and take it to a different level (Sarkar, 2012:35).

ICT has not yet been fully integrated into teaching in some developing countries, which slows down the development of their education systems. Several studies have revealed that ICT has the potential to extensively improve both formal and informal education in situations that were previously disadvantaged. These disadvantaged situations include rural areas, disadvantaged groups that were initially excluded from education because of cultural and social norms such like gender (women and girls), people with disabilities, and those who could not afford education (Buckner & Kim, 2014; Khan et al., 2012; Sarkar, 2012).

According to Kayalar (2016), technology can be integrated into the educational system and the teaching and learning process can be supplemented in many ways

by equipping classrooms with technological devices like computers, video/data projectors, smart boards, DVD monitors, and the provision of a wireless network. However, only equipping schools with ICTs is not enough to improve learning because the successful integration strongly depends on the enthusiasm and eagerness of all stakeholders to embrace the technological skills required to use ICT (Kayalar, 2016).

A study by Mills and Angnakoon (2015) about learner preferences, showed that high school learners were positive about learning when ICT was used in their learning environments. Noor-Ul-Amin (2013) reported that integration of ICT can assist revamp and upgrade teachers and learners' skills. This can, in turn, strengthen the quality of education and cement the curricula, especially in challenging subjects. There is high measure that we need to meet in order to accomplish what needs to be achieved in class. We can meet this standard through the involvement of teachers in all collaborative programmes and the application of development strategies, that could incorporate teaching practices with ICT as a tool. Ideally, when ICT is used in the educational setting, it will act as a change agent in the educational system and will stimulate independent learning in most levels of education (Noor-Ul-Amin, 2013).

Using ICT in any learning environment can reinforce different concepts of knowledge formulation and, as the number of learners that becomes accustomed to ICTs in their learning environment increases, its impact becomes more significant. With teachers being able to employ ICT in their respective specialties to enhance learning, learners may enjoy learning more and would be able to relate to the information because of being exposed to various technologies of learning (Noor-Ul-Amin, 2013)

With ICT at their fingertips, learners can search the internet for e-books, past examination question papers, and different explanations of the same concept. It also becomes easier for them to access subject matter experts and they can interact with their peers across the globe (Noor-Ul-Amin, 2013). In addition, ICT gives opportunities for the expansion of education to all walks of life especially those who are disadvantaged and are from lower socio-economic status so that they can also benefit from this disposition (Noor-Ul-Amin, 2013).

Murphy (2016) indicated that ICT integration in teaching and learning of mathematics is one strategy that teachers can use to help learners achieve in the subject. The use of technology in the teaching and learning of mathematics may help learners gain confidence and a sense of comfort in the subject; acquire deeper understanding; increase learners' motivation; and their engagement levels in the classroom (Murphy, 2016). Adam et al. (2011) investigated the strategic application of ICT in African countries, which included South Africa, Uganda, and Senegal. Adam et al. (2011) believed that teacher training is an essential factor that can help teachers to incorporate ICT into their teaching effectively. However, Adam et al. (2011) claimed that there are schools of thought that equip teachers with ICT skills without exploring how these skills can be used to plan lessons and be applied pedagogically.

Bester and Brand (2013) investigated the technological impact on the achievement and attention of learners during teaching. They argued that technology can get the attention of learners if these learners are willing to learn. According to Bester and Brand (2013), ICT provides new possibilities for the teaching profession and makes teaching and learning more exciting. They claimed that learners understand the stories read from electronic media better than those on printed papers. Furthermore, Bester and Brand (2013) argued that the integration of ICT during curriculum delivery promotes constructive learning where learners' critical thinking can be more efficient than it would be with traditional teaching. However, they indicated that technology would never substitute the aspect of human teachers as they will always be needed in teaching and learning in classrooms.

### 2.2.4. Smart board integration in education

Modern technologies have been championed into mainstream education with the objective of raising the standard of education (Hockly, 2013). Educational technologies, such as smart boards, make teachers' classroom and administrative work more manageable and less frustrating. With a smart board's integrated features, a teacher can record lessons and retrieve them whenever they are needed (Jwaifell & Gasaymeh, 2013). Günaydin and Karamete (2016) used a Type 2 design and development method for the study to raise awareness about smart board use for material development.

For Günaydin and Karamete (2016), smart boards technology can be used in any kind of instruction. Their study also found that teachers were interested in the material developed to raise awareness about smart board benefits and that they were willing to incorporate smart boards in their teaching. It seems that smart board technology has been accepted by both teachers and learners to raise the standard of education (Ahmad et al., 2017).

In their study, Türel and Johnson (2012) indicated that new teachers use smart board to write on as they would with a traditional blackboard, while advanced users use fluid lesson strategies and the interactivity of smart board to construct meaning (Shams & Ketabi, 2015).

When teachers use a smart board, they can use a smart notebook program that helps them easily write, erase, and display visual materials on the board (Nichols, 2015). According to Nichols (2015), the use of a smart board encourages cooperative learning amongst learners; learners are more interested in using technologies inside and outside the classroom; and teachers can capitalise on the increased learners' attention created by the smart board features. However, teachers must have a backup plan in case the smart board malfunctions (Nichols, 2015).

South Africa, being a country in the process of transforming the quality of education through ICT, has supplied some of its secondary schools with smart boards. Given the South African DBE policy on the use of ICT in education (South Africa, 2004 August), the use of smart board in schools became relevant, and some schools in South Africa have already adopted their use (Lewis, 2010). Lewis (2010) argued that teachers in South Africa use smart board to increase the level of learner participation in a lesson. Smart boards in secondary schools are indispensable as they expose the leaners to the reality of the corporate culture and prepare them for future obligations (Al-Qirim, 2016). It also empowers leaners with strong work ethics and gives them understanding of the business world (Yoke & Ngang, 2017).

### 2.2.5. Teachers' perspectives and challenges on the integration of ICT in education

Technology in education within the context of schools, calls for the teachers' positive attitudes and support for a successful implementation (Buabeng-Andoh, 2012). The perception of teachers towards digitalisation may be an obstacle towards integration of ICT if the teachers perceive these ICT programmes as worthless to their teaching practices and the learners at large (Buabeng-Andoh, 2012). If teachers have a positive attitude to ICT in education, then they would also willingly provide policy makers with critical input about acquiring and incorporating ICT into the education and learning systems. A negative attitude and perception will discourage teachers from using their computers because of fear of equipment failure, especially when there is no technical support provided (Buabeng-Andoh, 2012).

Teachers with a negative mindset towards digitalisation might not be persuaded even by the provision of excellent ICT facilities in their teaching facility. For that reason, teachers need assurance that using the technology can transform their teaching into an exciting career, simpler, more enjoyable for both teachers and learners, more encouraging, and more satisfying (Buabeng-Andoh, 2012). At the school level, support, boosting of resources through funding, training of teachers, and provision of proper facilities all have a high impact on how teachers acquire and integrate ICT in their teaching and learning systems. Professional development is an equally important success-factor because it eliminates frustration and induces confidence in teachers whenever they use the ICT (Buabeng-Andoh, 2012).

To sum up, the determinants that slow the use of ICT by teachers can be classified into attitude and teacher-level barriers, school-level and system-level barriers. The barriers at teacher level could be insufficient ICT skills and capabilities of the teacher; lack of teacher confidence; and lack of continuous reassessment of new and better programmes of training. At school and system level, the factors that may hamper ICT use are lack of ICT infrastructure; dilapidated and unmaintained hardware; failure to upgrade the educational software; inaccessibility to the ICT; lack of experience by the management; an organisational culture that does not support ICT, and rigid curricula (Buabeng-Andoh, 2012).

Teachers' attitudes and beliefs are fundamental in making sure that the

implementation of ICT is successful (Albugami & Ahmed, 2015). Successful integration of ICT in classrooms relies upon the teachers' attitudes and belief relating to technology (Khan et al., 2012). In addition, negative views towards ICT at schools is considered an obstacle to its incorporation (Buabeng-Andoh, 2012). According to Albugami and Ahmed (2015), there is a pressing need to model a positive attitude for learners that ICT is a great learning tool and to encourage learners to use the internet for educational purposes. However, the school management at some schools restrict internet use based on religious and moral grounds (Buabeng-Andoh, 2012). Some principals, therefore, still believe that ICT has adverse effects on religion and could corrupt the good morals of the learners because of continuous exposure of the immoral information (Albugami & Ahmed, 2015).

Guma, Faruque, and Khushi (2013) also reported that a teacher's previous computer experience is associated with their attitude towards computers. They highlighted that the confidence of teachers is also related to their perceptions and ability to operate computers within classrooms. Teachers who are slightly technologically capable and have a positive attitude towards ICT will, therefore, need a minimum amount of effort and motivation to be able to learn new skills that are necessarily important during the implementation of the ICT in their classrooms.

There is a link between the attitude of teachers and the way technology will be integrated in the teaching programme. Teachers with positive attitudes about the integration of ICT will more easily implement programmes related to ICT (Singh & Chan, 2014). Preston et al. (2015) conducted an explorative study to examine the perceptions of school leaders on the attitudes and skills of secondary school teachers on the use of technology in Prince Edward Island in Canada. Interviews were conducted with 11 educational leaders, which included principals, vice-principals, departmental heads, and Canadian DoE representatives. Participants indicated a sense of confidence about the use of technology with a willingness to learn more on the integration thereof. However, the study reported that some teachers were not incorporating technology into the teaching and learning process due to lack of time. The study also revealed a need for policy makers to establish policies on digital literacy for learners.

Successful integration of ICT in classrooms calls for proper professional development (Guma et al., 2013). When teachers are given enough time to use technology, learn, or even share, and work with their peers, they are likely to incorporate the technology into their teaching. Embracing integration of ICT into teaching in schools relies on the accessibility and availability of ICT resources, namely: software, hardware. Therefore, if teachers do not have to access to ICT supplies, then they might not want to use them (Guma et al., 2013).

The findings from a study conducted by Albugami and Ahmed (2015) in Saudi Arabia revealed that the Saudi Arabian policy for education was unclear and not well structured, and there was a confutation in the commands and responsibilities of all the stakeholders involved. The study also revealed that training plays a pivotal role in the delivery of ICT; that the teachers were interested in being trained, but the training times were inconvenient for them. Most of the teachers reported that they would not attend any training after working hours without being given any incentives and, as a result, poor attendance was observed in most of the training (Albugami & Ahmed, 2015). Policy makers, principals, teachers, and learners have faced many problems in trying to incorporate ICT into Saudi Arabian secondary schools. Nevertheless, despite all the challenges discussed, there is a future for ICT in Saudi Arabian schools, but much needs to be done to uplift the standard of ICT in the country (Albugami & Ahmed, 2015).

A study conducted by Baglama, Yikmis, and Demirok (2017) revealed that teachers who were qualified in special education believed that they could teach mathematics using technology. The study, therefore, teaches us that ICT does not exclude areas of speciality teaching; hence special education teachers should also pursue modern trends and activities in technology for them to integrate technology into the education system so as to assist learners. In this regard, ICT will be beneficial to those learners with special needs especially in challenging subjects such as mathematics (Baglama et al., 2017).

However, several challenges are experienced by countries such as Bangladesh, which include poor infrastructure, lack of funding, lack of a vision and mission plan, political factors, and lack of skills and time. Bangladesh, a developing country, does

not have the appropriate resources and infrastructure to implement ICT in education (Khan et al., 2012). In essence, effective ICT implementation calls for the availability of proper equipment, computer supplies, and proper maintenance of all the electronic ICT devices. Most areas of Bangladesh have no electricity and this prevents schools from using computers in the first place. Due to limited electricity supply, most of the areas in Bangladesh do not receive electricity for more than eight hours per day. ICT integration in schools depends on a reliable electricity supply, and provision of adequate resources, computers, printers, projectors, and other necessary resources; however, all these items are not available in most of the Bangladeshi schools (Khan et al., 2012).

According to Khan et al. (2012), the effective way to implement technology in any system, including education, is to inject enough resources into the system. This is difficult in most developing countries such as Bangladesh, where most of the communities are very underprivileged. All ICT tools, such as software, hardware, internet facilities, audio-visual aids, teaching aids, and other accessories, require a large investment (Khan et al., 2012). When implementing ICT in education, one not only needs a vision but also thorough planning, well-structured policy monitoring, and evaluation – especially in countries with limited resources like Bangladesh. Most of the educational schools in Bangladesh are still lagging with regards to ICT implementation in their teaching and learning environment. Some higher educational schools in big cities that have ICT facilities, are struggling to integrate it effectively due to lack of planning and no proper vision. (Khan et al., 2012).

Political factors have a high impact when it comes to how the resources are distributed in different departments of a country. In Bangladesh, for instance, most resources are channelled to the defence force department rather than the educational department. If political leaders could favour the integration of technology in schools, it would grow rapidly (Khan et al., 2012). According to Khan et al. (2012), the ICT use in teaching and learning environments in Bangladesh has been limited by the lack of knowledge and insufficient skills on ICT tools and software. Although learners may benefit from the resources of learning that are produced through ICT, teachers may not be well vested in using the technology. Teachers require more time to master how to use the software and hardware, to do the planning, and to

share information with other teachers. Teachers also require time to build and integrate technology into their curriculum; in most cases, their time is a very scarce resource (Khan et al., 2012).

The biggest problem in ICT integration in teaching is creating a balance between educational goals and economic realities (Mbodila, Jones & Muhandji, 2013). ICTs in education require large capital investments. Due to financial challenges, many governments, especially in developing countries, prioritise the renovation of school buildings and the welfare of teachers (Khan et al., 2012). As a result, most countries have not prioritised ICT for education. The human resources challenge is because of an insufficiently trained teaching workforce and educators are not motivated enough to embrace and use ICT as a tool into their teaching professions. A lot more commitment is required with regards to using ICT in education (Mbodila et al., 2013).

Oye et al. (2011) reported that the unavailability of internet access in some schools is due to the recurrent cost of securing the internet. In Nigeria, internet connection is costly, and this negatively affects ICT integration by teachers (Oye et al., 2011). The other pressing issue in Nigeria is that of continuous power cuts that affect the operation of the educational system. Most of the remote areas in Nigeria have electricity supply shortage in general and this is challenging when trying to implement ICT in these areas (Oye et al., 2011).

Lindberg, Olofsson, and Fransson (2017) argued that the incorporation of technology depends primarily on the kind of subject being taught. Research by Pamuk, Cakir, Ergun, Yilmaz, and Ayas (2013) indicated that smart boards are integrated mostly by teachers in subjects such as geometry, biology, geography, and English language more than any other subjects.

Lindberg et al. (2017) revealed ambivalence from teachers on the integration of ICT where, in some cases, they viewed ICT to be user-friendly while other times they viewed ICT to be challenging and unnecessary. The study also revealed that teachers felt that they do not have technological and educational knowledge to enable them to integrate ICT into education, which makes it difficult for them to work out how to integrate ICT into their subjects in a meaningful and pedagogical way.

A study about teachers' perceptions on the integration of ICT in Rwandan primary schools reported that ICT tools assist in communication with teachers and boost the learners' performance as the learners could understand the concepts much better (Munyengabe, Yiyi, Haiyan & Hitimana, 2017). Rwandan teachers were excited to use ICT and were eager to incorporate ICT into teaching and learning activities. Teachers believed that they would gain from ICT by sharing their advice, experiences, and skills. Teachers also acknowledged that ICT would assist learners in their self-study, and the teachers could teach new concepts using technology (Munyengabe et al., 2017). Teachers in Rwanda are faced with challenges related to insufficient skills needed to incorporate ICT into teaching activities, insufficient technological tools, unavailability of proper infrastructures, and low teacher-motivation due to income levels (Munyengabe et al., 2017).

Sarkar (2012) explains that ICT's incorporation comes with both rewards and challenges. Primarily, there are high costs incurred during the acquisition, installation, operation, maintenance, and replacement of ICT. On the other hand, the integration of an ICT system in developing countries comes with a significant opportunity cost for related businesses because installation cost is higher than in well-developed countries (Sarkar, 2012). Installing software may also be daunting, not only when it comes to assessing legitimacy but also the cost of maintaining it, particularly if software that was unregistered and is not compatible with various devices.

The other set back that is faced by many developing countries is the unavailability of appropriate buildings to accommodate the ICT equipment (Sarkar, 2012). Technological devices, like smart boards, require proper planning of the buildings where they will be installed safely; otherwise, it will be difficult to equip schools with these technologies.

Pamuk et al. (2013) applied a mixed-method research design to investigate the perspectives of teachers on the incorporation of smart board in Turkey. The study reported that teachers had positive attitudes towards the integration of smart board in schools. Participant-teachers acknowledged the value of smart board and their

capacity to integrate the boards in their lesson deliberation (Pamuk et al., 2013). Similarly, in a study conducted in grade 9 EFL classrooms in Turkey, Han and Okatan (2016) revealed that EFL learners were positive about smart boards, regardless of the technical challenges experienced during integration. In addition, Pamuk et al. (2013) explained that teachers perceived smart board as a tool that is dependent on the availability of the internet for successful integration. They further described that teachers struggle to obtain e-materials that are specifically developed for a subject to use when teaching. This results in teachers using smart boards to project information on the screen (Pamuk et al., 2013). The major challenge is the lack of teachers' technical knowledge and limited understanding of how to incorporate the technology in their teaching (Pamuk et al., 2013).

In the developing country of Iran, a study was conducted of 174 teachers in EFL classroom. Shams and Ketabi (2015) found that EFL teachers show positive attitudes towards the integration of smart boards in their teaching. The study revealed that teachers may gain more experience in the integration of smart board through frequent practice.

Gashan and Alshumaimeri (2015) conducted a descriptive study in Riyadh, the capital city of Saudi Arabia (a developing country) about the attitude of teachers on the use of smart board in EFL classroom. The findings indicated that teachers viewed smart board as an important instrument that is used to enhance teaching and learning. However, Gashan and Alshumaimeri (2015) also pointed out that teachers can use smart boards effectively during their lessons only if there is sufficient training provided to them on how to effectively integrate this smart board into the teaching in schools.

In another Saudi Arabian study, Bakadam and Asiri (2012) employed a mixed-method research design to investigate teachers' perceptions on the benefits of smart board in learning. The findings of the study revealed that teachers believe that the integration of smart board creates a suitable and effective way to convey the content to learners and that a smart board improves collaboration in the classroom which, in turn, improves learning experiences. However, the research also revealed that a large number of teachers do not effectively use the full features of the smart board

but use it mainly to write and display information.

Isman, Abanmy, Hussein, and Al Saadany (2012) used a quasi-experimental approach to assess the attitudes of Saudi Arabian secondary school teachers on the integration of smart boards in the classroom. The results indicated that teachers were optimistic about the integration of smart boards in the classroom. However, most teachers cannot effectively integrate smart board as the result of their lack of, or limited technological knowledge (Isman et al., 2012). Teachers need professional development on the integration of smart boards to help them improve their teaching through increased technological knowledge (Isman et al., 2012). According to Isman et al. (2012), teachers focus mostly on the technological issues surrounding smart board use, rather than on its pedagogical engagement potential.

Research by Bahadur and Oogarah (2013) in Mauritius revealed that most teachers believe that a smart board benefits different kinds of learners and that learners are interested in this technology which then increases their engagement levels in schools. A descriptive study conducted by Yapici and Karakoyun (2016) on the attitudes of high school learners on smart board use in a biology classroom showed that high school learners are interested in the use of smart boards in their learning of biology. They claimed that a smart board help them to understand concepts better in different subjects, motivates them, and arouses learner-interest. Bahadur and Oogarah, (2013) found that most teachers were not integrating smart boards in their classrooms.

Öz (2014) conducted a quantitative study in Ankara, in Turkey (a developed country) about teachers' views on smart board integration in the EFL classroom. The findings reported that both teachers and learners demonstrated positive views about smart boards and their advantages on the teaching and learning of EFL. Learners believe that teachers' application of smart board during the classroom assists them in understanding the content better, especially when videos are integrated into the lesson. Öz (2014) explains that a smart board can create an environment which is suitable for learning a language while motivating learners to learn more through increased interaction and learner involvement. The study also revealed that for teachers should be provided with training to be acquainted with necessary

capabilities on the use of smart board.

In Belgium, another developing country, Van Laer, Beauchamp, and Colpaert (2014) studied the use of smart boards by Flemish teachers in secondary schools. According to Van Laer et al. (2014), teachers have ICT skills but little confidence on their ability to transform their ICT skills into pedagogical strategies, which would allow them to use smart board in their teaching effectively. Van Laer et al. (2014) also indicated that many secondary schools than primary schools in Flanders are equipped with smart boards, and the number of smart boards in secondary schools are increasing rapidly. However, the availability of smart boards in schools does not give the assurance that they will be integrated effectively in teaching and learning because most teachers still regard themselves as novice users of the technology, even though smart boards have been incorporated into the mainstream education for several years (Van Laer et al., 2014).

As many classrooms become furnished with smart boars, teachers will easily transform teaching and learning into a technologically based process Maher et al. (2012). However, teachers need to carefully select suitable teaching resources that will positively influence teaching, learning, and learning outcomes (Maher et al., 2012). The same study revealed that teachers still use programs such as Word processor and PowerPoint presentations even when there are smart boards in the classrooms.

### 2.2.6. Teacher's support in the integration of ICT in education

It is generally agreed that teachers experience technical challenges when integrating technology in their classrooms, and that insufficient training would hamper the successful integration of ICT in education (Alfaki & Khamis, 2014). The training provided to teachers will determine teachers' level of confidence in the use of technology during the delivery of instruction. Teachers need professional development and technical support to effectively integrate ICT into their teaching (Alfaki & Khamis, 2014; Assan & Thomas, 2012). Technologies like smart boards are still fledgling in the education world and require competency and ample skills for operation. There is no doubt that smart boards were introduced to education to

change the teaching style from one that uses traditional blackboards to a modern ICT-based teaching in which learners are more likely to produce positive outcomes through the integration of the technology into other teaching strategies (Jang & Tsai, 2012).

Teacher competence on the integration of smart boards is critical, as teachers are the central aspect of the integration of smart boards (Hockly, 2013). The professional development provided to teachers must be sufficient and relevant in order to witness the impact of smart board on teaching and learning (Hockly, 2013). Teachers are likely to integrate and accept ICT in their classroom if the training they receive concentrates on their specific subject matter (Buabeng-Andoh, 2012). Teachers need to be trained well, whether individually or in a group, to learn all the features of the smart board in order to increase learners' engagement in the classroom (Karsenti, 2016). Alfaki and Khamis (2018) indicated that teachers need continuous support both educationally and technologically, but their study also revealed that teachers were not offered in-service training on the integration of smart board in English Language classrooms.

In a study conducted by DeSantis (2013), training was offered to teachers who were expected to integrate technology in their teaching. DeSantis (2013), indicated that an eight-hour long in-service training was offered to teachers followed by skills seminars, which were conducted monthly throughout 2011 and 2012. Professional development to support teachers' self- confidence regarding the integration of smart board was formulated and mentors were appointed to assist teachers with the incorporation of smart boards during teaching (DeSantis, 2013). DeSantis (2013) found that a well-structured professional development programme can help teachers to develop self-confidence when integrating smart boards in their teaching and can also improve their TPACK.

Alghamdi and Hamed (2018) conducted a study in Saudi Arabia and indicated that the Saudi Council Ministries introduced a professional development project called the King Abdullah Project for General Development which was aimed at, among other things, implementing ICTs to improve the quality of learning in classes. The study finding indicated that there is limited or insufficient professional development in

terms of the incorporation of smart boards. Participants in the study indicated that they had never received any professional development, and they were only relying on their colleagues to assist them (Alghamdi & Hamed, 2018). The training programmes to assist teachers on ICT use in the classroom should not only be in place but must be monitored and meet the needs of teachers.

Maher et al. (2012) revealed that teachers should be given training to boosts their knowledge about various teaching resources to enable them to easily locate appropriate resources that are well suited for the curriculum. Maher et al. (2012) emphasises that smart boards alone do not make a difference in learning but it is the combined choice of digital resources plus the well-planned pedagogical use of smart boards that carries much weight. Some teachers did not receive exposure to some ICT devices such as smart board during their tertiary years; hence they require training on smart board use to effectively integrate it in the classroom (Maher et al., 2012).

Raman et al. (2014) concluded that teachers will use smart board in their teaching if they believe that the smart board has the ability to help them improve their teaching performances and that the school administration is supportive when it comes to the integration in the classroom.

## 2.3.Theoretical framework

The following section will describe the theoretical framework applied by the researcher during the current study.

The researcher used a technological pedagogical and content knowledge (TPACK) theoretical framework (Mishra & Koehler, 2006) as a lens though which to understand the problem under study. TPACK is a dedicated type of teachers' knowledge which is applied in support of the integration of content-based technology (Harris & Hofer, 2011). TPACK embraces three knowledge components (expertise, content, and pedagogy) as well as the understanding of the interrelation between them (Mishra & Koehler, 2008).

The TPACK theory builds on from Shulman (1986) pedagogical content knowledge (PCK) which explains that teachers should have knowledge of the content as well as the knowledge of pedagogy for better representation of the content (Shulman, 1986).

Mishra and Koehler (2006) augmented Shulman's body of knowledge by adding technological knowledge (TK) to form the new knowledge which is TPACK. TK refers to technological skills which are needed to work with different technological devices (Ekrem & Recep, 2014). This new TPACK framework is believed to be powerful and broadly explains the role of teachers in modern schools (Liang, Chai, Koh, Yang & Tsai, 2013).

The main constructs of the TPACK framework are the content knowledge (CK), pedagogical knowledge (PK), and the technological knowledge (TK) (Chai, Koh & Tsai, 2013). With T included in the PCK framework (as shown in Figure 1 below), new components are formed, which are technological content knowledge (TCK), technological pedagogical knowledge (TPK) and TPACK (Liang et al., 2013).

Teachers are believed to have content knowledge as well as the expertise of teaching the subject. The unique expertise that teachers must have is known as the pedagogical content knowledge (PCK) (Voogt et al., 2013). Teachers can teach difficult concepts when they have this PCK (Voogt et al., 2013). The implementation of technology into the PCK is inevitable as technology plays an essential role because it presents new ways in which teachers can teach specific content in a specific subject (Voogt et al., 2013). The TPACK is viewed as a powerful prototypical that can be used to understand different knowledge bodies desired by teachers to effectively incorporate technology in the classroom (Voogt et al., 2013).

**Figure 1** shows the constituents of the TPACK framework and how they are interrelated.

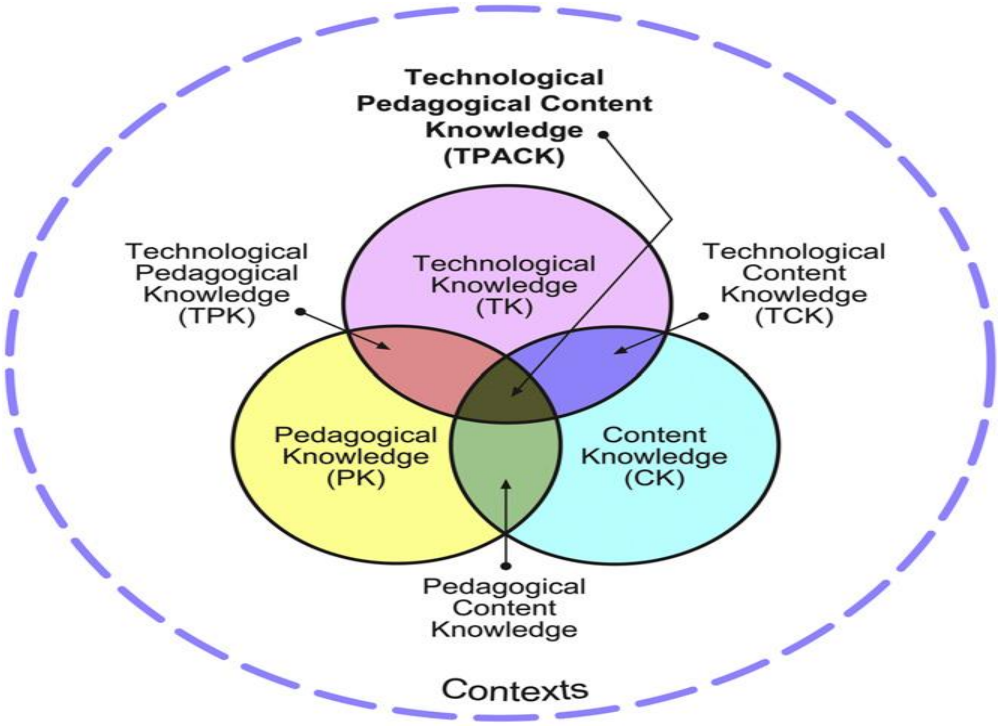



*Fig. 1* The technological pedagogical content knowledge framework (Koehler & Mishra, 2009).

### 2.3.1. Technological knowledge

Koehler et al. (2014) defined technology knowledge (TK) as a teacher's information about old-fashioned and fresh technologies that can be combined into syllabus. TK involves the required skills to operate different digital technologies, such as operating systems and computer hardware as well as software tools such as word processors, spreadsheets, e-mail, and internet browsers (Mishra & Koehler, 2006). In our modern society, technologies such as computers and the internet are mostly used by teachers to expand schooling and learning progression (Jang & Tsai, 2013).

Teachers need to have the ability to use different information communication technologies to perform a variety of tasks (Mishra & Koehler, 2008; Koehler, Mishra & Cain, 2013). However, tools often come with unique requirements that might hinder the content that must be taught and the method in which it should be taught (Mishra & Koehler, 2006). Equipment can help teachers be more flexible in terms of using different lesson presentation methods (Koehler et al., 2013). Teachers with TK

will be able to operate different software programmes such as PowerPoint presentations, digital videos, the internet, and will also be able to operate modern devices such as smart boards (Jang & Tsai, 2013). TK skills will also allow teachers to be able to install and remove both hardware and software programmes as well as create, save, and delete documents (Jang & Tsai, 2013).

In this study, participants were expected to use a smart board in their business studies lessons. Smart boards have been installed in the classrooms as a teaching resource in Tshwane West district secondary schools and teachers are expected to use them during their classes. Just like a traditional blackboard, a smart board has the ability to display information for all learners to see, however, it is not as time-consuming as using a blackboard where teachers needed a duster to erase information in order to write more content. Unlike the traditional blackboard, which was written on with a piece of chalk, teachers use either a digital pen or their finger to write on the smart board and they can write additional information on a new page, with the ability to save previously written information instead of erasing it. A teacher can even use a pointer to highlight particular information from a distance while performing educational intervention to learners in any part of the class. Participant-teachers were expected to demonstrate their TK skills by operating a smart board during their observed lesson.

### 2.3.2. Technological Content Knowledge

Technological content knowledge (TCK) is the situation where technology influences the content or vice-versa (Koehler & Mishra, 2009). Chai et al. (2013) defined TCK as knowledge about the use of machinery to signify/ investigate and generate content in various ways without contemplation about education. TCK implies that a teacher must understand that they can use different technological tools to achieve content-specific learning goals as there is a reciprocal relationship between the technology and the content (two constituents of TPACK framework) (Shinas, Yilmaz-Ozden, Mouza, Karchmer-Klein & Glutting, 2013).

Mishra and Koehler (2006) explained that teachers who have information of the content must recognise the way in which the technology application might influence

the subject being taught. Teachers must be optimistic about technology and effectively integrate it to ensure inclusion in their classrooms (Benton-Borghi, 2013).

Participants were expected to integrate technology with the content to better represent the content to learners by using digital devices to make the content more understandable to learners and in a manner in which peaked learners' interest. Rajabi and Khodabakhshzadeh (2015) believed that smart boards can be used in a way that can increase learners' motivation and promote their eagerness to learn through better engagement with the lesson. Participants were also expected to use smart boards to encourage collaboration among learners.

### 2.3.3. Technological Pedagogical Knowledge

Another critical feature of the TPACK model is the technological pedagogical knowledge (TPK) component, which is the understanding of the way the application of technology influences teaching and learning (Koehler & Mishra, 2009). Mishra and Koehler (2006) defined technological pedagogical knowledge (TPK) as knowledge of the presence, constituents, and abilities of various technologies as they are used in educational settings, and conversely, knowing how teaching might change as the result of using technologies. TPK involves planning and implementation where teachers need to plan for a lesson then develop a strategy for teaching a lesson with technology (Figg & Jaipal, 2011). TPK is characterised by the ability to design instruction, organise and manage a classroom, and decide on the teaching strategy that will best achieve the instructional goals of the subject (Figg & Jamani, 2011).

Teachers and educational leaders need both TK and specialised pedagogy to ensure effective integration of technology in education (Preston et al., 2015). As mentioned earlier, teachers need to have a combination of different knowledge bodies to effectively incorporate technology in schools. Teachers should not only have TK, which would simply mean basic skills in ICT literacy, but they must have knowledge that will help them use ICT in a classroom setting and integrate it into the curriculum (Voogt et al., 2013). A study conducted by Momani et al. (2016) revealed that both nominal and educational support must be offered to teachers continuously to ensure effective incorporation of ICT in education and learning.

In this study, participants were expected to use appropriate teaching methods and available technology, which was a smart board in this case, to ensure the delivery of lessons that catered for different needs of learners. Participants needed to ensure better classroom management through the integration of smart boards into teaching strategies, which would ensure learners involvement. Teachers needed to know that the application of technology can define ways in which a particular classroom could be managed and a variety of ways in which teaching and learning could be carried out (Mishra Koehler, 2008). Using a smart board in the classroom should assist teachers to better manage the classroom as learners' attention would be drawn to the lesson because of the technology. Teachers can use the features of the smart board to make the content delivery more interesting for their learners. Ahmad et al. (2017) supports the idea that teachers can use smart boards to maintain a collaborative class and create a better learning environment.

Teachers must choose the best delivery model to use during teaching and link it with the technological tools available to them in order to encourage cooperative learning through methods such as digital storytelling and other methods depending on the needs of the learners (Benton-Borghi, 2013). Teachers are expected use technology not to simply transfer the information to leaners but to amplify learners learning (Jang & Tsai, 2013).

### 2.3.4. Technological and Pedagogical Content Knowledge

Celik, Sahin and Akturk (2014) define TPACK as the foundation of decent teaching with equipment through necessary skills needed to use ICT in teaching and learning Teachers need to comprehend that the incorporation of technology in their teaching can change the construction of both the subject matter and the lesson presentation (Koehler et al., 2013). Celik et al. (2014) argued that it is especially important to recognise the correlation between the TPACK components as it will help teachers with their integration of technology into their teaching. Similarly, Chai et al. (2013) believed that schools that consider the TPACK framework when designing their educational environment, will ensure easier integration of ICT by teachers. They claimed that teachers could improve the way learners learn when they can design

lessons which are TPACK integrated (Chai et al., 2013). Teachers are believed to be well equipped with TPACK if they can incorporate technology, content, and pedagogy in a manner that facilitates learners' construction of knowledge in a subject matter that they teach (Jang & Tsai, 2013).

In this study, the researcher investigated whether business studies teachers have the TPACK that would enable them to enhance lesson outcomes. The use of a smart board in business studies for high school learners is indispensable as it exposes the leaners to the reality of the corporate culture, which uses advanced technologies, and prepares the learners for the professional life in the future (Al-Qirim, 2016). When using smart boards, learners are empowered with a healthy work ethic and they develop an understanding of how businesses operate in actuality (Yoke & Ngang, 2017). The study also focussed on content knowledge as curriculum informs the choice of a technological tool. The TK, TPK, and TCK were central factors as teachers must recognise how technology can influence the content matter and the way in which the subject content can be conveyed to learners.

Smart board technology was used, and the focus was on the delivery of business studies lessons using a smart board. The researcher used the TPACK theory to understand how business studies teachers integrate smart boards in their teaching. The researcher ascertained as to whether the participating business studies teachers have the TCK and TPCK to enable them to integrate different kind of technologies, such as smart boards, into existing teaching methods used to teach their specialised content material in ways that meet the requirements of learners. In this study, the researcher explored the TPACK of business studies teachers by assessing their TK, TCK and TPK through non-participant observations.

## 2.4.Conclusion

This literature review chapter focussed on the literature available about the incorporation of ICT in education. Many aspects on the use of ICT in education were addressed including, among other things; the views of teachers on the use if ICTs, like smart boards, in education. The literature highlighted that the views of teachers on the incorporation of ICT in education is of utmost importance. The literature also

indicated that teachers' professional development should be prioritised for teachers to fully incorporate different ICTs into the teaching and learning process. The literature review helped identify gaps from the literature to help the researcher refine the research objectives.

The research approach is explained in Chapter 3.

# CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

## 3.1. Introduction

Chapter 3 outlines the paradigm, research methodology and design used in this study, the population, sampling method, data gathering methods, and the instruments used to collect data. The research questions, aims, and objectives are restated at the start of the chapter to emphasise the justification of this study. Ethical measures followed during recruitment of participants and data collection process are examined. The data collection procedures are discussed, followed by the data analysis process. The data collected is analysed in Chapter 4.

## 3.2. Main aim and objectives restated

The aim of this study is to investigate the integration of smart board technology by secondary school teachers in their teaching of business studies subject in Tshwane West district in the Gauteng province.

The objectives of this study are to:

1. Explore the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning.
2. Determine the challenges that secondary school business studies teachers experience when integrating smart board technology in their teaching.
3. Examine the level of support that secondary schools' business studies teachers receive on the integration of smart board technology in their teaching.

## 3.3. Research methodology and design

The researcher located the current study in the interpretive paradigm. According to Rahi (2017) a researcher uses interpretive paradigm so as to obtain deep understanding of the phenomenon by interpreting true knowledge obtained from the subjects. It is important for researchers to select a specific paradigm so that they do not dwell on their own theoretical knowledge which can lead to biasness (Rahi, 2017). Researchers who support interpretive paradigm believe that the experiences

of the participants or subjects under study must be considered to create subjective meanings (Rahi, 2017).

A research design is an outline of the research that the researcher followed from formulating a hypothesis or the research question(s), to data gathering, analysis, and interpretation (Bezuidenhout et al., 2014). The research design becomes the parameters that the researcher used to formulate research questions and determine a detailed plan to answer the research questions using the gathered and analysed data (Clark, Flewitt, Hammersley & Robb, 2014). The research design for this study was to gather multiple case studies from four secondary schools that already have smart boards.

A case study allows the researcher to explore the reasons for the specific behaviours of participants and then generate evidence and findings that would be impossible to reveal using quantitative analysis (Rauch, van Doorn & Hulsink, 2014). A case study design enables a researcher to study very few participants as a sample group where the total population is relatively large (Rauch et al., 2014). Four cases were selected for the purpose of the study. The cases were four secondary schools in Tshwane West district that had been provided with smart boards.

The researcher developed a set of research questions to guide the study. The principal research question and the sub-questions of this study is:

*How do secondary school teachers integrate smart boards in teaching business studies in the Tshwane West district?*

Out of this research question, emerged the following sub questions:

1. What is the perspective of secondary school business studies teacher on the integration of smart board technology into teaching and learning?
2. What challenges do secondary school business studies teachers experience when integrating smart board technology in their teaching?
3. How are secondary school business studies teachers supported on the integration of smart board technology in their teaching?

Non-participant observations and semi-structured interviews were used to collect the

data that assisted in answering the research questions. Angrosino (2016) described non-participant observation as a kind of observation where the investigator refrains from being part of the activities of the participants that are being observed. Rauch et al. (2014) indicated that by using observations, a researcher can interpret phenomena from different contexts and identify patterns between these phenomena. The researcher used non-participant observations to collect live data from participants in a research setting (Cohen et al., 2011). Qualitative observation allows researchers to record the flow of participants' daily experiences (Angrosino, 2016). The existing timetables of the schools were used to determine the times in which the researcher could observe the teaching of business studies lessons.

The researcher also used semi-structured interviews where individual participants were asked a mixture of closed and open-ended questions that stimulated the discussion and collection of data about the specific topic on which the research was conducted (Galletta, 2013). Researchers use semi-structured interviews because they believe that open-ended questions allow for follow-up questions or probing (Adams, 2015). New and unique information, which was previously unknown, can arise using semi-structured interviews (O'Keeffe, Buytaert, Mijic, Brozović & Sinha, 2016). The most important reason for employing semi-structured interviews was to ensure that participants were given the opportunity to speak freely about their experiences. The researcher believed that the research questions would be answered by using both non-participant observations and semi-structured interviews to gather data.

### 3.3.1. The qualitative research approach

A qualitative research approach was relevant to this study. Creswell (2013) defined qualitative research as a research where the opinions of participants are examined to get an understanding of the phenomenon that is being studied. Angrosino (2016) described qualitative research as a process of investigation where researchers seek to understand the behaviour of participants by studying them in their natural setting and recording their actions to make a thematic rather than numeric analysis and then to write a report on the views of the participants. Qualitative research allows

researchers to understand, and not just measure, participants' views on the phenomenon under study (Sutton & Austin, 2015).

Qualitative research is based on the different views of several people about a particular field of study (Choy, 2014), unlike quantitative research, which is based on the belief that only one reality can be revealed if researchers use suitable experimental methods (Creswell & Creswell, 2017). A qualitative approach is useful if very little is known about a case and more research is needed to further understand a particular phenomenon (Creswell & Creswell, 2017). With a qualitative research method, the researcher is able to identify and manage bias in participants' response because participants may reply differently to the same question asked more than once. This could be because they do not want to look bad to the interviewer (Choy, 2014). The qualitative researcher seeks to understand participant perceptions, values, and traditions (Choy, 2014). This approach can help in understanding why one community could have different perspectives from another because it collects data from both diverse and homogeneous groups (Choy, 2014). Another advantage of qualitative approach is that it allows participants to speak out their views on a research phenomenon as it is open-ended (Choy, 2014).

Qualitative research is known as both interpretive and inductive as the study is conducted in the natural setting; and researchers seek to interpret the experiences of the people and the reason for their behaviour on a phenomenon (Mayan, 2016). In qualitative research, each case is studied individually to generate findings that cannot be generalised to similar cases (Mayan, 2016). Four case studies were selected for this study. A case study is a general inquiry that intends to understand an event in an ordinary environment.

Unlike quantitative investigators, who prefer to conduct observations in a setting which is highly controlled to test a hypothesis, qualitative researchers observe people in a natural setting where these people naturally interact so that they can get the true meaning of their behaviour and experiences (Angrosino, 2016).

In a natural setting, researchers can record first-hand the actions and behaviour that occurs naturally unlike in artificial settings where people can model their natural

behaviour to suit the setting (Hammersley, 2016). Angrosino (2016) referred to data collection activities done in natural setting as fieldwork. Fieldwork in this study was done in four secondary schools in the Tshwane West district in Gauteng. Participants were observed and interviewed in their natural work environment, which was their schools setting where the problem of the study was experienced daily (Creswell & Poth, 2016).

### 3.3.2. Population and sampling

Hartas (2015) defined population as a set of people who possess related features that are identified by the researcher to be important to the study. In this study, the population was secondary school business studies teachers in the Tshwane West District in Gauteng, South Africa. The case study selection was based on convenience. The researcher selected secondary schools that were accessible in terms of distance, had smart boards available in the school, and had business studies in their curricula. The researcher labelled the four selected schools which served as case studies from A to D. The sample of participants was then extracted from the four selected cases

The researcher used a fair selection of participants for the study. The researcher sampled five business studies teachers from the four cases with the aim to investigate the way they integrated smart boards in their teaching of business studies.

A purposive sampling was used, and only business studies teachers were invited to participate in the study. In purposive sampling, elements (participants) to be included in the population are chosen because they indicate certain characteristics (Bezuidenhout et al., 2014). Using this kind of sampling, the researcher was able to limit the sample to only the elements that fit in the population parameters of the study (Bezuidenhout et al., 2014; De Vos et al., 2011). This type of sampling is based on the researcher's judgement in terms of the characteristics of the representative sample (Bless et al., 2013).

Five business studies teachers served as a representative sample. One business

studies teacher per school was requested to participate in the study based on the teachers' experience of the use of smart board. In a situation where there was more than one business studies teacher in the same school, the most experienced teacher (in terms of the use of smart board) was selected to be part of the sample.

To get the fifth participant, the researcher considered the number of business studies teachers per school from the four selected schools. In schools where there were three or more business studies teachers, the researcher sampled an additional participant. This applied to only one school, hence the fifth member of the sample. The selection was based on the teachers' level of experience using a smart board in a business studies classroom. Only teachers offering business studies in the four secondary school using a smart board were considered for the sample. Of the five participants, three were males, and two were females. The table below gives a more detailed description of the participants.

**Table 3.1:** *Description of participants*

| Participants | Gender | Age group in years | Qualification | School type | Teaching experience in years |
|---|---|---|---|---|---|
| A | Male | 25-30 | Honours | Quintile 4 | 6 |
| B | Female | 25-30 | BEd | Quintile 2 | 2 |
| C | Male | 45-50 | Honours | Quintile 4 | 23 |
| D | Male | 45-50 | BEd | Quintile 1 | 23 |
| E | Female | 55-60 | Bed | Quintile 1 | 30 |

The sample size was five secondary school business studies teachers, of which three were males, and two were females. Of the participants, two had an Honours degree in education, while the other three participants had a Bachelor of Education (BEd) degree.

The participants were addressed as participants A, B, C, D and E to guarantee anonymity. The ages of the participants ranged between 25 and 55 years old with teaching experience between 2 and 30 years. The schools that were selected to be

case studies were ranked quintile 1, 2, and 4 according to the South African school ranking of public schools. The quintile school ranking is the South African DBE strategy of categorising schools in terms of the general income of the school community (Smith, 2011).

Quintile 1 schools are regarded to have the lowest incomes according to the community's income level, and they obtain a large sum of funding from the government as parents do not pay learners' school fees (Mestry & Ndhlovu, 2014). Quintile 1, 2, and 3 all do not pay schools fees but there is a slight difference in terms of their income scale (Ogbonnaya & Awuah, 2019). Quintile 4 and 5 schools are regarded as well resources schools which are found in higher-income communities where parents are believed to be financially stable enough to be able to pay for learners' school fees. It is for this reason that these schools receive little funding from the government (Mestry & Ndhlovu, 2014; Ogbonnaya & Awuah, 2019; South Africa, 2004 November).

However, some Quintile 4 schools are regarded as non-fee-paying schools as they accommodate learners who come from low-income communities or informal settlements that are established in the vicinity of the school community.

### 3.3.3. Recruitment of participants

The recruitment of participants was challenging because some teachers who were approached displayed fear in participating in the study, even when the researcher explained the procedure and the ethical issues controlling the study. The challenge persisted even after the researcher collected the signed informed consent forms from participants. When sending follow-up reminders for the dates of data collection, some participants postponed their set appointment to later dates saying they were not yet ready.

### 3.3.4. Data collection instrumentation

For the study's purpose, a semi-structured interview guide and non-participant observation checklist were developed to prepare for data collection and were used to

investigate the integration of smart board technology by secondary school teachers in their teaching of business studies subject.

- *Non- participant observations*

Non-participant observation was one of the methods used to collect data. Non-participant observation is the recording of actions by someone who is from outside who only records the actions without interacting with the person observed (Bless et al., 2013; Urquhart, 2015). Cohen et al. (2011) claimed that, through observation, the investigator can collect live data from social, naturally occurring cases. The schools' observational schedules were adopted to observe the delivery of business studies lessons using a smart board. The researcher implemented a passive, non-intrusive role, only remarking any incidences on the observation schedule (Cohen et al., 2011). The researcher maintained a researcher's journal to keep all records of the observed schedule. Observational schedules were compiled from a checklist (Appendix A). Each participant was observed only once for a double class period, which was expected to last for at least 1 hour. The semi-structured interview followed within 5 days of the observation with the particular teacher.

- *Semi-structured Interviews*

After observations, interviews were held with individual teachers. Interviews are conversations that occur with the primary aim of obtaining information (Bezuidenhout et al., 2014). De Vos et al. (2011) defined an interview as a societal connection planned to interchange information between participants and the investigator. Interviews allow participants to express their minds and beliefs. This description is supported by Cohen et al. (2011) who affirmed that interviews give participants a chance to share their explanations of the world they live in and give explanations of situations from their own perspectives.

A semi-structured interview guide, with a set of predetermined, open-ended questions was developed in preparation for the interviews and used to gather data (Appendix B). During the development of the semi-structured interview guide, the

researcher concentrated on questions that could aid in addressing the research question(s) and achievement of the objectives. The research questions were used to refine the interview questions for the interview guide. Open-ended questions were used on the interview guide. The interview was then sent to a research expert, who was also the researcher's senior, to verify the trustworthiness of the tool.

The researcher ensured that all the respondents' answers were captured accurately. This was done by audio-recording all interviews and immediately transcribing them on the completion of every interview (Chigona et al., 2014). It is very important to audio-record the interviews as the notes written during the interviews may be unreliable and researchers are likely to miss some of the information if they take written notes while conducting the interviews (Jamshed, 2014). The researcher asked the participants to provide their permission to audio-record the interviews. Only one interview was conducted with each teacher. The interviews were between 15 minutes to 30 minutes long. All participants were asked the same set of questions so that the views of participants could easily be compared (Bezuidenhout et al., 2014). However, the schedule did not dictate the interview but rather was guided by it (De Vos et al., 2011). The researcher asked the questions to participants in the same order. In cases where the researcher felt that the participants provided insufficient information, the researcher probed to get more information.

### 3.3.5. Data collection procedure

The semi-structured interviews and non-participant observations were all conducted in the natural setting of participants' schools, which was their working environments. The researcher conducted the process of data collection themselves.

- *Non-participant observations*

During non-participant observations, the researcher was an inside observer in the classrooms where business studies lessons were being delivered with smart board. The researcher visited each site to confirm the school timetables to decide on appropriate dates for observations. A day was chosen where the teacher would have a double class period, which was an hour long. A standby date for a double period

was also chosen in case the first preferred day did not materialise. The researcher ensured that the normal operation of the schools was not interrupted by the data collection process hence they used the already available school timetables to identify the periods that were allocated for business studies. The participants were reminded of the observation dates five days before the actual date. During observation, the researcher only greeted the learners and retreated to a space in the class to sit and observe. The observations lasted for an hour, which was a double period allocated on the day. The participants were each only observed once.

The researcher developed the checklist for the purpose of data gathering (Appendix A). During the development of the checklist, the researcher took into consideration the research questions and the objectives of the study. The researcher used the TPACK as the theoretical framework guideline to develop the content of the checklist. The researcher ensured that the aspects to be observed addressed the research question(s) by testing all the knowledge contents of the TPACK. The checklist was also well sent to the research expert, who was the researcher's senior, to ensure trustworthiness of the instrument.

- *Semi-structured Interviews*

A semi-structured interview schedule was developed containing a set of predetermined, open-ended questions. This was used to gather data (Appendix B). All participants were asked the same set of questions so that the views of participants could easily be compared (Bezuidenhout et al., 2014). Participants were reminded of the interview dates during the day of observations. Interviews were conducted five days after observations were conducted. Participants were requested to choose interview times convenient for themselves. In a case where the participant became unavailable during the scheduled time, another time was scheduled. Interviews lasted for 15 to 30 minutes, and the interviews were recorded to guarantee that all the participants' responds were captured correctly. Jamshed (2014) indicated that researchers cannot rely on the written notes taken during interview hence it is important to audio-record the interviews while the researcher directs focus on the participant.

A permission to audio-record the interviews was given by all participants. The semi-structured interview guide served as a guideline but did not dictate the interview. (De Vos et al., 2011). The audio-recorded interviews for all participants were later transcribe for the purpose of data analysis.

### 3.3.6. Data analysis and interpretation

Data collected from the semi-structured interviews and non-participant classroom observations were qualitatively analysed. Qualitative data analysis is the method of interpreting and providing underlying meanings to raw data by using incisive, recognising, assessing, exploring, representing, coding, and describing shapes, trends, themes, and forming categories (Mathipa & Gumbo, 2015). Similarly, Cohen et al. (2011) described qualitative analysis as creating logic from data in terms of the participants' descriptions of the position, noting patterns, themes, categories, and constancies. De Vos et al. (2011) on the other hand, defined qualitative data analysis as a method of inductive thinking, and theorising which undoubtedly is far removed from structures, mechanical and complex procedures to make interpretations from practical data of social life.

A content analysis was used to analyse data collected from semi-structured interviews and non-participant observations. The checklists completed during non-participant observations and audio-recordings recorded during semi-structured interviews were reviewed, transcribed, and coded immediately after each collection activity to avoid collecting too much data before analysis (Cohen et al., 2011). Audio recordings captured during interviews were transcribed and typed using a word processing program. The researcher transcribed the recordings by typing out the exact words that participants used without changing or adding anything (Mabuza et al., 2014; Sutton & Austin, 2015).

The researcher followed the five steps of data analysis explained in Chapter 1, namely familiarisation, thematic indexing, charting, interpretation, and confirmation (Mabuza et al., 2014). The researcher previewed the transcripts a number of times to be familiar with the content before starting the coding process (Petty et al., 2012). Participants' responses were coded after the transcript and non-participant

observation checklist reviews.

Coding refers to identifying both similarities and differences from participants' responses about a particular topic and then sorting them accordingly so that the researcher understands a particular case from the views of the participants (Sutton & Austin, 2015). Mabuza et al. (2014) defined a code as an expressive concept aimed at capturing the primary message data. The researcher assigned codes to participants' responses that were similar across the coding material while also looking at the similarity among different codes to identify emerging patterns (Mabuza et al., 2014; Petty et al., 2012). The researcher used a table in a Word document to create the coding material. Only the extract of a participant's response that was relevant to the study was captured on the coding material and the main idea from the extract was highlighted (Appendix C). Participants' responses were typed on the coding material in order of the questions asked. The researcher then highlighted matching or similar key information with one colour. Different responses were highlighted with assorted colours to identify variations. The researcher did not neglect to consider data that appeared to be negative from other codes as these responses were regarded as equally important. As the codes were allocated and organised, themes emerged from which the researcher could explain the findings derived from both the semi-structured interviews and non-participant observations.

The results, as well as the discussion of the results of the study, were then explained under the emerged themes. The opinions of authors who conducted studies on similar topic were also included during discussion of findings.

### 3.4. Trustworthiness in the study

For qualitative research to be successful, researchers need to take into consideration the trustworthiness of the study (White, Oelke & Friesen, 2012). The trustworthiness of the study is determined by the judgement of the readers (Gunawan, 2015). The evaluation of trustworthiness is compromised when the person who reads the research report does not get a clear idea of the procedures that were used by researchers during data collection and analysis (Nowell, Norris, White & Moules, 2017). Even though different researches may have different methods for collecting

and analysing data, researches have the responsibility to ensure trustworthiness of their own studied (Nowell et al., 2017). Qualitative researchers should be sceptical about the information they collect to avoid misinformation and the recording of information that might be incorrect (Anney, 2014).

Lincoln and Guba (1985) suggested four pillars of trustworthiness, which are credibility, dependability, confirmability, and transferability. The four pillars were used during data analysis phase to ensure trustworthiness of results. Mabuza et al. (2014) explained how researchers can use various ways to ensure trustworthiness and these are indicated on the table below.

**Table 3.2:** *Criteria for trustworthiness of qualitative research (Mabuza et al., 2014:3)*

| Criterion | Strategy employed |
|---|---|
| Credibility | • Lengthy or continuous field work<br>• Peer consultations<br>• The use of different data collection instrumentations<br>• Member checks |
| Transferability | • Clear description of research procedures |
| Dependability | • Creating an audit trial<br>• Comparing results from various data collection instrumentations |
| Confirmability | • Triangulation<br>• Developing a reflexive journal |

The researcher took into consideration the aspects concerning trustworthiness in all processes beginning with the development of the instruments that were used to collect data and continuing throughout analysis and interpretation. The trustworthiness procedure that the researcher employed is described below.

### 3.4.1. Credibility

Credibility should be pursued to ensure that the conducted study is of an expected quality (Theron, 2015). The findings that are drawn from the collected data should be

valid and should match the reality of the phenomenon that is being studied (Mabuza et al., 2014).

There are several approaches that qualitative researchers can use to ensure credibility of the research. These include peer debriefing, prolonged field experiences, triangulation, member checking, negative case analysis, and constant observations, amongst others. (Anney, 2014). In this study, the researcher conducted member checking and peer briefing. These methods of ensuring credibility are explained below:

- *Member checks*

During member checking, the participants are given the opportunity to comment on the analysed and interpreted data (Anney, 2014). This is achieved by sending the participants the analysis and interpretation so that they can evaluate the researcher's interpretation and make suggestions for corrections where they feel they were misreported (Anney, 2014). This strategy is used to eliminate researcher bias during the analysis and interpretation process (Anney, 2014).

The researcher needs to validate the content of collected data and the outcomes of the coding process by requesting participants to verify the accuracy of the collected content (Theron, 2015). A participant should believe that the findings are a true reflection of their experiences (Petty et al., 2014).

The researcher conducted member checking with all participants. The transcripts of the semi-structured interviews were taken to each participant by the researcher to confirm that the data was exactly what they said. In a case where a participant was not satisfied, it was the duty of the researcher to address the dissatisfaction of the participants (Theron, 2015). In this research, four out of five participants confirmed that the semi-structured interviews were correctly transcribed. Only one participant requested minor changes on their transcription and restructured a few sentences to what they believed conveyed what they meant. No corrections were made to the transcripts of the other four participants.

- *Peer debriefing*

It is indispensable that researchers seek guidance from scholars or academic experts; whether it be the postgraduate dissertation committee or other professional researchers during the process of the research (Anney, 2014). The researcher should also present their research findings to peers for their input, which can help improve the quality of the research findings as well as help identify aspects that the research questions did not cover, in order to identify negative cases (Anney, 2014). In this study, the researcher attended both the 3rd and 4th Annual Master's and Doctoral Student Research Conferences on 6th- 7th July 2017 and 28th- 29th June 2018 respectively, to seek advices from peers and academics. These were conducted by the institution with which the researcher had registered as a research student.

During the conference the researcher presented the current study to both peers and research experts who in turn gave advice regarding trustworthiness issues. During the conferences, the researcher learned important aspects about the research process, which, among others, were procedures pertaining to trustworthiness.

### 3.4.2. Confirmability

Confirmability is the level of objectivity displayed by the researcher during the processes of data gathering, analysis, and discussion (Mabuza et al., 2014). When confirmability is ensured, the reader can believe that the results reflect the true exposures of participants and not the researcher's own feelings and beliefs (Mabuza et al., 2014). Confirmability in a qualitative research is when a researcher is required to record all the events that take place during the data collection on the field. A researcher is expected to keep the notes recorded on the journal in a secure location for the purpose of future reference (Anney, 2014). The researcher in this study kept evidence of what transpired in fieldwork; data collected from both semi-structured interviews; and non-participant observations. The researcher also maintained confirmability in this study by using reflexive journal.

The researcher was neutral when gathering and analysing data collected from both the semi-structured interviews and non-participant observations. The researcher

transcribed the audio-recordings from the semi-structured interviews and captured exactly the way each participant conveyed the information. During non-participant observations, the checklists were completed with the utmost objectivity, where the researcher noted the true actions of participants. Member checking was also completed by the researcher to ensure confirmability. The researcher was objective about the data collected to eliminate researcher bias (Elo et al., 2014). The use of non-participant observations also eliminated bias from the researcher as the researcher did not contribute to the data collected.

### 3.4.3. Transferability

Transferability is the capability of other researchers to implement the delineated procedures of the study in related settings (Mabuza et al., 2014). It is imperative that researchers provide a full description of the research processes that they used to guarantee transferability of the finding to similar environments (Anney, 2014). The methods to ensure transferability are explained below.

- *Thick description*

Mabuza et al. (2014) claimed that transferability may be ensured by giving a comprehensive description of the study. If a similar study needs to be conducted in similar settings, then those researchers must be able to replicate the procedures of the current study to attain similar results (Petty et al., 2014). The researcher should provide a comprehensive thick description of all the research processes to allow other researchers to ascertain whether they can apply the study finding into their settings (Petty et al., 2014). In this study, the researcher explained in detail all the processes followed for the study including population and sampling; data gathering tools; data collection; as well as data analysis. The researcher also maintained a reflexive research journal to ensure that notes from non-participant observations were saved and would be accessible for future reference.

Also the research process is transferable, in qualitative research, the findings cannot be transferred to another sample group (generalised) because the finding are valid only for a specific context, and the sample does not represent the entire population (Petty et al., 2014). This study was empirical; hence the findings could not be generalised.

- *Purposive sampling*

One of the strategies that researchers can employ to ensure transferability is the use of purposive sampling where the researcher samples only participants who meet the criterion that determines the population parameters of the research (Anney, 2014; Bezuidenhout, 2014). This sampling method allows researchers to choose only the participants who possess characteristics which are of interest to them (Silverman, 2015).

### 3.4.4. Dependability

Dependability and confirmability perform the same functions. The researcher followed techniques used to ensure both concepts. Elo et al. (2014) defined dependability as the stability of collected data after a period of time and in different settings. The researcher was being closely monitored by the supervisor, during which the supervisor examined the researcher's processes of data collection, data analysis, and the results of the study. The supervisor also reviewed all the interpretations and conclusions to evaluate whether they supported the collected data. The researcher also attended workshops and annual conferences arranged by the researcher's academic institution and her findings were also reviewed by the researcher's peers for better understanding of the findings and to get useful peer contribution.

## 3.5. Ethical issues

Before the researcher begins the data collection process, they must make sure that they obtain the approval to collect such data (Stuckey, 2014). Stuckey (2014) indicated that, before conducting interviews or observations, the researcher must comply to the human protection review, which is intended to confirm that the privacy of participants is protected, and their image is not somehow negatively tainted by any act of the research. In this study, the researcher considered the guidelines pertaining to ethics, which includes voluntarily participation, anonymity, confidentiality, and informed consent. Each of these are discussed in more detail below.

### 3.5.1. Informed consent

The researcher applied for all relevant permission documents before approaching the research settings. The researcher obtained ethical clearance from the ethics committee of the University of South Africa (UNISA) College of Education. The application for ethical clearance indicated, among other details the research topic, problem statement, aims and objectives, and a brief explanation of the research methodology and design. The ethical clearance application form was completed and sent to the ethics committee together with:

- a copy of the data collection instruments (Appendices A & B);
- the permission letters addressed to the schools which the researcher used to apply for permission to collect data (Appendix F); and
- a consent form prepared for participants who gave their consents to participate in the study (Appendix H).

The institution's ethics committee issued the researcher with an ethical clearance certificate (Appendix D) which served as consent to conduct a study in the four secondary schools in the Tshwane West district.

After obtaining the ethical clearance certificate, the researcher asked for permission from the GDE to conduct the study. The researcher applied for an approval letter to carry out a study in secondary schools in the Tshwane West District, Gauteng. An application for permission form was completed and submitted to the GDE together with:

the research proposal for the study;

- the approval letter from the ethics committee (Appendix D);
- the data collection instruments which were non-participant observation schedules (Appendix A), and semi-structured interview guide (Appendix B);
- the application letter prepared for the purpose of applying for permission to carry out a study from schools (Appendix F); and
- a consent form (Appendix H) prepared for participant who agreed to participate on the study.

The GDE issued the researcher with the approval letter to conduct a study (Appendix E). Upon receiving the approval letter from the GDE, the researcher asked for permission to conduct the study from the principals of the selected schools (Appendix F). The researcher personally went to the four selected schools to hand the request letter to each principal. The researcher explained the purpose of the study to the school principals as well as the way that confidentiality and anonymity would be guaranteed. The school principals understood the purpose of the study and granted the researcher access to collect data in the schools. Each principal supplied the researcher with an approval letter (Appendix G). After the principals gave the researcher their approval, selected participants were given an overview of the purpose of the research and were requested to participate in the study. Informed consent forms were given to the selected sample of business studies teachers (Appendix H). The researcher clarified to participants that they need only consent to participate if they decided to take part in the study.

The researcher also considered the ethical guidelines of voluntarily participation, anonymity, and confidentiality. The researcher explained that participants would participate voluntarily, and they would be allowed to withdraw their participation without giving a reason at any point should they wish to do so. The researcher made participants aware of the procedures of the research and what was expected of the participants. Informed consent forms were issued and collected from all five participants. The participants were given 5 working days to review and understand the purpose and benefits of the study and to consider their roles as stated on the consent form. The researcher also explained that if participants refused to take part or withdrew from the study at a later stage, that there would be no penalties of any nature.

The researcher collected the signed consent from each participant five days after issuing, which served as evidence that the participants had agreed to participate in the study. Only after all relevant consent documents were signed and collected by the researcher, were the participants invited to take part in the study. A consent to audio-record the interviews during data collection was also requested from participants.

All the permission letters from the ethics committee of the university, GDE, school

principals, and participants were filed by the researcher in a safe and secure location.

All information collected by the researcher was treated as extremely confidential. The researcher stored hard copies of the semi-structured interview transcripts and the completed non-participant observation checklists safely at their private residence in a locked office. The documents will be secured for potential future reference within the scope of this study for a period of 5 years. After 5 years, the stored information on hard copies are to be shredded to ensure that they are not accessible to anyone for any reason outside of the scope of this study. All electronic information is stored on a computer that is password protected. The computer is stored in a locked office at the researcher's private residence and will be stored for the prescribed number of years after which was all data will be permanently deleted using the WipeFile program.

### 3.5.2. Voluntary participation

The participation in the study was voluntary and participants were not coerced to take part. Participants who displayed interest and agreed to participate in the study were issued with informed consent forms, which needed to be signed and returned before data collection began. Participants were made aware that participation is of their own free will, and that they hold the right to refuse to participate at any point in the process. The researcher explained that participants may discontinue with the study at any time without any explanation or penalties if they wished to do so. Participants were also made aware that there were no risks anticipated with the study and the benefits of their proposed participation were also outlined.

The researcher explained the contents of the informed consent forms to all participants which provided them with details about the study's ethical guidelines and what was expected of them during the data collection phase. Participants were asked to sign the consent forms to indicate that they understood the content. The researcher also explained to the participants that signing the consent form did not prevent them from withdrawing their participation. Participants were also informed that no reason would be necessary should they wish to discontinue their involvement in the study processes. A letter of request (Appendix F) for voluntary teachers' participation with a relevant data collection schedule was sent to the principals of the

identified schools (Appendix A and B).

### 3.5.3. Confidentiality

Research confidentiality indicates that there is an agreement between people that the information they share will have limits in terms of access to others (De Vos et al., 2011). To ensure confidentiality, the researcher handled the data collected from participants in a confidential manner. The researcher ensured that the data collected was not and will not be made available to anyone. Participants were made aware of any audio-recordings taking place during the interviews and observations.

Furthermore, researcher guaranteed anonymity to participants. Anonymity means that the subject's input should not be identified by anyone after the research process, including the researcher (De Vos et al., 2011). The identities of participants remained anonymous throughout the study from to point of data collection to publication. The researcher ensured that the data collected could not be associated with the names of the participants. Participants' names were not recorded anywhere on the collected data and there was no other person, apart from the researcher and the researcher's supervisor who knew about the participants' connection to the study.

The data that was collected was used for this research only. Participant responses were only seen by members responsible for the research, which included the transcriber, external coder, and members of the Research Ethics Review Committee. These responses were not associated with a specific respondent. Records that identified the researcher were available only to individuals who were working on the study. The identity of the participating schools and the four school principals were protected and remained anonymous throughout the research process. The researcher also ensured that all information associated with the study sites and participants was kept confidential by keeping the site and participants names anonymous. Selected schools were referred to from School 1 to School 4 while participants were addressed as Participant A, B, C, D or E to ensure that the collected data could not be associated with the names of schools and participants.

## 3.6 Conclusion

Chapter 3 described the research design that was selected for this study and the reasons for choosing the design were highlighted. A qualitative research designed was used as a guideline for the study and the process of data collection. Semi-structured interviews and non-participant observations were employed to gather data. The research design served as a guide for Chapter 4, which is the data analysis chapter. Chapter 4 outlines the results from both the semi-structured interviews and non-participant observations.

# CHAPTER 4: THE ANALYSIS AND DISCUSSION OF THE FINDINGS

## 4.1. Introduction

Chapter 4 presents the findings of the qualitative multiple case studies based on the main research question: ***How do secondary school teachers integrate smart boards in teaching business studies in the Tshwane West district?***

The study findings were acquired from five semi-structured interviews and non-participant observations, as explained in Chapter 3. The first section in this chapter is a presentation of the research context, followed by the description of the themes that emanated from the semi-structured interviews, then a description of the researcher's non-participant observations during classroom lessons where the participants were using a smart board. The identified themes were deliberated alongside the available literature to enable comparisons with other related studies and to indicate how the present study fits into the grand scheme of studies conducted on the same topic.

## 4.2 Review of the research context

The study was conducted with five business studies teachers who were invited to participate in the study after an intensive purposive sampling from four secondary schools in the Tshwane West District, Gauteng. In each of the four secondary schools selected, one business studies teacher was sampled. In a school where there were more than two business studies teachers, a second teacher was sampled; hence the final sample size of five.

The following table contains a summary on the four selected schools.

**Table 4.1:** *Description of selected schools*

| School | Area | Quintile | No of Principals | No of Deputy Principals | No of HOD | No of teachers | No of learners |
|---|---|---|---|---|---|---|---|
| 1 | Peri- | 4 | 1 | 2 | 4 | 23 | 745 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Urban | | | | | | |
| 2 | Peri-Urban | 2 | 1 | 2 | 6 | 43 | 1150 |
| 3 | Peri-Urban | 4 | 1 | 2 | 6 | 34 | 954 |
| 4 | Peri-Urban | 1 | 1 | 2 | 4 | 29 | 930 |

Table 4.1 displays the characteristics of the four selected secondary schools which served as the multiple case of the research design. All four secondary schools were located in peri-urban areas. Douglas (2012) defines peri-urban areas as areas found at the edge of an urban area and after which you find a rural area. Peri-urban areas are those areas which are found in the city, but they have low-income and middle-class infrastructure, and they are very close to informal settlements (Douglas, 2012). The areas from which the case studies were selected were on the edge of urban areas and were close to informal settlements and other partially and non-developed areas.

The four cases were ranked as quintiles 1,2, and 4. South African public schools are categorised into five quintiles, which classifies schools according to the economic condition of the communities in which they are located and where the people in the community are examined according their income level and the rate of unemployment in that community (Ogbonnaya & Awuah, 2019). Smith (2011) defined quintile as the categorisation by the South Africa Department of Basic Education (DoBE), where schools are grouped in terms of the poverty scale of their local community. South Africa (2004, November) indicated that schools in Quintile 1 cater for 20% of lowest-income learners while Quintile 2 schools accommodate 20% of the next lowest-income learners.

Quintile 1 to 3 schools are known as non-fee-paying schools where the schools receive higher allocation from the government to run the operation of the schools, while Quintile 4 and 5 schools receive less allocation as learners in these schools pay school fees (Ogbonnaya & Awuah, 2019). Parents from Quintiles 4 and 5 are

considered to be capable of paying for their children's school fees (Ogbonnaya & Awuah, 2019). Quantile 1 schools are believed to be schools with the least resources (Ogbonnaya & Awuah, 2019). In this study, the selected schools were from quintiles 1, 2, and 4. All the schools were classified as non-fee-paying schools. The classification was even applied to those schools from Quintile 4 as they also catered for learners from the informal settlements who were part of the 20% of the low-income learners mentioned earlier.

Table 4.1 indicates that all the schools had one principal and two deputy principals. The differences between these 4 schools were the number of Head of Departments (HOD) where School 1 and School 4 had four HODs, while School 2 and School 3 had six HODs. The school with most learners was School 2 with 1150 learners, followed by School 3 with 954 learners, then School 4 with 930 learners, and lastly School 1 with 745 learners.

The four schools were labelled from School 1 to school 4 to maintain anonymity. Every data item from each school was labelled in such a way that it could not be associated with the name of the school, but with a number allocated to a school.

Five business studies teachers were sampled from the four secondary schools. According to Creswell (1998), when conducting phenomenological studies, the ideal sample size should be between five and 25; therefore, five was considered as a large enough sample to complete the analysis. The table below indicates the description of teacher-participants according to gender, age, and their experiences.

**Table 4.2:** *Description of participants according to gender, age, and experience in the use of smart board.*

| **Participants** | **Gender** | **Age group in years** | **Smart Board use experience in years** |
|---|---|---|---|
| A | Male | 25- 30 | 5 |
| B | Female | 25- 30 | 2 |
| C | Male | 45- 50 | 5 |
| D | Male | 45- 50 | 3 |

| | | | |
|---|---|---|---|
| E | Female | 55- 60 | 4 |

The five participants were named from Participant A to Participant E. Of the participants, two were females and three were males. Participants' ages ranged from 25 to 60 years old, where two of the participants were between 25 and 30 years, another two participants between 45 and 50 years, while one participant was between 55 and 60 years. Table 4.2 above indicates that all participants had experience using smart boards in their teaching ranging between 2 to 5 years' experience.

Data analysis was done through content analysis. The researcher followed the five steps for data analysis which are familiarisation, thematic indexing, charting, interpretation, and confirmation, which were all explained in Chapter 1.

The following section presents the study findings and the discussion of the findings that were noted from both the semi-structured interviews and the non-participant observations. The findings and the discussions are discussed concurrently.

## 4.3 Findings and discussions of semi-structured interviews

During the analysis of semi-structured interviews on the coding material (appendix C), the researcher identified patterns in the participants' responses. Based on the identified patterns, eight themes arose from the semi-structured interviews. The emerged themes are discussed below.

- **Theme 1: Smart boards are good for the purpose of teaching and learning**

When responding to the question about their feeling in using smart board, the findings revealed that all five participants felt that the integration of smart boards in business studies classrooms is beneficial for both teachers and learners. The findings also revealed that all five participants felt that smart board use in the classroom is particularly good for the aim of teaching and learning. All five

participants found smart boards to be generally useful. Although the participants were business studies teachers, they felt that a smart board can make an important contribution to the process of learning. Most of the participants mentioned that smart boards are regarded as teaching tools that give teachers a chance to make use of several visuals from the computer to makes the teaching easy, entertaining, and interesting. These findings are evidenced from the following quotes:

> **Participant C:** "*Well I feel like it's going to make teaching and learning very simple because learners will be seeing what the teacher is talking about, for example, if the teacher is explaining about business studies he will be able to show different types of businesses".*
>
> **Participant B:** "*Well it's great because of now it makes our lives much more easier because we are able to interact with children, there are videos for them and we can be able to use our imagination rightly now, they can be able to interact with you now nicely".*
>
> **Participant D**: "*This is a good idea; I think the intention of the department to bring this was to make us get more information in regard to the outside world, especially activities. When you look at the subject that we are doing especially, they need internet, they need to be connected to the world, and I think that will be a good idea in order to bring the world inside the classroom".*

A smart board makes teaching interesting because it provides new ways for teachers to teach, and learners to learn because the touch screen capabilities allow learners to touch and interact with the board. A study conducted by Tiba et al. (2016) showed that teachers are in support of the integration of technology, and they believe that it is beneficial for teaching and learning process. Similarly, Bakadam and Asiri (2012) highlighted that most teachers believe that a smart board offers them different teaching methods that are convenient for conveying the subject content to learners and improved ways of learning for learners. The results are related to that of the study conducted by Bakadam and Asiri (2012) who showed that teachers believed that smart board integration provides a conducive and effective platform of teaching and learning experiences in the classroom. Using digital technologies can contribute

to a progressive development in the education fraternity (Celik et al., 2014) as it helps learners understand the content better (Bester & Brand, 2013). It also makes it easy to catch the attention of learners as the teacher displays the material that is being taught on the screen. Learners demonstrate interest on the features of the smart board, which increase learners' attention in the classroom (Nichols, 2015). Smart boards can improve the quality of education and improve learning outcomes if teachers use advanced methods of teaching (Sarkar, 2012).

- **Theme 2: Readiness in integrating smart boards in teaching and learning**

When participants were asked about their readiness to use a smart board in teaching and learning, there were conflicting responses. Two out of five participants indicated that one can never be ready when it comes to ICT as there will always be changes. Two other participants indicated that they were ready to integrate smart boards as they were able to use the features of the smart board effectively. One participant indicated that the training provided to teachers on smart board use, helps them to better integrate smart board into their teaching.

> **Participant B:** "*When it comes to technology, you'll never be ready because of every time you are learning a new thing about the smart board that you can do with the children, so there are still more to learn about. When it comes to technology when it comes to IT, actually there is a lot to learn about*".

> **Participant E:** "*I would say forty percent, I know how to use, not completely ready because I don't know how to use some of the icons. I only use [the] smart board for writing and for using the textbook on the smart board so I cannot say I'm completely ready".*

Two out of five participants were confident and mentioned that they were ready to use and integrate the smart board into the classroom. This is evidenced by the following quotes:

> **Participant C**: "*I should think I am at the advance level because I can utilise*

*the smart board hundred percent. I can manoeuvre with my smart board while I'm teaching in class".*

**Participant A**: *"I can say I'm more than ready since I'm a former student of Computer Application Technology. It's so very easy for me to teach using a smart board Even the smart phones that we are using as young people, makes it easy to use a smart board. Actually, I can say I'm fine with a smart board and I'm happy because it makes provision for a paperless classroom, thanks mam".*

Contrary to the other opinions, participant D mentioned that they had received training from the Gauteng DoE making it easy for them to integrate the smart board into the classroom.

**Participant D:** "*Well we have been given training by the Department of Education even though it is not sufficient enough, I think by now I am acquainted with the usage of smart board and then also I am able to integrate it into the teaching and learning situation*".

From the results, it appears that there is a necessity for the teachers to be trained in the use of the smart board in the classroom. An ideal situation should be that the teachers know how to effectively use the smart board in the classroom; otherwise, it would be a waste of resources if the technology is there, but it is not used or is poorly utilised (Mun & Abdullah, 2016).

- **Theme 3: Teachers' experiences of using smart board**

Participants were asked about their experiences of smart board use in the classroom. Participants experiences on the practice of using smart boards were expressed in years. Participants experiences ranged from two to five years. Two of the five participants indicated that they had been using smart boards for five years, whereas one of the five participants had four years' experience using the smart board. The remaining two participants confirmed that they have been using smart board for one and two years, respectively. This is evidenced in the quotes below:

**Participant A:** "*I think now it's been four years ever since 2014 since it was introduced here in Tshwane, actually is five years since it was introduced here in Tshwane. I'm familiar I think I'm better when it comes to it now; I'm able to use it in an effective way and enhance it to make my lesson better, actually, I can say I'm having an experience, I'm so advanced in it. I'm able to give my learners activities on it; I'm able to attach supporting documents that can help them in their education, and also advance my teaching".*

**Participant D**: *"Well in my career as a teacher of seventeen years, the introduction of smart board was probably done in 2015, and I only came to use this smart board in 2017 and 18, that's where now I fully used it and utilise it in my classroom for teaching and learning situation".*

**Participant B:** *"Not so long since I've been in the educational department, it's like two years, it's not that long since I've used it".*

According to the study findings; the ability to integrate the smart board can be linked to the number of years of experience with the smart board. The number of years in experience were between two and five years; with some participants indicating that they were becoming comfortable using the smart board because of experience. From the results, it is evident that the number of years in which teachers used smart boards is linked to the level of confidence that teachers have when it comes to the incorporation of smart boards into their teaching. Teachers confidence in the use of smart board increases with the continuous use of the board (Goodreau, 2013). A study done by Jang and Tsai (2012) revealed that more experienced teachers have a stronger belief than less experienced teachers that the use of smart board can develop teaching and learning and assist teachers to explain difficult concepts to learners more easily.

- **Theme 4: Smart boards help to enhance teaching and learning of business studies**

When responding to the question about their views on the use of smart board in a

business studies classroom, it is clear from the findings that participants are in support of the integration of smart boards in the classroom. Out of five participants, four believed that a smart board really helps to advance the level of teaching and learning. This is evidenced from the following quotes:

> **Participants A:** "*When I check mam, based on my subject, I think it's a big move on this one when it comes to business studies because now it's so very easy for me, when I teach to integrate business studies with those gadgets, I'm able now to make videos where learners can be able to see what I'm teaching, so with me, in business studies, I think it's helping a lot because now a learner is able to, for example, when I give a difference between formal and informal sector, I'm able to show my learners videos using a smart board for them to understand. Thanks mam".*

> **Participant B:** "*Yes, the smart board is better than integrating with a chalkboard and it does not just make the classroom environment easy, it makes the classroom environment fruitful. So the children are eager to be participating in the class and they are able to enjoy what they are learning, and it becomes colourful for them, it becomes movable for them and they are able to integrate it with their daily lives*".

However, one of the five participants still believed that the integration of smart board depends on the type of subject being taught. The participant believed that it is easy to integrate smart board in subjects like mathematics rather than business studies. The results are parallel to those of Lindberg et al. (2017), who argued that technology integration is dependent to the type of subject that is being presented. Similarly, Pamuk et al. (2013) asserted that research showed that smart boards are mostly integrated by teachers teaching subjects like biology, geometry, geography, and English language. That is evidenced by the following quote:

> **Participant E:** *"Business studies is not like maths, maths has graphs and so on. In business studies, I feel that we are still lacking so many things of the smart boards. Like now I remember there was a lesson sometime last month where they gave cards to other subjects and they said that they haven't*

*installed changes for business studies but other subjects there were some changes and they gave them the cards".*

The participants were in support of the integration of the smart board for assorted reasons, as indicated in the quotes above. The major reason being that business studies teachers view the smart board as ideal for delivering lessons to their learners as it engages and connects the learners to the broader world outside the classroom. These results are similar to the results of the study conducted by Gashan and Alshumaimeri (2015) who exposed that teachers view a smart board to be a significant instrument that has the ability to improve teaching and learning. Similarly, Türel and Johnson (2012) revealed that teachers demonstrate positive perceptions on smart board use in general. With a smart board, learners are empowered with work ethics and they develop an understanding of how businesses operate in the real world (Yoke & Ngang, 2017).

Albugami and Ahmed (2015) also revealed that both teachers and learners should build positive attitude towards ICT for them to be encouraged to successfully use it in the classroom. A negative attitude can be an obstacle to ICT integration. Similarly, the study by Guma, et al. (2013) highlighted that there is a connection between teachers' technological knowledge, perceptions, and their confidence towards the operation of technologies like computers in the classroom environment.

These findings are in agreement with the study by Bahadur and Oogarah (2013) conducted in Mauritius, which indicated that most teachers have confidence that a smart board is an appropriate technological tool that is suitable for teaching a variety of learners while increasing learners' participation levels in the classroom. From the results of the same study, it is evident that the perspectives of teachers will determine whether teachers use smart boards in their teaching or not. In addition, Türel and Johnson (2012) found that a smart board has flexibility in terms of its usability in different contexts.

Likewise, Öz (2014) established that teachers and learners both possess positive views on smart board use. They believe that it is beneficial for both teachers and learners and inspires learner involvement by creating a classroom environment that

improves the understanding of lessons especially through the integration of visual materials. Furthermore, the study by Nhete, Sithole, and Solomon (2016) exposed that most Business Education teachers perceived a smart board as an instructional tool that has the ability to increase the interest of learners, motivates learners to actively participate during classroom activities, and contributes to the development of a task-oriented and learner-centred lesson. However, Buabeng-Andoh (2012) asserted that teachers' perceptions can be discouraged if they fear that the they may face challenges of technical failure during the lesson delivery and they do not receive immediate technical support when needed.

Teachers must be well equipped with required knowledge to transfer the knowledge to learners (Singh & Chan, 2014). Teachers' continuous professional development on ICT use is of utmost importance in the improvement of instructional delivery (Tedla, 2012). Unsatisfactory training in digital knowledge can be the source of many challenges that teachers may face when using interactive whiteboard in the classroom (Alfaki & Khamis, 2018).

In conclusion, teachers who accept that smart board technology can modify their performance, are likely to integrate it in their teaching (Raman et al., 2014).

- **Theme 5: There is no electricity**

When responding to the question that asked about the challenges that participants faced during smart board integration, the results revealed that the lack of electricity has a great impact on the integration of smart board in the classroom. All five participants indicated that they were experiencing challenges during the integration of smart board in the classroom. Several challenges were mentioned during the interviews, which includes power outages. When there are power cuts, the classes are disrupted as the smart board requires electricity to function. Four out of five participants indicated that they do not have back-up generators to power the smart board during power outages. These findings are substantiated by the following quotes:

**Participants A:** "*What I've noticed nowadays, the challenges that I have is*

*the issue when there is no electricity, is challenging too much because without electricity it's not easy for me to teach since those smart boards they didn't bring them with a backup generator in a case where there is no electricity to use a generator to proceed with my teaching so that's a challenge. If they can provide us with generator for a case of emergency to back up when electricity is not there, I think it can be easy for us to teach, thanks*".

**Participants C** " *Well the first challenge will be if there is no electricity but with the usage of smart board I'm not having any problem.*"

**Participant E:** "*The first challenge it will be sometimes the smart board will take time to open [not audible] you wait for a very long time before they are functional so it's a big challenge. Sometimes we do not have electricity, so if we don't have electricity if you want to use a smart board it's a problem so these are the big challenges. And they are dirty, if you try to write it's like they are greasy you can't write on them. We do not have whatever we can use to clean the smart board and you find than when you write some of the letters skip and they are not visible."*

From the results, it is evident that there are still challenges to be addressed before smart boards can be fully integrated in the teaching and learning of business studies. Persistent power cut as a result of load shedding is one of the big challenges that may hinder successful integration of smart boards. Teachers are frustrated when they experience power outages as a results of load shedding during the lesson time. The results of this study are in line with Han and Okatan (2016) who revealed that electrical failures disrupt the classroom activities because teachers need to restart the smart board every time there is power cut and that takes a lot of teaching time. Similarly, Ersan (2018) argues that continuous power cuts disrupt the teaching and learning momentum in the classroom and weakens the authority that the teacher has in the classroom. Studies have also highlighted that constant power cuts are the most negative contributing factor on the ICT integration in education (Goodreau, 2013). Despite the challenges that teachers face during integration, they are willing to integrate boards into their teaching (Günaydin & Karamete, 2016)

- **Theme 6: Time not sufficient for smart board integration in a business studies classroom**

Participants expressed mixed responses to the question that asked about the time allocated for teaching and learning of business studies. The issue of time allocated was mentioned as a challenge in the integration of smart board in a business studies classroom. Three of the five participants mentioned that the time allocated for teaching of business studies was not enough because sometimes the smart board takes time to start, which consumes a portion of the time that was allocated for the class. The participants indicated that 30 minutes is allocated for a single period and one hour for a double period, which is the maximum. This is verified by the following quotes:

> **Participant A:** *"When it comes to time, mam, what I've noticed is that the time is not sufficient. What I've learned is that the integration of smart board is not in line with our lesson plans' notional time because when I go to class I have to switch on the smart board and this is technology, sometimes it takes its time to recover and start in a right way, so it's time consuming actually when it comes to the lesson because you have to start preparing a smart board then after you start teaching, time is over by that time, thanks".*
>
> **Participant B**: *"It's not sufficient, an hour is not sufficient for us let's say for example a video is there and then it's like five minutes or six minutes, explaining the concepts, and then you have to expose them to colours or magazines or newspapers on the board while you are explaining. It takes time, so arranging the time, one hour is not enough, it's never enough".*
>
> **Participant D**: *"Well I cannot say it is sufficient because you can't fully utilise a smart board optimally simply because you are sometimes allocated an hour, that's the maximum that you are allocated, which I feel is not enough especially when using a smart board in the classroom because you need to show learner some of these socio-economic issues as an example and you find that this time is so short to an extend that while you are busy engaging the learners especially in terms of teaching them, the time will lapse and also*

*that will have a negative impact on our teaching and learning".*

The findings of this study revealed that the time that is allocated for teaching business studies is not enough for teachers to carry out all classroom activities. Switching on the smart board and organising the lesson that is prepared might also take time which reduces teaching time. These finding support the results of the study done by Nhete et al. (2016) who discovered that teachers specified that they need additional time, above the time scheduled for teaching, which will allow them to develop teaching material using a smart board and search for additional resources including e-resources that are relevant to each planned lesson.

In contrast, Participants C and E indicated that they consider the time allocated for the subject to be sufficient because they could teach using smart board within the given time.

> **Participant C**: *"Yes it's sufficient because you can teach and at the same time using the smart board the learners can see what you are talking about because sometimes you can use the videos or different slides with the help of your laptop".*

> **Participant E**: *"Yes the time is sufficient because they weigh the subjects so there is no way we can say business studies should take an hour, and it must be 30 minutes at that time, so it's one hour, one hour, one hour plus thirty minutes in a week so they can't ask people to [not audible]".*

The time allocated for the teaching of the subject has a significant impact on the integration of smart boards. This is in line with the study conducted by Singh and Chan (2014) where most teachers indicated lack of time as one of the challenges they come across when integrating ICT because teachers were overloaded with other responsibilities. Likewise, the study done by Jang and Tsai (2012) revealed that teachers had smart boards in their classrooms, however, they were not using them because of lack of time to design materials they could use for teaching with the smart board. Alghamdi and Higgins (2018) revealed that teachers complain about the time allocated for lessons, which is limited for them to design teaching resources

and do lesson presentation. Ghavifekr, Kunjappan, Ramasamy, and Anthony (2016) expressed that most teachers have confidence in the use of technological devices during teaching, but that the challenge of limited time discourages them from integrating technologies in their classrooms because they need time to prepare and surf the internet for information to support their lessons, deal with technical challenges, and practice how they will use those technologies during lesson presentation.

- **Theme 7: Support for the integration of smart boards in a business studies classroom**

Participants were further asked about the support that they receive on the use of smart board in teaching business studies. There were mixed responses from participants regarding the question about support. Four of the five participants mentioned that the Gauteng DoE provided them with training. However, one participant mentioned they have never received any form of training based on their subject.

> **Participant D:** "*Well even though the district is trying by all means, actually let me say the department is trying, by all means, to conduct workshops and also training in terms of the usage of the smart board but you find that all these difficulties that have been mentioned in question number 5, the district has no power in order to correct such problems. But in terms of the training one might say it is not enough simply because you'll find that we'll only be trained for three to four weeks, which is not enough. And then you can't even utilise it to the fullest and then, as a result, the smart board becomes inefficient*".

> **Participants A**: "*Actually I don't receive any support based on business studies, what I can say is that the only support that I get when it comes to the integration of smart board in classroom is a general one on how to use a smart board, but in my subject we don't have a person whom they have appointed to say this person will be responsible in business studies on how to use it when I teach my subject, we don't have that person, thanks mam*".

From the findings, it is apparent that the business studies teachers really need support to ensure that the smart board is well integrated in the classroom. The results of this study are similar to the research done by Mihai (2017), which indicated that some teachers believed that the training that they received on the use of smart board was inadequate and they needed more. It is also evident that business studies teachers need continuous training on smart board use, especially content-specific training as some participants specified that they were only provided with training on the general usage of smart board. These results support Momani et al. (2016) who explained that teachers indicated that they never received work-related training on smart board integration specific to their subject, English language; however, they received training which they believed was merely computer skills training.

Teachers will possibly integrate ICT in the classroom if the training that they receive concentrates on their respective subjects rather than a general training on smart board use (Buabeng-Andoh, 2012). Singh and Chan (2014) also revealed that teachers were only able to use basic ICT applications like spread sheets, presentation software, and e-mailing as the result of moderate TK. In another study, Alfaki and Khamis (2018) claimed that teachers who were novice users of smart boards, agreed that they were trained, however, the training provided was not adequate and teachers needed continuous upskilling to keep up with the ever-changing technology. In another study, Alghamdi and Hamed (2018) revealed that teachers were not provided with professional development on smart board integration and they depended on their colleagues to help them with some aspects of the smart board.

Teachers require adequate and specialised training in order to be well conversant with the multiple features of a smart board, which could be used to increase the level of learner engagement in the classroom (Karsenti, 2016). Singh and Chan (2014) recommended that teachers develop their ICT skills regularly to be confident with their integration of technology in their teaching. Necessary training should be provided to teachers so that smart boards can be excellently incorporated into teaching and learning (Mihai, 2017). The lack of or limited support may make teachers unwilling to integrate a smart board in their teaching (Tiba et al., 2016).

- **Theme 8: Training is not sufficient classroom**

Participants were further requested to give recommendations that they believed would assist in improving the use of smart board in teaching of business studies. Four out of five participants indicated that the level of training that they were provided with was not enough. These suggestions are substantiated by the following quotes:

> **Participant A**: "*What I think, based on my experience when it comes to smart board, I think they have to buy a generator for back up when it comes to the issue of load shedding since nowadays we are affected with load shedding, and they also have to train those interns in an effective way in a manner where interns they are able to develop those teachers. There are those teachers who were born before technology; you can't train them at once and expect them to perform well when it comes to smart board. I think they must provide a continuous training when it comes to those teachers because it is difficult for them to adapt to a smart board, thank you*".
>
> **Participant B:** *"There are lots of teachers who still need workshops about integrating with technology because some didn't have that opportunity to learn about computers. Some have difficulties even in typing so integrating in it in the classroom is going to be challenging let alone to organise or to plan a lesson, for them it is challenging. For us as young stars, it is not challenging because it is something that I grew up with from Universities, from high schools, we've always had the opportunity to integrate technology and to research about some topics using technology. So my suggestion is to have a lot more people who are experienced in integrating with smart board."*
>
> **Participant C:** *"Well I think that some teachers or all the teachers should be trained maybe on a monthly basis until all the teachers know how to resolve technical challenges by themselves, the software and hardware and in the classroom, when the smart board stuck the teacher won't have a problem."*

**Participant D**: *"Well, I have few of my suggestions. Let me start with this one of training. I think the training that is given to us as educators is not sufficient. We might require a training of almost six months so that we will be able to acquaint ourselves and then when we come back; we will be able to use it and effectively especially in the teaching and learning situation. And then the second challenge that one might encounter will be the issue of electricity. I suggest that the department or the schools should have a backup especially in terms of electricity or a generator in order to back up if we have any electricity failure."*

The findings of this study indicate that business studies teachers were provided with training, however, the training was not sufficient. Participants in this study indicated that they still struggled when faced with technical challenges as they do not possess necessary skills to resolve those technical challenged on their own. The findings of this study revealed that professional support and development through workshops should be an ongoing process among the teacher for them to be able to effectively integrate ICT in their classrooms. This was also supported by Ruggiero and Mong (2015) who reported that administrative, peer, and technological support is the foundation of ICT integration in most American schools. The level of training that teachers receive will determine whether teachers use smart board in their classrooms or not. Insufficient training can hinder successful integration of ICT in the classroom for an effective learning in teaching (Alfaki & Khamis, 2014). Under the same notion, Buabeng-Andoh (2012) indicated that insufficient training of teachers makes then to avoid ICT usage in classrooms and teachers will end up adhering to their old ways of teaching without technology. The study conducted by Öz (2014) also reported that teacher professional development on smart board use will capacitate teachers on effective use of smart board during their teaching.

## 4.4 Findings from non-participant observations

The second component of the study involved non-participant observations during business study classes. A checklist (appendix A) was used to record actions of the non-participant observation. The researcher did not interfere with the class

presentations in any way but was simply observing while the participants conducted their business studies classes as usual.

The researcher used technological and pedagogical content knowledge (TPACK) as a framework to evaluate the business studies teachers' integration of a smart board in their teaching. Pamuk (2012) described that the components of the TPACK model work in collaboration and if one knowledge component is missing, then the outcome may not be as good as expected. The researcher considered the components of TPACK and their interrelation during the observations. Although all components were considered, the emphasis was on the TK, TCK, and TPK. A non-participant observational data collection instrument was used to guide the discussion of the findings in line with the TPACK model. Each TPACK component, including TK, TPK, and TCK, was addressed in the observation findings. A non-participant observational studies checklist was developed by the researcher (Appendix B) and was used to collect the data. What follows is a presentation of the data, presented according to the sections on the data collection instrument.

- **Demonstration of Technological Knowledge**

From the observations, it was evident that all the participants knew how to switch on a smart board and organise a lesson on a smart board. All five participants had their teaching materials saved in an organised folder on the smart board. All five participants demonstrated TK during the lesson observations. TK is the type of knowledge needed to operate technology (Jang & Tsai, 2013). According to Jang and Tsai (2013), TK includes knowledge that teachers need to work with devices, create and work on documents, and install and remove application programs.

The participants showed the ability to switch on the smart board and display the topic they wanted to teach to the learners. They also demonstrated their TK by navigating the topic sites and motivated learners to participate in their learning.

- **The use of applications during teaching business studies**

All the participants were able to display the content to all learners and discuss it with the learners. Three participants used PowerPoint presentations with well-prepared slides that were linked to online pictures to help explain the content. Two of the five participants used smart notebook to explain the content. Mishra and Koehler (2006) asserted that teachers should understand how using technology in the teaching and learning process can influence specific content that is being taught. According to Tsai (2013), teachers demonstrate TCK if they can use advanced technologies like multimedia, smart boards, PowerPoint, internet, and many more, to present their content. Participants demonstrated TCK as they were able to use the smart board to make the content more understandable to learners.

One of the five participants used several pictures to demonstrate unprofessional and unethical behaviour to learners, while other participants used a smart notebook to explain different concepts using different colour pens. Pamuk (2012) indicated that teachers need to have proper pedagogical planning for technology to support the transformation of the content. All participants were prepared to use the smart board to teach their business studies content.

- **The use of programs on the smart board**

ICT in the classroom, among other things involves using the Internet, software, and various media and telecommunications, and yet, no specialised programs were installed on the smart boards for the specific purpose of teaching business studies. The majority of the participants used PowerPoint presentations, pictures collected from the internet, online textbooks, or a smart notebook. Although specific business studies application programs were not installed in the smart board, participants modelled their TK potential by preparing PowerPoint presentations.

This finding is supported by Boris, Campbell, Cavanagh, Petocz, and Kelly (2013) who indicated that TK is the necessary technical skills that has to be present in order to operate technological tools and manipulate the internet to download online resources. According to the DBE (South Africa, 2004 August), ICT integration in the classroom should be integrated at grassroots level. However, curriculum developers should ensure that teachers are provided with content that can be presented using a

smart board as it is difficult to present some subjects wit
h the smart board when the content isn't suitable (Gashan & Alshumaimeri, 2015).

- **Ability to use a smart board to make the content interesting for learners**

The PowerPoint presentations used by three of the five participants were well prepared with relevant pictures on the slides. Several colours and designs were used to make the PowerPoint presentations attractive and the content clearer. Shinas et al. (2013) highlighted that teachers who have TCK can apply various technological software or applications for effective teaching of specific concepts because they understand the correlation between technology and content (co-components of TPACK framework). Similarly, Boris et al. (2013) indicated that teachers with TCK possess the specific technical skills needed to teach a specific subject.

Participants used arrows on the slides to indicate the link between content materials. Jang and Tsai (2013) claim that teachers should know different technological programs and the potential ways to integrate them into instructional delivery. Participants were able to explain the content by using various pictures, and learners were receiving prompts about what the teacher wanted to say before saying it. Participants also used smart notebook to explain content and used several colour pens to indicate the differences between concepts. Benton-Borghi (2013) indicated that teachers sometimes apply TCK unknowingly when they use different technologies to teach and assess all learners on specific content material.

The use of smart boards made lesson delivery more appealing to both participants and learners. Participants were able to link the online resources, and learners displayed interest in the use of online pictures. With smart boards in their classrooms, teachers have the opportunity to create a comfortable environment for learning, which makes learners more interested in their learning (Rajabi & Khodabakhshzadeh, 2015).

- **Ability to use a smart board in delivering a lesson**

Three participants were able to use smart boards to deliver lessons. They demonstrated the use of unique knowledge emphasised by the TPACK theory. Participants displayed TK as they were able to use a smart board as one of the ICT devices to carry out different classroom activities (Mishra & Koehler, 2008). They were able to implement different programs such as PowerPoint slides, smart notebook, and the internet to represent the content. It is vital for teachers to recognise that ICT integration in the classroom can change the way in which the subject content is constructed and the way in which that particular subject is taught (Koehler et al., 2013).

The use of technology changed the content delivery, which demonstrated participants' TCK. These participants did not only use PowerPoint but were also able to display questions for learners on the smart board. The participants were able to draw learners' attention by using the learner-centred method. Learners were requested to discuss the questions and give their response in groups, where each group selected a representative to write their answers on the smart board. Mihai (2017) indicated that both teachers and learners are motivated by the use of smart board in the classroom, especially when learners are given a chance to write their views on the smart board during instruction. Learners display more interest, and cooperation is encouraged when they are asked to collaborate when a lesson is presented using a smart board (Nichols, 2015).

Technology can help teachers be extra flexible in terms of using different lesson presentation methods (Koehler et al., 2013). The PowerPoint slides that participants used were well prepared, and the learners were actively involved in the lesson. Teachers need to gain expertise, which will qualify them to integrate technology in such a way that the classroom is transformed into a collaborative environment (Kayalar, 2016). Nichols (2015) found that a smart board encourages small groups collaboration and teamwork among learners while increasing their interest of the lesson. Yapici and Karakoyun (2016) also indicated that, when teachers use smart board during teaching, learners become motivated to learn more which increase their understanding.

However, two of the five participants showed a lack of- or limited TPACK as they

each only used one program to present their lesson. These two participants demonstrated TK as they were able to use smart board during their teaching. They also demonstrated TCK as they were able to use the smart board to explain the content to learners using a smart notebook program. But the results indicated that there is still a need for the development of other knowledge component, which is TPK. Smart boards are meant to replace the old-fashioned blackboards to improve the quality of teaching (Mihai, 2017). However, the two participants still used the smart board mostly to display the content to learners (which is similar to the use of a blackboard), unlike the other three participants who blended different teaching strategies in their teaching.

These results are parallel to the results of the study conducted by Türel and Johnson (2012), who highlighted that some teachers do not use several features of the smart board, such as hyperlink and internet resources. Likewise, Bakadam and Asiri (2012) revealed that a great number of teachers still use a smart board as a projector or a tool to display information and not effectively use the interactive features of smart boards, which could be the result of lack of- or limited knowledge of the use of smart board.

- **Plan and designing lessons in a way that suits the use of a smart board during teaching**

Four of the participants used the lesson plans provided by the Gauteng DoE, which were not smart board inclusive. South Africa is still lagging in terms of the application or integration of ICT in the classroom (Vandeyar, 2015). There are inconsistences when it comes the understanding of policies, which could be a reason for the poor integration of pedagogy and ICT. Lesson plans should include smart board use in the lesson introduction, lesson methodology, and conclusion. However, the lesson plans that participants used did not include smart boards as the preferred teaching resource. This could be the results of not involving teachers in the development of ICT usage plans and in describing the role of ICT in teaching a specific subject curricular, even though teachers are the implementers of ICT in the process of teaching and learning (Hennessy, Ruthven & Brindley, 2005).

Niess (2011) argued that the development of lesson plans, which will cater for ICT use and its influence on teaching and learning, should be re-envisioned. When teachers believe that ICT policy decisions are imposed on them by the upper structures, they may have a more negative attitude on the integration of smart board technology (Hennessy et al., 2005). The time allocated to the lesson should also be extended to suit the use of smart board. One of the challenges that was noted during semi-structured interviews was that smart boards sometimes take long to switch on, or even freeze during teaching, which consumes teaching time. Teachers are likely to end up not using smart board when they believe that the time that they are given to prepare for smart board integration is not sufficient (Jang & Tsai, 2012).

One out of five participants had created his own lesson plan, which included a smart board as a resource for teaching. The participant designed his own lesson plans in line with the time allocated for a business studies period. Teachers need training that will teach them how to modify the departmental lesson plans and create their own that will be inclusive of a smart board.

- **The use of different methods of teaching and presenting a lesson using smart board**

Three participants were able to integrate two programs during their lesson, these being PowerPoint and a smart notebook. However, there were no programs on the smart board which were designed specifically for business studies teaching and learning. Three participants demonstrated their TPK capabilities as they were able to integrate different teaching methods to improve teaching and learning.

According to Boris et al. (2013), teachers with TPK can teach using various technologies such as smart board and can teach learners issues related to cyberspace. TPK involves categories such as development and execution of lessons where teachers need to plan their lesson presentation by developing teaching materials then apply technical skills to implement their teaching plans (Figg & Jaipal, 2011). The DBE (South Africa, 2004 August), also stresses the need for an approach where different stakeholders work together towards the success of implementing ICT in schools.

In contrast, two of the five participants each only used one program to teach where one used a smart notebook, and the other used the smart board only to display information without interacting with smart board features. These participants displayed TK as well TCK, but they displayed a lack of- or limited TPK capabilities because they could not manipulate the smart board for better and unique methods of lesson delivery.

In line with the current results, Boris et al. (2013), conducted a study where participanrs' knowledge capabilities were tested and the study revealed that teachers who participated in the study had lower TPK capabilities when compared to their TCK capabilities.

Relevant stakeholder could assist in alleviating some of the major challenges that were mentioned, which include lack of- or limited teaching programs, and internet access in the classrooms.

- **Displaying unique qualities when delivering the content using a smart board**

Three out of the five participants displayed unique qualities that indicate their TPACK capabilities because they did not only use a smart board to teach, but also used it to create an atmosphere that encouraged cooperative learning among learners. These participants displayed information and pictures on the smart board and requested learners to discuss with each other, which culminated in a discussion by the whole class. The results of this study are similar to the findings by Buckner and Kim (2014) that teachers did not only use technology to transfer information to learners, but used technology in a way which allowed learners to work collaboratively in small groups.

The participants were able to assess learners while teaching where some learners were called to write the answers on the smart board. Participants showed the ability to integrate a smart board with various resources, such as online textbooks and internet pictures, which were properly linked to a PowerPoint presentation. The participants used their smart board for learning where they taught and assessed their learners using the board itself. One of the three participants was able to link his

presentation on the smart notebook with the information in the online textbook to produce an excellent lesson. Teachers' abilities to integrate content and pedagogy with technology in a way that learners' knowledge construction is improved, is the indication that teachers are viewed to be well equipped with TPACK (Jang & Tsai, 2012).

Two participants demonstrated a lack of TPACK as they appeared to be missing one TPACK component. From the observation, the participants were well conversant with the content that they were teaching. They also demonstrated the knowledge of technological usage because they were able to switch on the smart board and able to work with some features of the smart board. However, when it comes to pedagogy, the participants validated that they lack TPK as they could only use a single program, did not interact effectively with the smart board features, and did not use the smart board to encourage collaboration among learners.

One of the two participants only used the smart board to display information, which is more related to traditional teaching methods. Rajabi and Khodabakhshzadeh (2015) argued that teachers must familiarise themselves with different technologies, like smart boards, to upgrade their expertise so that they can replace the traditional instructional methods with more learner-centred methods to ensure learners motivation, engagement as well as collaboration. They further asserted that the lack of information about the use of various teaching technologies could lead to negative results in the teaching and learning process (Rajabi & Khodabakhshzadeh, 2015). One of the suggestions they made to improve the integration of the smart board in classrooms, was to provide continuous training because technology is constantly changing. Teachers should be provided with necessary training to be well conversant on the use of available technologies to advance teaching and learning (Rajabi & Khodabakhshzadeh, 2015)

## 4.5 Conclusion

Chapter 4 presented the analysis and discussion of the findings from the semi-structured interviews and non-participant observations conducted with business studies teachers. The findings and discussions were drawn from the transcripts of

the open-ended questions asked in the interview and from the checklists completed during non-participant observations. Other related studies were consulted to see if there is consistency with the results of the current study.

# CHAPTER 5: SUMMARY, LIMITATIONS AND RECOMMENDATIONS

## 5.1 Introduction

Chapter 5 is a summary of all the chapters presented thus far in the study. The summary of findings, limitations of the study, and the recommendations made by the study are also outlined. The chapter ends with a clear conclusion summarising the importance of the study

## 5.2 Summary of chapters

- **Chapter 1**

This chapter outlined both the introduction and the background of the study and included the statement of problem, the research questions, aims and objectives, and the rationale for the study. It also gave a brief introduction to the research methodology and the design used in the study. The brief introduction to the available literature that was relevant to the study, was also given.

- **Chapter 2**

Chapter 2 was a literature review, which presented the literature that was relevant to the study objectives and that helped refine the study's research questions. The chapter discussed available literature on topics including the use of ICT in developing countries, the use of ICT in developed countries, the integration of ICT in education, the integration of smart boards in education, and the kind of support given to teachers. Furthermore, it introduced the theoretical framework which was employed to guide the study.

- **Chapter 3**

Chapter 3 described the research methodology, the design used by the researcher, and the reasons why both were chosen. It described the targeted population and the technique used to sample five business studies teachers as participants. The data collection instrumentation developed for the study were explained. The instruments

were a semi-structured interview guide and a non-participant observations checklist. The chapter went on to describe the data collection procedure during the semi-structured interviews and non-participant observations. The researcher did not play any role in the classroom during non-participant observation, and the schools' timetables were followed to select appropriate dates for observations to ensure that there were no interruptions to the normal operation of the schools.

Details were given regarding ways in which the researcher applied the four pillars of trustworthiness which are credibility, transferability, dependability, and confirmability. The ethical considerations of using voluntarily participation, anonymity, confidentiality, and inform consent were also included.

- **Chapter 4**

Chapter 4 was a discussion of the findings, which were arranged according to the themes that arose during analysis. Both the findings and the discussion of the findings were done concurrently in this chapter.

### 5.3. Summary of findings

Smart boards have been installed in most secondary schools in Tshwane West district in Gauteng province. The main aim of this study was to investigate the integration of smart board technology by secondary school teachers in their teaching of the business studies subject in Tshwane West district in Gauteng province through the following research questions (RQs):

RQ1: What is the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning?
RQ2: What challenges do secondary school business studies teachers experience when integrating smart board technology in their teaching?
RQ3: How are secondary school business studies teachers supported in the integration of smart board technology in their teaching?

### 5.3.1. Semi-structured interview findings

The semi-structured interviews were conducted for the purpose of answering the research questions in this study. The findings showed that the smart boards should be integrated in teaching and learning practices because it makes teaching and learning easier. In addition, teachers can integrate various audio and visual materials during lesson delivery, which increases the level of understanding for learners.

The findings indicated that although teachers are keen to use smart board for teaching and learning business studies as a subject, irregular electricity supply is a barrier to their use of smart boards. Power supply plays an essential role in the use of smart board to deliver business studies lessons. Schools should have a generator as backup to provide an uninterrupted electricity supply in case of an emergency to minimize disrupted teaching and learning when using smart boards. Many challenges were identified in the findings such as smart board malfunctioning; computer viruses; lack of or limited internet access; and insufficient time given for the integration of smart board in the classroom. These challenges hinder successful integration of smart board; as a result, teachers develop a negative attitude because of anticipated challenges during integration.

Again the findings revealed that the schools stakeholders provided support to the business studies teachers on the integration of smart boards in the classrooms; however, the findings further showed that the support was not relevant to specifically to business studies matters but was a general support for the use of the smart boards. The semi-structured findings have shown interest from the side of the teachers to use smart board for teaching business studies subject, but some challenges experienced had a take in its fully integration.

### *5.3.2. Non-participant observation findings*

The non-participant observation aimed to answer the main research question which is:

*How do secondary school teachers integrate smart boards in teaching business studies in the Tshwane West district?*

When investigating the level of integration of smart board in teaching and learning through non-participant observations, it is evident that some participants effectively integrated smart board in their teaching as they incorporated smart board with several other teaching methods to create a cooperative classroom environment. This is evidence by technological knowledge (TK) emphasised by TPACK theory. Some participants were able to locate relevant internet information and pictures to use in their lessons and presented them to the learners. In other words, the use of smart board enabled technological content knowledge (TCK) found in TPACK theory. These participants also assessed learners during integration, where learners were either asked to write answers on the smart board or to discuss the given material in small groups and present their views to the whole class. The use of smart board encouraged participation in the delivery of business studies lessons. The findings in this context showed technological pedagogical knowledge TPK proclaimed in TPACK theory.

A smart board has many features that participants could have used to enhance their teaching standards. These features include among others the show and hide feature where the teacher displays only the question and hides the answer by dragging a colour page on the answer until the learners display their own answers. Teachers can also use voice and screen recording to record everything written on the screen and the teacher's voice during the lesson to share the recordings with the learners and to save using cloud based teaching to allow learners to view the recording anywhere at their convenient time.

The results of this study revealed that business studies teachers display interest in the use of smart board technology, however they are not sufficiently trained to effectively use the different features of the smart board.

### 5.4. Limitations of the study

The study only focused on teachers as study participants, so the learners' perceptions were not accessed. Only business studies teachers were recruited in the study; hence views of other subject teachers were not explored. The sample chosen

for this study was small, which limits the generalisability of the findings to the large population. Future research should focus on a larger population, which should include learners, so that the educational managers can be made aware of the learners' perspectives about smart boards. Teachers teaching other subjects should also be considered as participants in future studies related to smart board.

### 5.5. Recommendations

This study recommends that professional development should be made a priority to help ensure the successful integration of smart board in a business studies classroom. Teachers should be provided with training that will concentrate on teaching their specific subjects. Some of the challenges identified by participant should be addressed by policy makers. One such solution is to include additional time for the integration of smart boards when structuring the notional time for and periods for schools' operation. The South Africa, Department of Basic Education (DBE) can train someone at the school to maintain or repair the smart board and use an assistant to switch on the board before class starts.

### 5.6. Conclusion

ICT in education is proven to play a vital role in teaching and learning. The introduction of technologies such as smart board and the continuous injection of ICT resources in the classroom may improve the connection between the teacher and learner and improve information acquisition between the two parties. These technologies are believed to have the ability to focus the pedagogy into the direction of success and bring about a positive impact in the way classroom activities unfold. However, this is not an overnight victory; it is an ongoing process that calls for sustainability in terms of resources, research, evaluation, skills, and professional development. When all stakeholders involved come together with one goal of integrating ICT in education, an effective teaching and learning in classrooms may be enabled, and this will eventually change the education system in secondary schools.

The researcher saw a need to conduct this study to bridge the gap that can

negatively impact teaching and learning. The study collected data that may be useful and may serve as a guideline to both teachers and education managers on smart board technology integration in the teaching and learning of business studies. It brings to light that the perspectives of teachers on the integration of smart boards in education should not be underestimated as it is the major contributing factor to the success of ICT in education.

This research exposes challenges that are obstacles to the integration of technology in education. The results of this study are also a call for the South Africa, DBE and other relevant stakeholders, including policy makers, to work collaboratively and present strategic plans to alleviate the challenges experienced by teachers. The knowledge could be used with confidence to present a clear view of the future of smart boards in a business studies classroom. Based on the findings of the current study, it is evident that teachers need professional development to increase their confidence on the use of smart board.

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**APPENDIX A**

Non-participant observation checklist

| No | Questions | Yes | No | Comment |
|---|---|---|---|---|
| 1. | Does the business studies teacher demonstrate knowledge of the use of mart board? | | | |
| 2. | Does the business studies teacher use smart board during teaching? | | | |
| 3. | Are there programs on the smart board that the business studies teacher could use during integration? | | | |
| 4. | Does the business studies teacher use smart board to make the content interesting for learners? | | | |
| 5. | Does the business studies teacher use smart board effectively during integration? | | | |
| 6. | Is the lesson plan designed in a way that suit the use of smart board during teaching? | | | |
| 7. | Does the business studies teacher use different methods of teaching and presenting a lesson using a smart board? | | | |
| 8. | Does the teacher displays unique qualities when delivering the content using a smart board? | | | |

## APPENDIX B

Semi-structured interview Guide

1. How do you feel about the integration of smart board in education?
2. How ready are you on the integration of smart board in the classroom?
3. How long have you used a smart board in your teaching?
4. What are your views on the integration of smart board in a business studies classroom?
5. What challenges do you experience during the integration of smart board in the classroom?
6. Is the time allocated for the integration of smart board in a business studies classroom sufficient?
7. What kind of support do you receive on the integration of smart board in a business studies classroom?
8. What do you suggest could be done to improve the integration of smart board in a business studies classrooms?

**APPENDIX C: Coding material for data analysis**

| PARTICIPANTS | A | B | C | D | E | Themes |
|---|---|---|---|---|---|---|
| 1: How do you feel about the integration of smart board in education? | | | | | | |
| | I think it is a good move actually, it is a good move. | Well it's great because of now it makes our lives much more easier. | Well I feel like it's going to make teaching and learning very simple because learners will be seeing what the teacher is talking about. | Mm… this is a good idea in order to bring the world inside the classroom. | I think it is a good thing because we are living in a digital world. | 1. Smart boards are good for the purpose of teaching and learning. |
| 2. How ready are you on the integration of smart board in the classroom? | | | | | | |
| | I can say I'm more than ready, since I'm a former student of Computer Application Technology. | When it comes to technology you'll never be ready because of every time you are learning a new thing about the smart board that you can do with the children. | I should think I am at the advance level because I can utilise the smart board 100 percent. | acquainted with the usage of smart board and then also I am able to integrate it into the teaching and learning situation. | I would say forty percent, I know how to use not completely ready because I don't know how to use some of the icons. | 2. Readiness in integrating smart boards in teaching and learning. |
| 3. How long have you used a smart board in your teaching? | | | | | | |
| | I think now it's been four years. | two years. | five to six years. | Three years. | four years. | 3. Teachers' experiences of using smart board. |
| 4. What are your views on the integration of smart board in a business studies classroom? | | | | | | |
| | I think, it's, it's a big move, it's so easy for me, I'm able now to | The smart board is better than integrating with a chalkboard | Well I should think that mart board helps us to make sure that we | This smart board actually helps a lot especially when coming to topics like | I feel that we are still lacking so many things of the smart boards. | 4. Smart boards help to enhance teaching and learning of |

| | | | | | | |
|---|---|---|---|---|---|---|
| | make videos where learners can be able to see what I'm teaching. | and it does not just make the classroom environment easy. | show learners maybe examples of a different types of businesses. | the socio-economic you are able to show learners practically. | | business studies. |
| 5. What challenges do you experience during the integration of smart board in the classroom? | | | | | | |
| | The challenges that I have is the issue when there is no electricity, is challenging too much because without electricity it's not easy for me to teach. | It's going to be the smart board freezing because of the viruses and stuff that's where ee.. it becomes very challenging to teach. it needs to be changed or needs to be maintained each and every day or each and every week perhaps. | Well the first challenge will be if there is no electricity but with the usage of smart board I'm not having any problem. | Sometimes you will find that they have installed wrong content into the smart board and they sometimes are malfunctioning and that has a negative impact especially when we prepared for the lesson. Sometimes there is this outrages of electricity in our community. | Sometimes the smart board will take time to open. Sometimes we do not have electricity, if you want to use a smart board it's a problem. they are dirty, if you try to write it's like they are greasy you can't write on them. | 5. There is no electricity. |
| 6. Is the time allocated for the integration of smart board in a business studies classroom sufficient? | | | | | | |
| | Actually I can say no, the time is not sufficient because what I've learned is that the integration of smart board is not in line with our lesson plans notional | It's not sufficient, an hour is not sufficient for us to let's say for example a video is there and then it's like five minutes or six minutes, explaining the | Yes it's sufficient because you can teach and at the same time using the smart board. | You are sometimes allocated an hour, that's the maximum that you are allocated which I feel it not enough. | Yes the time is sufficient because they weigh the subjects so there is no way we can say business studies should take an hour and it must be thirty minutes at that time. | 6. Time not sufficient for smart board integration in a business studies classroom. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | time. | concepts. | | | | |
| 7. What kind of support do you receive on the integration of smart board in a business studies classroom? | | | | | | |
| | Actually I don't receive any support based on business studies, what I can say is that the only support that I get when it comes to the integration of smart board in classroom I think is a general one. | There is a lot of support in our school because of there are people coming in to help us, to workshop us. | Yes we receive training because the GDE would send some of their trainers of facilitators to come and check whether we are at the advance level or at the basic level or intermediate level. | In terms of the training one might say it is not enough simply because you'll find that we'll only be trained for three to four weeks, which is not enough. | We always have interns so if we have a problem we call them to the class then they show us whatever we need to do. They give us training also. | 7. Support for the integration of smart boards in a business studies class room. |
| 8. What do you suggest could be done to improve the integration of smart board in a business studies classrooms? | | | | | | |
| | I think they have to buy a generator for back up when it comes to in the issue of load shedding since nowadays we are affected with load shedding and they also have to train those interns. I think they must provide a continuous training | There are lots of teachers who still need workshops about integrating with technology because some didn't have that opportunity to learn about computers. My suggestion is to have a lot more people who are experienced | Well I think that some teachers or all the teachers should be trained maybe on a monthly basis until all the teachers know how to resolve technical challenges by themselves, the software and hardware and in the classroom, when the | We might require training of almost six months so that we will be able to acquaint ourselves. School should have a backup especially in terms of electricity or a generator. I would suggest that also we would have interns or technical interns who would be on standby | When learners press the "finish" button the programme that would have been installed from the smart board will automatically mark within a minute. When I'm teaching investment, like each and every topic to have a video, which is the content part, | 8. Training is not sufficient. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | when it comes to those teachers. | in integrating with smart board | smart board stuck the teacher won't have a problem. | especially in regard to assist if [not audible] the smart board is giving us any challenge.<br>And lastly, we would think that a sufficient Wi-Fi should be forwarded especially inside the classroom. | I think they should be given to us. | |

**APPENDIX D:** Ethical clearance certificate

UNISA university of south africa

**UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE**

Date: 2018/07/18

Ref: **2018/07/18/61951412/39/MC**
Name: Ms CE Khosa
Student: **61951412**

Dear Ms Khosa

**Decision:** Ethics Approval from 2018/07/18 to 2021/07/18

**Researcher(s):** Name: Ms CE Khosa
E-mail address: connyekhosa@gmail.com
Telephone: +27 76 015 5767

**Supervisor(s):** Name: Dr AR Molotsi
E-mail address: Molotar@unisa.ac.za
Telephone: +27 12 429 3265

**Title of research:**

**Integration of smart board technology in Business Studies classrooms in secondary schools in Tshwane West District**

**Qualification:** M.Ed. in Natural Science Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2018/07/18 to 2021/07/18.

*The **low risk** application was reviewed by the Ethics Review Committee on 2018/07/18 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

**APPENDIX E:** GDE approval letter

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

## GDE AMMENDED RESEARCH APPROVAL LETTER

| | |
|---|---|
| **Date:** | **24 January 2019** |
| **Validity of Research Approval:** | **05 February 2019 – 30 September 2019**<br>**2018/283A** |
| **Name of Researcher:** | **Khosa C.E** |
| **Address of Reseercher:** | **PO Box 204** |
| | **Ga-Rankuwa** |
| | **0208** |
| **Telephone Number:** | **076 015 5767/ 081 065 7081** |
| **Email address:** | **connyekhosa@gmail.com** |
| **Research Topic:** | **Integration of smart board technology in business studies classrooms in secondary schools In Tshwane West District.** |
| **Type of qualification** | **Masters** |
| **Number and type of schools:** | **Four Secondary Schools.** |
| **District/s/HO** | **Tshwane West** |

***Re: Approval In Respect of Request to Conduct Research***

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

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

24/01/2019





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

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

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

Kind regards

.....

Mr Gumani Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: 24/01/2019





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

## APPENDIX F: Request for permission to conduct research from school principal

Title of the study is: Integration of smart board technology in business studies classrooms in secondary schools in Tshwane West District.

School address

Dear

I, Conny Khosa am doing research under supervision of Molotsi Abueng Rachel, a Doctor in the Department of Science and Technology towards a Master of Education degree at the University of South Africa. We have funding from the Division of Funding, UNISA post-graduate. We are inviting you to participate in a study entitled:

INTEGRATION OF SMART BOARD TECHNOLOGY IN BUSINESS STUDIES CLASSROOMS IN SECONDARY SCHOOLS IN THSWANE WEST DISTRICT.

The aim of the study is to investigate the integration of smart boards in business studies classrooms.

Your school has been selected because it is one of the schools which uses smart boards and it offers business studies.

The study will entail collecting data relevant to the topic from selected schools through interviews and observations then analyse the data to project certain findings.

Participants will be requested to answer questions prepared by the researcher during interviews and to prepare a business studies lesson which they will deliver through the integration of smart board where the researcher will observe through a checklist.

The participants will be observed only once for a double period which is expected to last for at least an hour. After observation with the participant, the interviews will follow within 5 days. Interviews will take between 15 to 30 minutes. The researcher

will also ask permission to audio record the interviews from the participants. Only one interview will be conducted with each teacher.

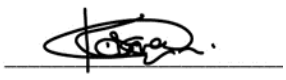
Participants will also be requested to select their suitable time for interviews. The schools' timetable will determine the periods in which observations will be conducted.

The benefits of this study are: The challenges that secondary schools' business studies teachers experience when integrating smart board technology in their teaching will be determined and there will be recommendations on how the challenges could be addressed. There will be recommendations on the level of support that secondary schools' business studies teachers receive on the integration of smart board in their teaching. There will be no potential risk as a result of this study to both participants and the school.

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and I will ensure that the data collected is not associated with the names of the participants. The data that is collected will be used for this research only.
Participating in this study is voluntary and you have a right to withdraw at any time and without giving a reason.
There will be no reimbursement or any incentives for participating in the research.

Feedback procedure will entail taking the analysed data to participants to confirm that the information is what they have provided as well as the final results of the study before writing the final report.

Yours sincerely



Khosa Conny

Researcher

**APPENDIX G:** Permission letters from principals

3

**PERMISSION GRANTED TO CONDUCT A STUDY**

THE MANAGEMENT
SECONDARY

CONTACT NUMBER:
DATE: 22/01/2019

**TO WHOM IT MAY CONCERN**

Dear College of Education Ethics Review Committee

**RE: PERMISSION GRANTED TO CONDUCT A STUDY**

On behalf of secondary, I am writing to formally indicate our awareness of the research proposed by Miss Conny Khosa, student number: 61951412, a Master of Natural Sciences Education, ICT in education, in the University of South Africa, Mucklenuek Campus.

We are aware that Miss Khosa will be conducting her study among the grade 10 and 11 Teachers teachers. The title and the objectives of her study are respectively as follows: Integration of smart board technology in business studies classrooms in secondary schools in Tshwane West District.

1. Explore the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning
2. Determine the challenges that secondary school business studies teachers experience when integrating smart board technology in their teaching.
3. Examine the support that secondary school business studies teachers receive in the integration of smart board technology in their teaching.

We are also aware that participation of teachers in this study is voluntary and participants may withdraw from the study at any time without being penalised. The study will seek to do no harm and the only potential impact could just be the inconvenience of sitting for approximately 30 to 45 minutes long for interviews. Moreover, the data will be collected by Miss Khosa (researcher). The student participation will be anonymous in the analysis and write up and at no time will their names be used. The study is going to be done in partial fulfilment for the degree: Masters of Natural Sciences Education, ICT in education in the University of South Africa, Mucklenuek Campus.

**As the principal at secondary, I therefore grant Conny Khosa permission to conduct her study at our institution.**

If you have any questions or concerns, please feel free to contact my office at 012 703 5867

SEC SCHOOL
ADMINISTRATION
Tel / Fax:
2019 -01- 22
Private Bag X
GAUTENG DEPARTMENT OF EDUCATION

Yours sincerely

Mr (Principal)

Signature:

Date: 22-01-2019

**PERMISSION GRANTED TO CONDUCT A STUDY**

THE MANAGEMENT
SECONDARY

CONTACT NUMBER:
DATE: 22-01-2019

**TO WHOM IT MAY CONCERN**

Dear College of Education Ethics Review Committee

**RE: PERMISSION GRANTED TO CONDUCT A STUDY**

On behalf of secondary, I am writing to formally indicate our awareness of the research proposed by Miss Conny Khosa, student number: 61951412, a Master of Natural Sciences Education, ICT in education, in the University of South Africa, Mucklenuek Campus.

We are aware that Miss Khosa will be conducting her study among the grade 10 and 11 teachers. The title and the objectives of her study are respectively as follows: Integration of smart board technology in business studies classrooms in secondary schools in Tshwane West District.

1. Explore the perspective of secondary school business studies teachers on the integration of smart board technology into teaching and learning
2. Determine the challenges that secondary school business studies teachers experience when integrating smart board technology in their teaching.
3. Examine the support that secondary school business studies teachers receive in the integration of smart board technology in their teaching.

We are also aware that participation of teachers in this study is voluntary and participants may withdraw from the study at any time without being penalised. The study will seek to do no harm and the only potential impact could just be the inconvenience of sitting for approximately 30 to 45 minutes long for interviews. Moreover, the data will be collected by Miss Khosa (researcher). The student participation will be anonymous in the analysis and write up and at no time will their names be used. The study is going to be done in partial fulfilment for the degree: Masters of Natural Sciences Education, ICT in education in the University of South Africa, Mucklenuek Campus.

**As the principal at secondary, I therefore grant Miss Conny Khosa permission to conduct her study at our institution.**

If you have any questions or concerns, please feel free to contact my office at 062 798 9250

Yours sincerely

Mr (Principal)

Signature:

Date: 22-01-2019

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THE MANAGEMENT
SECONDARY

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**As the principal at secondary, I therefore grant Conny Khosa permission to conduct her study at our institution.**

If you have any questions or concerns, please feel free to contact my office at 076 225 9389

Yours sincerely

Mr (Principal)

Signature:

GAUTENG DEPT. OF EDUCATION
SECONDARY SCHOOL
PRIVATE BAG X
PRINCIPAL
DATE: 2019/01/04
Date: 22-01-2019

**PERMISSION GRANTED TO CONDUCT A STUDY**

THE MANAGEMENT
SECONDARY

CONTACT NUMBER:
DATE: 22-01-2019

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**As the principal at secondary, I therefore grant Miss Conny Khosa permission to conduct her study at our institution.**

If you have any questions or concerns, please feel free to contact my office at 012 702 3600

Yours sincerely

Mr Sanyane (Principal)

Signature:

Date: 22-01-2019

DEPARTMENT OF EDUCATION
SECONDARY SCHOOL
2019 -01- 22
PRIVATE BAG X
GAUTENG PROVINCE

## APPENDIX H: Participants consent form

**CONSENT/ASSENT TO PARTICIPATE IN THIS STUDY** (Return slip)

I, _____, confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview and observation.

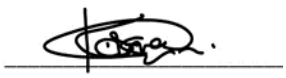
I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

_____ _____

Participant Signature Date

Researcher's Name & Surname (please print) Conny Ephasi Khosa



06 May 2019

_____

Researcher’s signature Date

## APPENDIX I: Editing proof

# EDITING DECLARATION

This document certifies that the dissertation listed below was edited for proper use of English language, grammar, punctuation, spelling, typographical errors, and overall style. The same dissertation was edited for the correct use of APA referencing style according to the requirements of the University of South Africa.
Neither the research content nor the student's intentions were altered in any way during the editing process. The student was given the ability to accept or reject all suggestions and changes through Word track changes and comments.

The student is responsible for the final, correct presentation of the content, illustrative materials, tables, arrangement of parts, sentence structure, grammar, paragraphing, punctuation, spelling, typographical errors, quotations, bibliographical items, and all information contained within. The student is also responsible for the detection and correction of all instances of plagiarism.

### Title

Integration of smart board technology in business studies classrooms in secondary schools in Tshwane West District

### Author

Conny Ephasi Khosa (61951412)

### Date Edited

20 January 2020

### Editor

**Belinda Marguerite Cuthbert:**

Baccalaureus in Business Communication, 2000 (North-West University)
Master of Arts in Business Communication, 2005 (North-West University)
Member of the Professional Editors' Guild (Membership #CUT002)

The editing declaration may be verified with the editor at either of the following contact methods:

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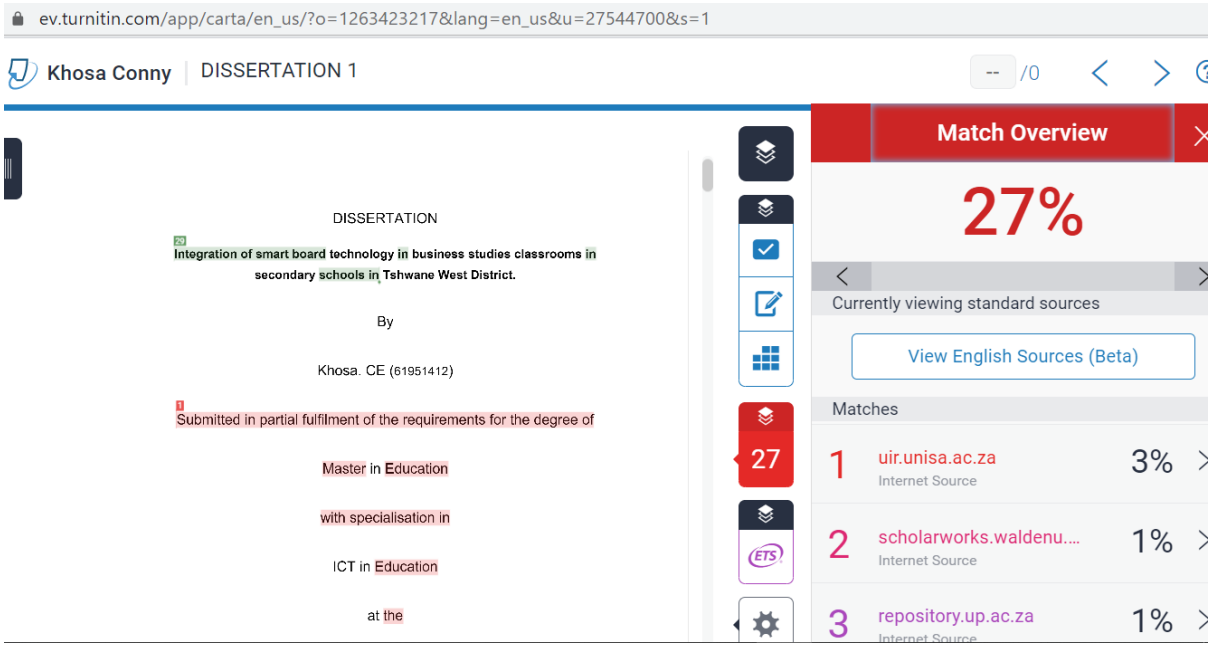
## APPENDIX J: Turnitin report