GRADE 9 TECHNOLOGY TEACHERS' USE OF DIALOGUE TO ENHANCE LEARNERS' COMMUNICATION COMPETENCE IN TSHWANE SOUTH DISTRICT

by

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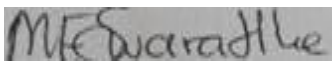
GRADE 9 TECHNOLOGY TEACHERS' USE OF DIALOGUE TO ENHANCE *LEARNERS' COMMUNICATION COMPETENCE IN TSHWANE SOUTH DISTRICT*

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I have submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



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11 OCTOBER 2024
DATE

DEDICATION

TO MY LATE MOTHER

I dedicate this dissertation to the memory of my beloved mother, Mokgadi Annah (Sebola) Swaratlhe. Though she is no longer with us physically, her unwavering love, support, and guidance continue to inspire me every day.

My mother was the embodiment of strength and resilience, always encouraging me to pursue my dreams and strive for greatness. She believed in me even when I doubted myself and provided unwavering support throughout my academic journey. Her unwavering belief in my abilities fuelled my determination and gave me the courage to face any challenge that came my way.

I can still vividly remember the countless late nights we spent together, where she tirelessly helped me with my studies and supported me through each step of the process. She was my biggest cheerleader, my rock and my source of motivation.

Her wisdom, kindness and unwavering dedication to my education shaped me into the person I am today. She taught me the importance of hard work, perseverance and the value of knowledge. Her legacy lives on through my accomplishments, and I am forever grateful for the strong foundation she provided.

This dissertation is a tribute to her selflessness, love and unwavering belief in my potential. Though she cannot be here to witness this milestone, I know she is watching over me with immense pride. I hope that this work honours her memory and becomes a testament to the lasting impact a mother's love can have on her child.

I am eternally grateful for the time we had together and the lessons she imparted. Her memory will forever be cherished, and I dedicate this dissertation to her with profound love and gratitude.

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Last but not least, I would like to take a moment to acknowledge and appreciate my own efforts throughout this journey. I thank myself for believing in my capabilities, for the dedication and hard work that has brought me this far, and for the persistence to keep going without taking shortcuts. I also recognize my commitment to resilience, to never giving up, and to striving to be generous in all my endeavors. I appreciate my ongoing efforts to make ethical decisions and to remain true to who I am. This achievement is a testament to my unwavering belief in myself.

ABSTRACT : ENGLISH

The use of dialogue in teaching and learning is important for learners as it enhances communication competence needed within educational settings and beyond. This qualitative study explored the Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process. Six teachers were purposively selected from three public high schools in the Tshwane South District. The social constructivist theory guided this study. Data were collected through semi-structured interviews and observations and were transcribed, coded and arranged into themes using a thematic data analysis method. The study revealed that learners are more likely to interact in classroom discussions when they believe that their opinions matter. Regardless of the challenges experienced in this study regarding classroom overcrowding, which led to the increase in noise level, it was found that teachers' use of dialogue and questioning in the teaching of the subject of Technology, inspired learners to reflect, which helped them to clarify their understanding and improve their communication competence. It was also revealed that learners' understanding of the concepts demonstrated increased learner enjoyment of the classroom as they interacted, hence helping them enhance their communication competence. Based on the findings on using dialogue to enhance learners' communication competence, it is recommended that teachers should prioritise dialogue and structure lessons in ways that guide learners into meaningful dialogue that develops their understanding and enhances their learning. However, teachers need to provide a nurturing atmosphere where learners feel secure and comfortable in contributing to the conversation.

KEYWORDS: Classroom, communication competence, design process, dialogic method, teaching strategy, Technology subject, support

ABSTRACT : ISIZULU

Ukusetshenziswa kwezingxoxo ekufundiseni nasekufundeni kubalulekile kubafundi njengoba kuthuthukisa ikhono lokuxhumana okudingekayo ezimeni zokufunda nasezimpilweni zangaphandle. Le ncwadi yocwaningo lwezinga eliphezulu ihlola indlela othisha beze-Tekhnoloji besebenzisa izingxoxo ukuthuthukisa ikhono lokuxhumana kubafundi ohlelweni lokufunda. Othisha abathandwayo abaningana abavela ezikoleni ezahlukene ezintathu ezisemphakathini zikaTshwane South District bahloliwe. Umgomo we-Theory ye-Social Constructivism uholisile kulesi study. Imininingwane yaqoqwa ngokusebenzisa izingxoxo ezihlelwe kahle kanye nokubuka, kwahlanganiswa, kwacutshungulwa futhi kwahlelwa ngezihloko ngokusebenzisa indlela yokuhlaziya idatha ye-Thematic Analysis. Ucwaningo luthole ukuthi abafundi bavame ukuxhumana ezingxoxweni zeklasi uma bekwazi ukuthi imicabango yabo ibalulekile. Naphezu kwezinkinga ezitholakele kulesi study mayelana nokugxila kwezihlalo okukhulu, okwaholela ekwandeni kwezinga lephimbo, kutholakale ukuthi ukusetshenziswa kwezingxoxo nothisha kanye nemibuzo ekufundiseni izifundo zeTekhnoloji kushukumisele abafundi ukuba bacabangele, okwasiza ekucaciseni ukuqonda kwabo nasekuthuthukiseni ikhono lokuxhumana. Kutholakale futhi ukuthi ukuqonda kwabafundi ngezifundo kwakukhombisa ukwaneliseka okukhulu kwabo ekilasini njengoba bephendulana, ngakho-ke bekwazi ukuthuthukisa ikhono lokuxhumana. Ngokusekelwe ezifundweni zokusebenzisa izingxoxo ukuthuthukisa ikhono lokuxhumana kwabafundi, kuhlonishwe ukuthi othisha kufanele babeke phambili izingxoxo futhi bahlele izifundo ngendlela ezoholela abafundi ekuxoxweni okuhloniphekile okuthuthukisa ukuqonda kwabo nokufunda kwabo. Kodwa-ke, othisha kudingeka bahlinzeke ngezimo ezixhasa lapho abafundi bezwa bephumule futhi bejabulile ekuthatheni izinqumo.

AMAGAMA AHMUKHOSI: Ikilasi, ikhono lokuxhumana, inqubo yokuklama, indlela yokuxoxa, isu lokufundisa, isifundo seTekhnoloji, ukwesekwa

ABSTRACT : SETSWANA

Tsholofelo ya go dirisa dipotso le dipuisano mo thutong le thutamisong e botlhokwa go baithuti, ka gonne e nonotsha bokgoni jwa puisano bo bo hlokegang mo mekgweting ya thuto le go feta. Patlisiso e e tlhwatlhwakgolo e tlhahlobile tshedimosetso ya baphatlalatsi ba thuto ya thekenolotsi ba sekgang ya go dirisa dipuisano go nonotsha bokgoni jwa puisano ba baithuti mo tshegetsing le morerong wa thuto. Baithuti ba le lesome ba ne ba kgethwa ka maikaelelo a go tswa dikolong tse tharo tsa sechaba mo Aforikeng Borwa kwa Tshwane South District. Melao ya thero ya Social Constructivism e ne ya kgona go aga patlisiso e. Tshedimosetso e ne ya kgobokanngwa ka go dirisa dipotso tse di hlophilweng le go lemoga, mme tsa tlhagisiwa, tsa kgetholwa, mme tsa ranolwa go tsa diteng ka go dirisa tshekatsheko ya datha ya thematic analysis. Patlisiso e bontshitse gore baithuti ba atamela go dirisana mo dipuisanong tsa klaseng fa ba dumela gore maikutlo a bona a botlhokwa. Le fa go ne go le leetsweng mo patlisisong e ka dikgwetlho tse baithuti ba tshelang ka tsona jaaka phatlalatso ya klaseng, e e neng e tlisa maemo a lerata, go lemogilwe gore go dirisiwa ga dipuisano le dipotso ke baphatlalatsi mo thutong ya sekgang sa thekenolotsi go ne ga kgothatsa baithuti go iketleeletsa, e e thusitseng go tlhalosa kutlwisiso ya bona le go ntsha bokgoni jwa puisano. Go ne gape ga bonala gore kutlwisiso ya baithuti mo ditshegetsing e ne e supa go oketsega ga go itumelela ga baithuti mo klaseng fa ba dirisana, mme seo se ba thusitse go nonotsha bokgoni jwa bona jwa puisano. Go tswa mo diphongweong tse di bontshitseng go dirisa dipuisano go nonotsha bokgoni jwa puisano ba baithuti, go kgothaletswa gore baphatlalatsi ba simolole ka go tlotla dipuisano le go laola dithuto ka ditsela tse di tla thusang baithuti go tsenela mo dipuisanong tse di nang le maikaelelo tse di nonotsang kutlwisiso ya bona le go nonotsha thuto. Le fa go le jalo, baphatlalatsi ba tlhoka go fa tikologo e e nonotsang fa baithuti ba ikutlwa ba le bolokehileng le ba amogelesegile go tsenya dikakanyo mo dipuisanong.

DINTLHA TSA DITHUTO: Klaseng, bokgoni jwa puisano, tshegetso, morero wa go rulaganya, tsela ya puisano, setlhogo sa thekenolotsi, tshegetso

ACRONYMS

ATP	Annual Teaching Plan
B.Ed	Bachelor of Education
B.Ed. Hons	Bachelor of Education Honours
BERA	British Educational Research Association
C2005	Curriculum 2005
CAPS	Curriculum and Assessment Policy Statement
DBE	Department of Basic Education
DBST	District-Based Support Team
DoE	Department of Education
DP	Design Process
DT	Discussion Technique
ELRC	Education Labour Relations Council
FET	Further Education Training Phase
GBL	Game-Based Learning
GDE	Gauteng Education Department
GET	General Education and Training
HoD	Head of Department
ICT	Information and Communication Technology
LER	Learner–Educator Ratio
mini-PAT	Mini-Practical Assessment Tasks
NCS	National Curriculum Statement
N. Dip. Ed.	National Diploma in Education
OECD	Organisation for Economic Cooperation and Development

PCK	Pedagogical Content Knowledge
PD	Professional Development
SCK	Subject Content Knowledge
SMT	The School Management Team
TPCK	Technological Pedagogical Content Knowledge
TPD	Teacher Professional Development
UK	United Kingdom
US	United States
ZPD	Zone of Proximal Development
LOLT	Language of learning and teaching
SBST	School-Based Support Teams
DBST	District-Based Support Team

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CHAPTER 1

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

The utilisation of dialogue in teaching and learning is crucial for learners as it increases communication competence necessary both within educational environments and in broader contexts. Ehiobuche, Tu and Justus (2012:304) indicate that in the Technology classroom, dialogue entails partnership and relationship between learners and teachers. This is particularly important as the subject of Technology aims at “producing engineers, technicians and artisans needed in modern society and the need to develop a technologically literate population for the modern world” (DBE, 2011:8). Through dialogue, the teacher and the learners participate in the teaching and learning process, paying attention to different perceptions, encouraging cooperation and increasing the level of commitment with communicative competence to enhance learning and understanding. This study aims to explore Grade 9 Technology teachers' use of dialogue to enhance learners’ communication competence in the teaching and learning of the design process. As learners communicate, they develop confidence in asking questions, reviewing challenges and considering possibilities to improve collaboration and solving problems in a creative way. The motivation behind the study is rooted in the belief that communication is a fundamental component of education. Learners can participate actively in the design process by engaging in dialogue. This engagement encourages group work and helps learners build confidence in asking questions and addressing challenges.

The teaching and learning process started making sense when the researcher understood it from the perspective of dialogue. At the beginning of the researcher’s career, getting the learners’ attention was a struggle. As a result, there was much frustration for the researcher as a new teacher. The researcher spent sleepless nights trying to devise with ways on how to win the learner's attention. The only thing that encouraged the researcher to love school when she was a learner, was the interaction with her peers, which led to an interest in the concept of dialogue teaching. Hendrickx,

Mainhard , Boor-Klip , Cillessen and Brekelmans (2016:2) state that the perception of ‘peer ecology’ is embedded in conservational provision perception, which refers to how a person participates in public environments such as with relatives or during classes. According to Hendrickx et al. (2016:2), the classroom should be a welcoming setting that helps learners feel secure and motivated to achieve their best.

According to Jensen, Skibsted, and Christensen (2015:19), teaching learners is intended to contribute to self-assurance using teachers’ practice that brings significant conversation into the teaching and learning process. Since teachers act as consultants by giving expert advice and helping learners understand difficult topics, guiding and supporting learning by sharing their insights and giving personalised feedback. Jensen et al. (2015:45) indicate that teachers can increase learners’ self-assurance which in turn enhances their ability to communicate well during classes. The study examines how Grade 9 Technology teachers in Tshwane South District use dialogue to enhance learners' understanding and learning. Dialogue helps learners grasp complex technological concepts, improves communication competence, and encourages group work. By engaging in dialogues, learners become more confident in expressing ideas and understanding the subject matter deeply. This interactive approach makes learning more effective and meaningful. The researcher figured that this study could contribute to the existing body of knowledge subjects concerning the phenomenon under study.

1.2 BACKGROUND TO THE RESEARCH

The subject of Technology was introduced into the South African syllabus in acknowledgment of the significance of developing engineers, technicians, and artisans required in today's society and the importance of improving the level of the technological know-how of the world (DBE, 2011:8). The Department of Basic Education (DBE) states that Grade 9 is the last phase of General Education and Training (GET), as learners proceed to the Further Education Training Phase (FET) which is Grades 10-12 (DBE, 2011:49). The intention of Technology as a subject is to familiarise learners with the basic requirements in Civil Technology, Mechanic Technology, Electrical Technology and Engineering Graphics and Design where learners develop awareness of how engineers apply scientific values to real-world difficulties (DBE, 2011:8).

The subject of Technology is likely to offer learners a skill that can help them make informed professional decisions by the completion of Grade 9. According to Heymans (2007:37), prior to the establishment of Curriculum 2005 (C2005) in 1998, South Africa did not have an authorised learning area known as Technology in its schools. The purpose of C2005 was seen as the main initiative to exclude the imbalances of the doctrine of discrimination. However, its introduction caught teachers off guard and many had to teach a subject with which they were not familiar. This resulted in considerable difficulties in effectively implementing the curriculum and emphasised the necessity for sufficient training and support for teachers. It highlights the struggles teachers encountered when trying to adapt to a new curriculum without adequate preparation (Smith, 2023).

In 2002, the curriculum underwent changes, but Curriculum 2005 was not just renamed as the National Curriculum Statement (NCS). Instead, the NCS marked a substantial revision and improvement of C2005, aiming to resolve many of the issues and complexities that had emerged (Harley & Wedekind, 2004; Jansen, 1998). As Taylor (2022) explains, the introduction of the NCS was part of broader educational reforms designed to enhance the clarity and effectiveness of the curriculum, rather than merely rebranding the existing framework. Mapotse and Gumbo (2012:542) explain that in 2009, the curriculum adjustment was carefully reviewed to tackle existing issues. As a result of this evaluation, the curriculum was updated, leading to the introduction of the Curriculum and Assessment Policy Statement (CAPS) in 2011.

The Curriculum and Assessment Policy Statement (CAPS) was implemented to unify and simplify the national curriculum, tackling a range of educational issues. Johnson and Patel (2022:45) explain that CAPS marks a major shift towards a more integrated and practical curriculum design, aiming to fix inconsistencies and boost overall educational results. This reform has particularly impacted the teaching of Technology, which now follows specific guidelines set out by CAPS, focusing on blending hands-on skills with theoretical knowledge. As Miller and Davis (2022:78) observe, The CAPS framework is intended to close the gap between theory and practice in Technology education, ensuring learners gain both conceptual insights and practical experience. Additionally, Smith (2022:102) highlights that the emphasis on dialogue within CAPS encourages deeper learner engagement and collaborative learning, further enhancing

the application of Technology concepts. By concentrating on these aspects, CAPS is designed to deepen learners' grasp of Technology and better equip them for future challenges. As a result, in Technology education, dialogue helps learners work together on projects and improve their skills in areas like design, evaluation, and communication. This kind of group work helps learners interact more effectively and build their values and decision-making skills (DBE, 2011:8).

Teacher development should address several important aspects, especially for Technology teachers who play a crucial role in introducing learners to this relatively new subject (Mapotse & Gumbo, 2012:542).Due to its nature as a theory-practice oriented discipline, Technology necessitates the use of qualified teachers (Mapotse & Gumbo, 2012:542). According to the Department (DBE 2011:13), the Technology CAPS work schedule inspires learners to develop ideas and communicate ideas. Furthermore, CAPS elucidates the importance of the development and assessment of skills and values related to subject knowledge, as in the field of technology, information without the abilities to put it into practice, has limited value. Equally, skills cannot be acquired without the requisite knowledge to develop answers to issues or fulfil requirements, which lies at the core of the field of Technology.

1.3 PROBLEM STATEMENT

Many Grade 9 classrooms struggle with communication in Technology subject because teachers often talk more while learners just listen without much participation. This issue shows the need for more interactive communication to help learners engage better and learn more effectively (Jones, 2024). Over the last twenty years, there has been a growing demand for teachers to provide learners with the skills they will need to navigate an increasingly interconnected and globalised society in the 21st century (Teo, 2019:1). This means that teachers should provide their learners with a well-rounded education that develops knowledge but also promotes skills like communication. Gharbavia and Iravani (2014:552) indicate that many communicative teachers consider teacher talk as an obstacle that restricts learners' learning opportunities.

Teo (2019) first examined the impact of dialogic teaching methods in high schools in the UK, but the concept has since gained international attention. Patel and Singh

(2022:123) highlight that dialogic teaching methods have become widely adopted, with research extending to countries like South Africa, Australia, China, India, Mexico, Norway, and Canada. Liu and Wang (2022:89) further emphasise that the global enthusiasm for dialogic teaching underscores its proven effectiveness and versatility in various educational settings. This broad acceptance underscores the growing acknowledgment of dialogic teaching as an important educational strategy worldwide.

As a whole, these countries assume that learners are able to increase their level of involvement in the learning process through dialogical teaching in a natural setting. Although exploratory dialogue is less common, it is thought to be most educationally beneficial, according to Vrikki et al. (2019:86). Learners have to critically engage with ideas to reach an agreement. Therefore, it is crucial for Technology teachers to be well-equipped with technology knowledge to implement dialogue as a teaching strategy. Technology teachers must understand the content to be taught (Kola, 2021) as well as how it should be taught. It is of concern of how little pedagogical expertise and experience Technology teachers have when it comes to teaching learners about the process of designing technology (Gumbo, 2020).

There is not a lot of existing research on how dialogic teaching applies to Technology, which makes this study especially significant for exploring this topic. According to Ramaboea, Ramaligela and Mtshali (2022:140), some research on Technology Education in South African schools has been conducted, but not with this focus. Kola (2019) emphasised the development of critical thinking skills, Gumbo (2014) highlighted the integration of indigenous knowledge systems into Technology Education and Mapotse (2015) developed an emancipation framework for Technology Education teachers. Research on preservice teachers in Technology Education was conducted by Ramaligela, Ogbonnay and Mji (2019). Makgato (2015) investigated the teaching and learning of Technology with a focus on sectional drawing among student teachers. Finally, Khoza and Makgato (2016) identified challenges faced by student teachers in the engineering graphics and design course.

The researcher therefore argues that further research is required on Technology as a subject, specifically in Grade 9 classes where the Design Process of **I**nvestigate, **D**esign, **M**ake, **E**valuate, **C**ommunicate – IDMEC - forms the backbone of the subject (DBE, 2011:12). It is the Communicate aspect that is considered crucial for this

research, as effective communication is fundamental to the successful implementation and understanding of the other aspects. To address the issue, the research attempted to expand the body of knowledge regarding this aspect, and as a result, aimed to explore the Grade 9 Technology teachers' use of dialogue as a teaching strategy in Tshwane South District.

1.4 RESEARCH QUESTIONS

The central question in this study was: *How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning design process?*

The following sub-questions were generated from the main research question:

1. What is Grade 9 Technology teachers' understanding of the design process to enhance communicative competence?
2. How do Grade 9 Technology teachers teach the design process to enhance communicative competence?
3. How are Grade 9 Technology teachers supported in using dialogue to enhance communicative competence?
4. What are Grade 9 Technology teachers' challenges in using dialogue to enhance communicative competence?

1.5 RESEARCH AIM AND OBJECTIVES

This study aimed to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process.

The objectives of the study were to:

1. examine Grade 9 Technology teachers' understanding of the design process to enhance communicative competence.
2. investigate how Grade 9 Technology teachers teach the design process to enhance communicative competence.
3. find out how Grade 9 Technology teachers are supported in using dialogue to enhance communicative competence.
4. identify Grade 9 Technology teachers' challenges in using dialogue to enhance communicative competence.

1.6 THEORETICAL FRAMEWORK

A theoretical framework consists of the theories put forth by experts on the topic the researcher intends to study (Kivunja, 2018:46). In other words, the theoretical framework helps shape the researcher's understanding and approach to the topic, guiding their interpretation of the subject. Kivunja (2018) further elaborates that researchers use these theories as a theoretical starting point for data analysis and result interpretation.

This study was based on the social constructivist theory focusing on Vygotsky's (1978) perspective. Vygotsky (1978:57) states that social relations display an important part in the growth of reasoning which implies that the cognitive development of a learner is dependent on interaction with peers. As learners interact, they develop a sense of belonging and 'ownership' thus giving them confidence. The interaction helps improve vocabulary and communication competence which assists them in gaining information, understanding, clarity through dialogue and participation with others, according to Vygotsky (1978), leading to knowledge construction. Based on Vygotsky's theory, this study is directed by the element that involves learners with their peers in learning and as they prosper, they enhance their academic performance.

The study focused on social interaction, zone of proximal development (ZPD) and scaffolding as components of social constructivism theory. According to Bahtiar et al. (2021:1), the mental and academic growth of a learner is significantly influenced by social interaction in the classroom In this study, it is clear that social interactions, like sharing knowledge and different perspectives, play a crucial role in enhancing learning. Miller and Johnson (2023: 114) emphasise that dialogue and collaborative projects are key to helping learners build on what they already know and create a supportive learning atmosphere. Davis and Lee (2023: 76) add that peer interactions and group work allow students to move from their current skill level to greater understanding with support and collaboration. Smith and Brown (2023: 89) also note that using the Zone of Proximal Development (ZPD) in teaching underscores how essential guidance and teamwork are for helping learners reach their full potential beyond what they can do on their own.

Based on Vygotsky's theory, providing appropriate assistance to a learner while they are operating inside the space considered the zone of proximal development, for a certain activity will provide them sufficient support to successfully complete their task (McLeod, 2019:2). With scaffolding, learners can do difficult tasks that they could not complete on their own. According to McLeod (2019:3), to assist the learner in moving through the ZPD, it is possible for the teacher or a more experienced classmate to provide scaffolding or exercises that are motivating. The theory of SCT and how it relates to this study is discussed in more detail in Chapter 2.

1.7 RESEARCH METHODOLOGY

Research methodology refers to the certain methodology or practices used to identify, select, process and break down data about a content (Nicholson, 2018:10). According to Rajasekar, Philominathan and Chinnathambi (2013:5), research methodology refers to a structured approach used to address and resolve an issue. This is the field of study that investigates the proper methods for doing research. The methodologies used by researchers in carrying out their work, interpret and predict phenomena are called research methodologies. Rajasekar et al. (2013:5) state that this is also defined as the study of knowledge acquisition methods and its purpose is to provide a roadmap for exploratory work.

1.7.1 Research Design

A research design, according to Maree (2010:70) is a plan or strategy which moves from the fundamental theoretical expectations to specify the type of approach followed, the strategy supporting the research and the research paradigm in order to collect and analyse the data.

1.7.1.1 Research paradigm

This study is embedded in an interpretivist paradigm. The interpretivist paradigm enables researchers to see the world from the perspective of the participants (Thanh & Thanh, 2015:24-27). Qualitative research has its origins in constructivism and interpretivism, which are both founded on the ontological notion that one's psychological structure and actions shape reality (Slevitch, 2011:77). It is based on

three underlying assumptions: the nature of existence (ontology), means of knowing (epistemology) and ethics and value systems (axiology) (Patton, 2002).

1.7.1.2 Research approach

This study used the qualitative research approach, which according to DeFranzo (2011:1), is largely exploratory. It is implemented to find out what is at the bottom of issues, attitudes and motivations. It provides information about the circumstance or assists in the creation of concepts. In this study, the researcher used qualitative research to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence. The qualitative research approach is unlike quantitative studies, as it investigates behaviour in the natural environment or uses human accounting as data, and does not usually manipulate variables, whereas quantitative studies manipulate some variables (Hancock, Ockleford & Windridge, 2009).

1.7.1.3 Research strategy

A research strategy, according to McMillan and Schumacher (2010:20), is "the mechanism by which the study is carried out, setting out the period and people who will participate, as well as the prevailing conditions within which data will be obtained". A case study design, underpinned by the interpretivist paradigm, guided this study. The goal of a case study is to learn more about the research issues and not to provide definitive answers to current problems (Dudovskiy, 2018:18), that is, to generate indepth, multifaceted understanding of the phenomenon under study. Case study analysis is adaptable and versatile to change and powerful in laying the preparation that will prompt future studies (Dudovskiy, 2018:18). According to Dudovskiy (2018:18), case studies possibly save time and other resources by selecting the sorts of study that are worth pursuing at an early stage. The disadvantage of a case study is that qualitative information and interpretation are subject to bias (Dudovskiy, 2018:19).

A case study's success depends on how well research questions are formulated as well as the viability of research protocols (Hancock & Algozzine, 2016). The study was explorative in nature because case studies allow researchers to investigate phenomena in context employing a range of data sources (Baxter & Jack, 2008:544).

Usually, the exploratory case study aims to respond to the ‘what’ question. Through the case study approach, the researcher was able to elicit information from the participants as they shared and clarified their personal experiences of dialogic teaching in the subject of technology.

1.7.2 Research Methods

Numerous methods and systems utilised in research are referred to as research methods (Khaldi, 2017:17). Research methods aid in gathering samples, data and finding results to a problem (Rajasekar et al., 2013:5). A research technique or approach is dictated by the nature of the study and the subject being researched, according to Denzin, Lincoln and Giardina (2006:5). In the context of this study, interviews and observations were used as research methods to collect data.

1.7.2.1 Selection of participants

In qualitative research, sampling refers to the choice of particular data sources from which data is obtained to meet the study's goals (Gentles, Charles, Ploeg & McKibbon, 2015:1775). In this study, two Grade 9 Technology teachers from each of the three public secondary schools in the Tshwane South District of Gauteng, South Africa, were purposively selected, with one female and one male participant from each school, making a total of six participants. The selection process involved identifying schools within the Atteridgeville Township that met specific criteria relevant to the research goals. Teachers were chosen based on their experience and involvement in teaching Technology at the Grade 9 level, ensuring that the sample provided rich and relevant data. This purposive sampling was applied to ensure that the selected participants could contribute valuable insights that align with the study's objectives (*see Table 3.1, Chapter 3).*

1.7.2.2 Data generation

Collecting data is essential for gaining a deeper understanding of the research topic (Taherdoost, 2021:10), and this can be done through various methods like document analysis, observation, interviews, and surveys. For this study, semi-structured interviews and observations were chosen as the most suitable methods because they provide a detailed look into the participants' experiences and behaviors within their

actual teaching environments. These approaches were especially effective for gathering the iinsights of Grade 9 Technology teachers and observing how their classroom practices connect with the study's goals.

- ***Semi-structured interviews***

The semi-structured interview falls within the category of an exploratory questionnaire (Magaldi & Berler, 2020) and is usually guided by a particular topic and focuses on the core idea that provides a comprehensive overview. In addition, Megaldi and Berler (2020) argue that the semi-structured interview enables a researcher to thoroughly explore and uncover new insights, despite the presence of other intriguing research methodologies that may have been presented beforehand. Six Grade 9 Technology teachers were interviewed in this research endeavour.

- ***Observations***

In this study, the researcher served as the observer, conducting observations of six classes, one for each of the six Grade 9 Technology teachers. According to Kumar (2022:1), observation is “a data collection method in which a person (usually trained) observes subjects of phenomena and records information about characteristics of the phenomena.” The researcher observed the participating teachers in class, focusing on how they applied the concept of the Zone of Proximal Development (ZPD) and scaffolding in the teaching and learning of Technology. These planned observations allowed the researcher to gather primary data directly from the participants, capturing subtle and potentially uncomfortable facts that might be difficult for the teachers to express themselves (Creswell, 2014:191).

1.7.2.3 Data analysis

Dawit (2020:1) describes data analysis as a key part of research that makes study results more impactful. Dawit (2022) further elaborates that it involves collecting, transforming, cleaning, and modelling data to uncover important information. Data analysis, according to Braun and Clarke (2006), is a method of discovering, assessing and interpreting sample data (themes). The thematic data analysis method suggested by Braun and Clark (2006) was used to analyse the data. The six steps namely

familiarisation with data, generating initial codes, generating themes, reviewing themes, defining themes and writing up a report were followed.

The data analysis process is fully described in Chapter 3.

1.8 MEASURES FOR TRUSTWORTHINESS

Trustworthiness or rigour is the extent of assurance in the data, perceptions, and methods utilised to ensure the quality of research related to the study (Polit & Beck, 2014). To make sure the study is trustworthy, the researcher followed the guidelines set by Lincoln and Guba (1985). The researcher ensured credibility by checking that the results truly reflected what participants said. Dependability was maintained by sticking to consistent research methods and keeping thorough records. The researcher addressed transferability by giving enough detail about the study's context so others could see if the results apply to their situations. Finally, conformability by showing that the findings came from the data, not from any personal bias.

1.9 ETHICAL CONSIDERATIONS

The profiles of the participants who agreed to participate in the study and signed the consent forms before the interviews began are included in this section. The six purposively selected participants were drawn from three secondary schools in the Tshwane South District. They consented to take part in the recorded interviews and observation of lessons during the Technology classes. According to the British Educational Research Association (BERA, 2018:9), participants' informed agreement to participate in a study should be sought at the beginning of the study. While the researcher was collecting data, the researcher kept in mind that participants could withdraw their consent whenever they wanted, for any reason. The guidelines from the University of South Africa made it clear that the researcher should not try to persuade participants with money or other rewards. It was important to respect participants' choices and ensure they were participating entirely on their own terms, without any pressure from external incentives (UNISA, 2016:13). The UNISA Ethics Committee was approached for ethical clearance before the data collection process, and the Gauteng Education Department (GDE) was approached for permission to conduct the research. The study was conducted under the ethical clearance number Ref: 2022/02/09/44174543/26/AM.

1.10 KEY CONCEPTS

The key concepts utilised in this study are explained below as follows:

1.10.1 Dialogue

In Technology Education, dialogue is deemed a collaborative conversation where learners actively share and discuss their thoughts and questions about Technology topics. Michaels and O'Connor (2012:4) define dialogue as an effective discourse for learning in the classroom or school setting. With an emphasis on distributing and assessing concepts, generating ideas, thinking, reviewing and presenting ideas, and presenting evidence to support the argument, it is intended to identify knowledge and ideas, perspective, with their promise of reconciliation (Michaels & O'Connor, 2012). In this study, learners exchange ideas, work out opinions and come to a shared knowledge of a subject through group discussions and interactions with teachers and peers.

1.10.2 Communication Competence

Communicative competence, according to Kiessling and Fabry (2021:1), entails effectively reaching communicative objectives in a manner that aligns with social norms and expectations. In the context of this study, within the learning community, effective communication helps learners express their ideas, hear what others have to say, and participate in meaningful dialogue that leads to a common understanding.

1.10.3 Subject of Technology

The subject of Technology uses expertise, awareness, ethics, and resources to discover practical solutions to cultural, economic, and environmental challenges to fulfil people's goals and wants (DBE, 2011:3). For this study, in the design process, learners have to Investigate, Design, Make, Evaluate, and Communicate to create knowledge in practical settings and generate knowledge in real-world contexts.

1.10.4 Teaching Strategy

Teaching strategies are the structure, methods, techniques, tactics, procedures and practices that a teacher uses during class to help learners learn (Shinn, 1997:23). In

this study, teachers assist learners in building their knowledge through their interactions with the subject matter and with one another.

1.10.5 Design Process

Hassan (2023:22) describes a design process as the process of simultaneously identifying the problem and providing a solution. The first stage in every problem-solving procedure in Technology is to describe the issue thoroughly and precisely. In the context of this study, the design process utilises dialogue to effectively teach technology, enhance the overall learning experience, foster learner involvement and develop a deeper understanding of technological subjects.

1.10.6 Challenges

According to Horikoshi (2023:1), challenges are described as new or difficult tasks or situations that test somebody's ability and skill. Lin and Chung (2016:99) defines a challenge as commonly viewed with negativity, often associated with terms like disagreement, defiance, confrontation and competition. In the context of this study, a range of challenges might affect the teaching and learning and its success, such as overcrowding in classrooms and language as a barrier, are identified.

1.10.7 Support

According to Drageset (2021:142), support is defined as practical assistance that can be provided by determining the individual's past strengths and the internal and external resources that are currently available, as well as by encouraging and supporting them to make use of these resources despite any constraints. In the context of this study, support from stakeholders for teachers involves the supplying of necessary resources, training, and support to guarantee the successful incorporation of dialogue into the educational process.

1.11 CHAPTER OUTLINE

In *Chapter 1*, an orientation to the study was provided. This included an introduction, personal implications, and a justification of the study. The context and rationale for the study were presented, and a statement of the problem, the purpose, the research questions, as well as the aim and objectives were outlined. A brief overview of the

research methodology that guided the study was given. The final sections related to concept clarification and an overview of the chapters making up the dissertation.

Chapter 2 reviews relevant literature, providing a comprehensive understanding of existing research and theories related to the topic. It blends key findings, identifies gaps in the literature, and lays the groundwork for the research approach taken in the study.

Chapter 3 presents a detailed report on the research methodology that guided the study. The research depends on the research approach, which is qualitative and research design which is a case study. Research methods included techniques for sampling participants, collecting and analysing information. Reliability and ethical issues are also discussed in this chapter.

Chapter 4 of this dissertation focuses on presenting, analysing, and interpreting the findings gathered from the research. It offers insights into the data collected, providing a deeper understanding of the research questions and their implications within the study's context.

Chapter 5 of this dissertation outlines the conclusions drawn from the research findings and their implications. It also discusses recommendations for future research and practical applications based on the study's outcomes.

1.12 CHAPTER SUMMARY

The study’s orientation was given within the scope of this chapter. It gave an overview of the study of why the study was conducted, exploring the Grade 9 Technology teachers’ use of dialogue to enhance learners’ communication competence in Tshwane South District. The review of literature is presented in the following chapter.

CHAPTER 2

REVIEW OF LITERATURE AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

The current chapter presented a review of the literature on the use of dialogue in teaching Technology as a subject. A review of literature is a detailed outline of research findings and reports, information from past academic research studies as well as documented reports by organisations. It is gathered to describe the past and current state of knowledge about a topic. This is achieved by organising the literature into sub-topics that narrate a clear flow of the available information (Creswell, 2008:116). The literature was reviewed from international, African and South African perspectives. The aim was to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning of the design process.

2.2 INCLUSION OF THE SUBJECT OF TECHNOLOGY IN THE SCHOOL CURRICULUM

Technology has become more and more important over the years as the world has consistently evolved from hard physical labour to smarter ways of doing things. It has made life a little easier and also made globalisation easier as communication has become less tedious between continents and countries. Technology Education in South Africa, according to Gumbo (2017:3), is driven by Western knowledge since curricular improvements in Australia and New Zealand, which are primarily Eurocentric, have had an impact on it. Since the South African Constitution of 1994 serves as the foundation for the South African curriculum, it acknowledges inclusive values like indigenous knowledge systems (DBE, 2011:10). The Technology Education curriculum aims to incorporate traditional Technology within its three objectives which are to, develop and apply specific design skills to solve technological problems; understand the concepts and knowledge used in Technology Education and use them responsibly and purposefully and appreciate the interaction between people's values and attitudes, technology, society and the environment (DBE, 2011:8).

Prior to 1995, work education was part of the Technology Education curriculum in Slovakia (Haskova, Mandulakova & Merode, 2017:75). However, this educational approach was not exclusive to Slovakia. According to Smith (2021:52), work education, focusing on practical and technical skills, has been integrated into curricula in various countries, including Germany and the Czech Republic, reflecting a broader European emphasis on vocational training. This indicates that the focus on practical skills and work education was a common trend in several educational systems beyond Slovakia. In 1996, this topic was converted to a subject called technical education, which resulted in still another transition caused by the curricular reform implemented in 2008 (Haskova et al., 2017). Since then, Technology Education has been taught within the context of a subject called Technology. It is reasonable to anticipate that Science and Technology Education will be given a higher priority in primary and secondary schools in the technology-based society in which we presently live. Additionally, it is reasonable to anticipate that learners will be interested in continuing their education in a variety of technical subjects. According to the conclusion reached by Haskova et al. (2017), Technology Education has been implemented in basic and lower secondary schools.

In South Africa, Technology is taught to Grade 6 to 9 learners at the lower level of secondary education. It is a compulsory school subject given a weekly time allocation of one lesson (Valentová & Brečka, 2019:999). Valentová and Brečka (2019) reported that the education programme aims to form practical work habits while learners are still at a young age, resulting in ease of integration into real practical life and the labour market later in life. These practice-oriented activities help learners acquire safe work habits and assist learners in developing risk assessment skills while they are working with various materials and tools. Learners also have the opportunity to acquire time and resource management skills that fall under basic administrative and commercial skills (Valentová & Brečka, 2019:999).

2.2.1 Technology Subject in China

Learners in China who study the subject of Technology, are consistently given many chances to collaboratively plan, choose methods, make choices and solve issues in order to successfully accomplish tasks as a team (The Curriculum Development Council of China, 2017:44). Learners are provided with chances to interact, negotiate

and reach agreements with others while completing activities and strengthening their cooperation abilities. It is through these practical activities that learners learn how to function better in teams while building good working relationships, a skill crucial for future job and business opportunities later in life (The Curriculum Development Council of China, 2017:45).

In China, the emphasis on Technology education, including subjects like computer science and robotics, is part of a larger effort to prepare learners for a tech-focused economy and encourage innovation (Li, 2023)

2.2.2 The Subject of Technology in Botswana

In Botswana, Technology Education is presented as Design and Technology (Du Toit & Gaotlhobogwe, 2018:172). It is identified as one of the subjects capable of fostering economic growth by cultivating entrepreneurial expertise and practical skills among the youth in these nations. Moreover, the subject of Technology holds promise in promoting sustainable development, particularly through its connections to traditional knowledge systems. Doyle, Seery, Canty and Buckley (2019:144) report that Technology Education in Ireland has changed significantly during the past few decades with the discipline still undergoing transformation. The alterations to curricula signify a practical move away from a craft-based vocational approach and toward a philosophy centred on design.

Botswana is working to improve digital literacy and access to Technology to help bridge the gap and prepare learners for future Technological changes (Mokoena, 2024). By understanding these historical efforts, it can be learned about the different strategies and challenges each country faces in adapting education for the future, providing valuable insights for others looking to enhance their technology education programs.

2.2.3 The Subject of Technology in South Africa

Globalisation and the evolution of Technology have led to a transition in South Africa's education system. One of the major changes was the inclusion of Technology as a school subject for high school learners. The South African Department of Basic Education (DBE, 2011:8) describes Technology as the use of knowledge, skills,

values, and resources to meet people's needs and wants. It results in the above through the development of practical solutions to challenges at hand, while taking into account the socio-economic and environmental aspects. According to Mabaso (2014:6), Technology relates to materials being used and skills and knowledge being applied in the creation of artefacts, systems, processes or even new knowledge; the result is meeting people's needs while considering the environment through openended problem-solving. The knowledge and production skills provided by the subject of Technology have the potential to be applied in real life to solve problems that are often encountered during the various steps involved in the design process (Du Toit & Gaotlhobogwe, 2018:38). As a result, it contributes to technological literacy through the provision of constant opportunities to solve real-life technological problems. The acquired production skills plus technological literacy help learners adapt to the current environment which is a complex and diverse culture, a result of the accelerating evolution in technological developments. Therefore, as learners are simultaneously developing problem-solving and production skills, they are also preparing to become entrepreneurs as they are exposed to new possibilities that inspire them to be innovative. This implies that the development of the above-mentioned skills in the classroom environment goes a long way in contributing to the alleviation of poverty, unemployment and inequality in South Africa, especially among the youth.

2.2.3.1 Technology in CAPS: Boosting real-world skills and critical thinking

The Curriculum and Assessment Policy Statement (CAPS) stipulates that through the use of Technology, learners ought to be given opportunities that will challenge and encourage them to solve challenges that are similar to real-life experiences (DBE, 2011; Kola, 2019). The CAPS further emphasises that the subject of Technology should help learners to be advanced, and to also cultivate original and critical intellectual skills (DBE, 2011:8). Other benefits of the subject of Technology are that learners are equipped with time and resource management skills, and they learn together while working in teams. As a result, the curriculum requires learners to work in teams where they are involved in practical projects that allow them to use a variety of technical skills which include investigating, designing, making, evaluation and communicating (DBE, 2011:10).

2.3 THE USE OF DIALOGUE IN A TECHNOLOGY CLASSROOM

According to Howe and Abedin (2013:325), the term ‘dialogue’ can be associated with all verbal communication as it originated from two words in classical Greek; *‘dia’* meaning ‘through’ and *‘logos’* meaning ‘word’. Parson (2016:15) describes dialogue as “a conversation or interaction between two or more persons that leads to authentic interpersonal communication, a sense of community, and a co-creation of reality”. In the classroom, the productivity of dialogue is evident when there is a complementary strategy that aids teachers in incorporating dialogue in their classroom. The result is a notable development in the communication, thinking and understanding of the learners (Van der Veen, van Kruistum & Michaels, 2015:18).

It is assumed that promoting dialogue as a teaching approach in a Technology classroom results in learners communicating better and developing confidence in asking questions. The goal is to create a shift from teacher talk where learners listen passively to a collaborative classroom where learners interact with each other and the teacher and build a community of practice. In the long run, such a classroom becomes a conducive environment that allows learners to be comfortable, secure and perform optimally (Hendrickx et al., 2016:2). Therefore, the use of dialogue in a Technology classroom is necessary as teachers effectively interact with learners and learners work together in learning Technological concepts which then develops confidence in communicating their design results.

2.4 EXPLORATORY TALK AS A TYPE OF DIALOGUE IN THE DESIGNING PROCESS

Exploratory talk refers to the type of talk that is effective for thinking and learning (Mercer, Hennessy & Warwick, 2019: 186). Its effectiveness is notable when learners are active and are continuously involved in the active interaction taking place in the classroom. This results in the classroom teaching-learning interaction becoming an experience that is collectively enjoyed by both the learners and the teacher and encourages a joint construction of knowledge and understanding as opposed to a teacher-centred approach where the teachers take on the primary role and present information to learners who passively receive the information (Erdogan & Campbell, 2023).

In contrast to a teacher-centred approach, an exploratory talk approach requires learners to work collaboratively in groups without the teacher (Mercer et al., 2019:189). Therefore, exploratory talk lessons encourage a culture of active participation, modelling dialogic teaching. It is in these classrooms where learners receive guidance on how to use language as a tool for individual reasoning as well as for problem solving. Mercer et al. (2019) offer specific guidelines on what exploratory talks entail:

- Critical but constructive engagement by everyone in the team.
- Everyone freely contributes to the sharing of relevant information.
- Consolidating written observations and illustrations into a comprehensive project report in anticipation of delivering their proposed resolutions.
- Team members have question-answer sessions where they elaborate on the answers given.
- At each stage of the process, team members try to reach an agreement before they progress to the next stage.
- Ensure that the reasoning is clear and understandable to all team members and the team moderator (Mercer et al., 2019:186).

Exploratory talk is a type of dialogue that links well with the Technology design process. Appia (2014:8) describes the design process used by learners as one that creates solutions to technological problems. Through the design process, the learning aims of Technology Education are achieved (DBE, 2011; Appia, 2014). Appia (2014:1) further states that the process stimulates learners to be innovative. Throughout the process learners' creative and critical thinking skills are developed, they learn how to manage time plus how to use other resources effectively, and they also learn how to work with other learners in a team that produces productive results. The design process is made up of a set of skills namely, investigate, design, make, evaluate and communicate, each of which is discussed in detail below.

2.4.1 The Investigation Skill

As stated in the CAPS Technology document (DBE 2011:12), one may acquire knowledge about certain features of the subject areas or assess the suitability of a product for its intended use. Investigation in this area entails learning about contexts

and needs, examining or evaluating current products about important design aspects, and conducting practical tests. This implies that learners should be given the opportunity to investigate attitudes and values while forming viewpoints based on complete and accurate information that will help them reach compromises and make value judgements. Any stage of the design process can involve investigation.
Investigation skills are developed practically when learners search for information.

Learners are required to demonstrate the ability to confidently explore and examine phenomena that are important to the subject of Technology by using skills such as inquiry, problem-solving, critical thinking and other comparable abilities (DoE, 2008). During this process, the learners find out about the situation and the needs thereof; they learn how to evaluate existing products by looking at their designs; practical tests are administered in order to assist them in comprehending certain parts of the subject matter or in determining whether or not a product is suitable for its intended use (DBE, 2011:8). This suggests that learners should search for information on the exact given scenario. When performing investigation skills, the learner is allowed some flexibility and independence to explore while learning on his or her own (Ohemeng, 2014:16). Mawson (2007) suggests that learners should constantly be motivated so that they discover their ability to make sound decisions. This will unfold when the learner states and visualises their ideas and those lateral thoughts will gradually build on the recognition of their existing knowledge and ability. During their investigation, the learners come across opportunities to explore values and attitudes, as they also learn how to develop informed opinions that may be important in making valuable judgements (DBE, 2011:8).

The Sasol Inzalo Foundation (2019) presents the scenario below in Figure 2.1 that can be given to learners to investigate, design, make, evaluate and communicate a product:

Figure 2.1: Scenario 1

Rivers provide water that is used for drinking purposes plus several other functions. Unfortunately, the very same river can bring harm to the communities. A river may be overflooded during the rainy season, making it difficult for villagers to cross to the other side for school or work. There are villages where there is either no bridge at all or the existing bridge is poorly built, making it impossible for the villagers to cross during the rainy season. That means that the villagers are unable to get to shops and other facilities that are across the river. The more vulnerable individuals are children walking to school and the elders having to collect their pension funds or visit the clinic. In this instance, the existing bridge is far away from some of the villages, and the villagers would rather cross the river on foot. This is a very dangerous activity during the rainy season; more so because there have been some crocodiles spotted in the river. They can either drown or risk being attacked by the crocodiles.

(Source:Adopted from SASOL Inzalo Foundation, 2019)

Given the above scenario, learners are required to team up and tackle the challenge as a contracting organisation that will submit and present how they will go about findings solutions to the challenge (DBE, 2013:46). The team members must be chosen in a way that will allow for a balance between good performing learners and those who are still struggling. They should also take note of the fact that bridges differ in form and the materials used for their construction are also different, regardless of them having a similar function.

In these task teams, the learners have to investigate and have discussions regarding the benefits of each of the bridges identified for the community; they should also take note of the negatives of choosing each bridge. Task teams engage in group work which can be defined as an “in-class activity wherein a group of two to six learners works towards completing a task together” (Guy, Williams & Shore, 2019:168).

Learners must make a list of factors that are suited to the community’s situation and those that would not be beneficial at all (DBE, 2013:50). They should investigate if the bridge that they have chosen is meant to carry cars or people. This process is termed fit-for-purpose (DBE, 2011:11). In the above scenario, the bridge should be high and strong enough to carry people but it is not designed for motor vehicles. The bridge must also be strong enough to withstand floods as it was indicated that they are

common in those villages. Learners, therefore, must consult relevant experts to verify if the chosen bridge would as stable as desired and it can span a wide river. In light of the scenario, the bridge needs to be built to handle pedestrian use and resist frequent floods, but it should not be designed for cars. Therefore, it is essential for learners to consult experts to confirm that the bridge is stable and suitable for crossing a wide river, taking into account the unique conditions of the area.

2.4.2 The Design Skill

The design process presents the opportunity to recognise human requirements and generate options for improving life. Regarding Technology Education, it gives learners the opportunity to acquire values such as empathy, mindfulness and environmental, cultural and social sensitivity as well as abilities that translate concepts into reality (Chin, 2019:14). In a broad sense, the design process can be understood as a series of sequential steps undertaken to achieve the ultimate objective of a project (WikbergNilsson, 2021).

Seven out of ten Technology Education teachers see the design process (DP) as an activity that can be utilised to solve problems, according to the findings of a 2014 study by Ohemeng-Appiah (2014) on the views of teachers on the process. The analysis reveals that these teachers do not distinguish between the process of designing and solving problems. In other words, it is assumed that the design process is the same as addressing problems. Moreover, the design process is viewed as a ‘structure, method or plan’ that may be applied to address needs, wants or issues (AppiahOhemeng, 2014).

According to the findings of research conducted by Singh-Pillay and Ohemeng-Appiah (2016), teachers have a tendency to see the design process as a cyclical step-by-step process. The way in which teachers conceptualise the design process shapes and, in some cases, restricts their implementation of design thinking, which in turn has an effect on the options for creative expression among students. In their 2016 study, Singh-Pillay and Ohemeng-Appiah made the recommendation that teachers of Technology should have a structured intervention to support their implementation of the design process in order to encourage creative thinking among learners.

Research conducted by Kola (2019) found that Mini-Practical Assessment Tasks

(mini-PAT) provide a platform for tackling real-world issues through design skills and fostering critical thinking capabilities within the South African Technology curriculum. A mini-PAT consists of concise practical assessment tasks designed to formally evaluate learners' application of skills and knowledge throughout each term (DBE, 2011). It is necessary for learners to be creative when it comes to designing and interacting with others and this goes a long way in helping them develop unique solutions (DBE, 2011). The design process is complex; this is partly due to its cyclical and interactive nature (Lawson, 2006; Mabaso, 2014). Lawson (2006) further states that the process yields results that emanate from its complex nature; it also requires constant refinement when ideas change throughout the task. Ohemeng Appiah (2014) concurs with Mawson (2003) in considering the design process as the main driver of Technology Education.

All manufactured products undergo development through design; and over the years, design technology has replaced the integrated life skills subject that was implemented in 1988 in the school curriculum (DBE, 2011:11; Khairudin & Mahendra, 2019:121). Khairudin and Mahendra (2019) further state that among the design criteria taught to learners, is design Technology in product development; this trains learner to not limit their thinking but to have a global view of how technology can help bring solutions to current and future challenges.

2.4.2.1 Technology education in Singapore

In Singapore, Chia and Tan (2016) highlight that technology education primarily revolves around hands-on projects, driven by a well-defined design process. This approach includes understanding real-world needs, generating and refining ideas, and applying solutions while integrating research. Tan et al. (2021) note that this method helps learners address complex technological issues and create innovative solutions through iterative design. Additionally, Lim and Wang (2022) point out that Singapore’s curriculum promotes experiential learning, boosting learners' problem-solving abilities and preparing them for real-life challenges. The emphasis on a structured design process and practical applications in Singapore’s Technology education offers valuable insights for other educational systems aiming to improve their teaching of Technological design and problem-solving.

2.4.2.2 Technology education in Sweden

Fahrman, Norström, Gumaelius, and Skogh (2019) delve into how essential the design process is for Technology Education in Sweden, showing that understanding this process is key to teaching it effectively. Their research highlights that the design process is a fundamental aspect of Swedish Technology Education, playing a crucial role in shaping how the subject is taught. Andersson and Johansson (2021) also stress that including design thinking and problem-solving in the curriculum is vital for building learners' technological skills. Additionally, Eriksson and Olofsson (2022) point out that Sweden's focus on iterative design and hands-on problem-solving greatly enhances learners' ability to tackle real-world tech challenges. This strong emphasis on the design process offers valuable lessons for improving Technological Education practices.

The inclusion of Singapore and Sweden in the study of Technology Education is justified by their shared emphasis on the design process and hands-on problem-solving, which aligns with the study's aim to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process. In Singapore, Chia and Tan (2016) and subsequent researchers like Tan et al. (2021) and Lim and Wang (2022) highlight a curriculum centered on real-world applications and iterative design, fostering learners' ability to tackle complex problems and innovate. Similarly, Swedish studies by Fahrman et al. (2019), Andersson and Johansson (2021), and Eriksson and Olofsson (2022) underscore the importance of the design process, design thinking, and practical problem-solving in developing Technological competencies. Both countries' approaches demonstrate a commitment to experiential learning and real-world problem-solving, offering valuable insights into how dialogue can be used effectively in Technology Education to enhance communication competence and support the design process. Their shared focus on these elements provides a strong foundation for understanding best practices in Technology Education across different contexts.

It was discovered that this process has become an integral component of Technology Education by emphasising project work. The participants in a Fahrman et al. (2019) study stated that this is rewarding for the teachers as well as appreciated by learners. There are many opportunities for collaborative learning for learners using this method

of teaching. Additionally, it gives teachers the ability to organise and guide learners' work through guidance and feedback, which is beneficial for their growth (Fahrman & Gumaelius, 2016). The Swedish School Inspectorate recommended the need for additional Technology teachers equipped with appropriate training to advance the subject (Skolinspektionen, 2014). However, the findings of this research indicate that merely increasing the number of teachers is insufficient.

When learners are grouped into different task teams, every learner contributes in that they offer relevant information and share ideas (Mercer et al., 2019:186). This means that during the design process, learners continuously learn to understand as well as master basic concepts. Learning requires that the learners be imaginative in their thinking, and observant so they can question certain procedures while developing various skills in the process (Khairudin & Mahendra, 2019:121). The study by Khairudin (2019) aligns with that of Facione (2015) who believes that the use of diagrams helps learners get a clear picture and understand the experiences, situations, beliefs and events.

2.4.3 The Making Skill

The design determines the type of materials to be used in the implementation stage when the final product is assembled. Suitable tools and materials are selected by the designer, making sure that the selection is performed with accuracy to avoid structure collapse after building the product. This is accomplished through precise and efficient measurement, marking, cutting, separating, shaping, joining and finishing of various materials (Sephoto, 2018:34). The Sasol Inzalo Foundation (2017:55) states that, in the making skill, each aspect of the plan is allocated to one learner so they can practise the skill of drawing using angle orthographic projection with a suitable scale, correct line types and dimensions. During the making step, Rambrij (2018) suggested that the planning and production of the product be extremely carefully studied. Initially, it is necessary to make preparations in advance in order to gather the necessary materials and equipment. Secondly, a flow chart should be created to offer the learner the ability to establish a time period for each individual component of the project. Rambrij's (2018) study implies that the making stage of a project demands a thoughtful and systematic approach.

Consistent with the aforementioned findings, Mbongwe's study (2016) explained that this procedure entails learners utilising a variety of materials and tools to devise a solution to the problem at hand. It encompasses a multitude of skills such as measurement, construction, blending and adaptation. During the creation process, learners should be prompted to assess their advancement and adjust their solutions in response to encountered challenges. Mbongwe (2016) suggests that during this phase, learners engage in utilising diverse materials and tools to formulate solutions to identified problems, requiring a spectrum of skills such as measuring, building, mixing and modifying. Furthermore, the study advocates for an iterative approach, emphasising the importance of encouraging learners to evaluate their development and modify their approaches in light of new challenges. At this stage of the process, the learners get an opportunity to use tools, equipment and materials that help them achieve the desired goal for the challenge or task at hand (DBE, 2011:68). In order to fulfil the requirements of the solution (design specification), the product or system is constructed, tested and adjusted throughout the process.

In the practical scenario by the Sasol Inzalo Foundation (2017:61), learners were given a task where they were required to design and draw a bridge. The working drawings they developed were used as visual guides to show them how to go about building their structure. It had to be drawn to scale so that it could clearly show detail. Each member of the team had to make their first-angle orthographic projection of the bridge that showed all the views and each drawing had to show all measurements of the structure and the scale the learners had chosen.

At this stage, team members have to reach an agreement before proceeding to the next stage (Mercer, 2019:186). The teacher and the learners work together on this task because learners cannot perform it independently due to its difficulty level (Adam, 2018). This guided process is referred to as the zone of proximal development (ZPD) which scaffolds learners through the learning process. Adam (2018:6) shows that the results are achieved because the learners applied their understanding throughout the process and gained valuable knowledge as well.

2.4.4 The Evaluation Skill

Evaluation involves a systematic way of determining factors and actions that work well and those that need some improvement. The learners are required to be

cognisant of how they act, make decisions and achieve results when working through the design process (DBE, 2011:31). Upon identifying gaps in the design process, learners then suggest effective changes or improvements where necessary. Evaluation is performed for both the design stages and the final product of the bridge, based on the stated criteria. Team members should ask each other various questions at this stage and answer them accordingly. They should also provide reasons for the given answers (Mercer et al., 2019:186) which helps as it serves as a fair test and an analysis.

Learners can then proceed to evaluate the finished bridge product. This begins by evaluating the process followed, and then making suggestions on how sensible improvements can be made to achieve a better fit-for-purpose (The Sasol Inzalo Foundation, 2017:68). According to Mbongwe's findings (2016), it is essential to conduct an evaluation or test subsequent to the completion of a project. Before a person begins construction, it is necessary to determine whether or not it satisfies the conditions that were established.

It is necessary to use fair testing procedures, incisive questions and analysis (Mbongwe 2016). The implication is that the completion of a project necessitates a thorough evaluation or testing process, thus emphasising the importance of assessing whether the project aligns with the initially set requirements that guide its construction. To achieve this, the evaluation stage involves employing probing questions, fair testing methodologies and analytical tools. This implies that a critical examination is essential to validate the success and effectiveness of a project, ensuring that it meets the intended criteria and promoting a comprehensive understanding of the project's outcomes.

Kola (2019) discovered that evaluation is the capacity to determine whether data accurately reflect a person's viewpoint, background, situation and convictions. These emphasise the development of critical thinking skills, specifically in the areas of evaluation and inference (Kola, 2019). The findings of the research highlight the significance of equipping learners with the capacity to judge whether information is reliable or not, reflecting personal perspectives, experiences, circumstances and convictions. Additionally, the study highlights the significance of honing skills related to inference, including the capacity to recognise and ascertain elements necessary

for forming reasonable conclusions, and considering relevant information. Hence, the study recommended that educational programmes and training initiatives focus on cultivating these critical thinking abilities to enhance learners' capacity to evaluate information and draw meaningful inferences effectively.

2.4.5 The Communication Skill

According to Baydillah (2021:3), communication competence involves listening and speaking as well as reading and writing. In addition to the above, learners should always document and display their progress through written and visual means (DBE, 2011:12). As they move through the phase, learners' presentations ought to demonstrate an increasing amount of formality, customs and media use.

Subramanian and Jeyaraj (2018:2) suggest that teams can work separately or with each other. They can use apps such as WhatsApp to share files for interacting in realtime and managing their communication as this will help collaborate with ease. Learners in groups also explain why other bridges were not chosen. They should also keep a record of the inauguration of the process, to the completion which means that a record of the project should be kept in a project portfolio (Subramanian & Jeyaraj, 2018:3).

Every learner in a team presents their tender bid to the mock tender board, performed in front of the entire classroom (Mercer et al., 2019). Kola (2015:14) asserts that interaction in the classroom allows learners to grow in their cognitive abilities because they actively engage with their peers and compare their thoughts. Furthermore, the learners reflect on their ideas while comparing them to those of other learners and how they reason and justify their actions or ideas.

This perspective is echoed by Johnson and Wang (2022), who assert that learners need to present their solutions with a detailed rationale to foster a deeper understanding of the process. Taylor, Anderson, and Martinez (2023) also support this view, noting that incorporating explanations and justifications into communication helps students articulate their thought processes and enhances their critical thinking skills. Similarly, Lee and Zhao (2021) highlight that providing both solutions and detailed rationale reinforces learners' grasp of the subject matter. Nguyen and Patel (2022) further argue that justifying and explaining one's reasoning is crucial for

solidifying comprehension and demonstrating mastery of complex concepts. Lastly, Garcia and Smith (2023) affirm that offering explanations and justifications during communication helps learners articulate their reasoning and improves their overall understanding of the material. These scholars collectively underscore the importance of detailed explanation and justification in the learning process, aligning with Kola's findings on effective educational communication.

The procedure requires the capacity for analysis, research, planning, design, drawing, evaluation and communication (DBE, 2011). Kola's study (2019) recommended that curriculum developers emphasise the integration of comprehensive communication competence within the learning process. Learners should be encouraged not only to present solutions but also to articulate and rationalise the entire problem-solving process, from its conceptualisation to realisation. This approach aligns with the multifaceted cognitive tasks that need to be completed in the procedure, as identified in the CAPS Technology document (DBE, 2011), which include analysis, investigation, planning, designing, drawing, evaluating and effective communication. By fostering these communication competencies, teachers can contribute to the holistic development of learners, equipping them with the skills necessary for effective problem-solving and knowledge dissemination in various academic and real-world contexts. The ZPD highlights the gap between what a learner is capable of doing on their own and what they can achieve when assisted by others. These interactions with both the teacher and the learners' peers, promote their cognitive development. As teachers and learners engage in dialogue about a particular concept, the communication competence of the learner improves, which has been shown to improve learners' academic performance (Kubheka, 2016:29).

2.5 WAYS TO TEACH DESIGN PROCESS IN SECONDARY SCHOOLS

A great education system is one where changes are constantly implemented to refine the available teaching strategies. Teachers in such a system should be flexible and responsive to change, which entails being open to new and better ways of engaging with their learners. This requires patience and enthusiasm so that learners remain excited about learning and participate freely (Senthamarai, 2018:37).

A study by Chilliba (2019), explored the knowledge of the design process and critical thinking that Grade 9 Technology teachers possess, as well as the ways in which they encourage critical thinking when teaching the design process. The findings revealed that Technology teachers in KwaSanti in South Africa understand the design process to be interactive with the process being more essential than the end product. As it is crucial to bring life into the classroom to encourage the participation of learners, the following sections discuss effective ways to engage learners.

2.5.1 Enhancing Teacher Knowledge through Workshops

Skills development and refresher workshop sessions are important for teachers. Murphy, Smith, Varley and Razi (2015:4) advocate for professional development (PD) and describe it as a systematic procedure that results in enhancement in teacher expertise, classroom methodology and learners' educational achievements. Teacher Professional Development (TPD) programmes encompass a series of initiatives crafted to enhance an individual's abilities, knowledge, expertise and other attributes as an educator (Zeng, 2023). The primary objective of teacher professional development is to foster changes within the classroom setting. Gröschner, Seidel, Kiemer and Pehmer (2015:729) added that the transformation of educational systems largely depends on the skills acquired by the teachers through professional development. Attendance at workshops with explicit professional development will enhance a teacher’s experience and sharpen the skills required in dialogue teaching (Salas, 2016:1).

Krasniqi (2022) conducted research to analyse the trends with regard to teacher professional development (TPD) in Kosovo, as well as the influence that the activities had on the professional practice of teachers. As a result of the research, it has been determined that the most common forms of TPD in Kosovo are training sessions and workshops. It seems that teachers are primarily interested in programmes that provide the credits needed to renew their licences, while participation in other formats is almost non-existent.

Govender and Ajani's (2021) research sought to evaluate teachers' in-service professional development initiatives, focusing on how teachers perceive the monitoring and evaluation of these programmes in South Africa. The findings indicated that South African teachers were not sufficiently monitored and evaluated

regarding their participation in various professional development activities aimed at enhancing teaching methods. Moreover, teachers did not regularly attend professional development activities each year. The study also revealed that the content of these professional development activities did not meet the expectations of the teachers as each teacher has different experiences in their teaching careers as well as different skills. The workshops could add more value because they offer some ideas for teachers and coordinators, going beyond professional development, but also include personal development which improves self-confidence in executing their work (Desimone, 2009 as cited by Rodriguez, Condom-Bosch, Ruis, & Oliver, 2020:1; Salas, 2016;).

The majority of teachers who attend workshops are said to end up with a change in attitude as well as beliefs and this has a positive impact on the classroom environment as it has been reported, to enhance learners' performance (Guskey, 2002). In Vietnam, Mai (2020) found that professional development raises teachers' awareness of their strengths, weaknesses and needs as well as informing training programme developers and administrators in designing appropriate professional training programmes. Gröschner et al.'s (2015:730) findings also indicated that teachers who attend PD programmes are well equipped with skills required for the implementation of classroom dialogue that yields desired results, and that is characterised by how the learners improve in their discussions and arguments during dialogue exercises. These types of skilled teachers are well able to identify opportunities that are conducive to positive change which leads to successful teaching as it improves the teachers' competencies, abilities and commitment (Fahrman et al., 2019:164).

2.5.2 The Use of Multimedia in the Technology Classroom

Multimedia is a form of technology that is used as a teaching tool (Gunawardhana & Palaniappan, 2016:1). Some teachers are comfortable with using technology; however, many teachers consistently use traditional ways of teaching (Patel, 2013:117).

Naz (2023) examined the role of technology in enhancing classroom interaction and participation among students in public and private schools in Bangladesh. The research investigated whether the use of multimedia in the learning process helps

Technology learners concentrate and learn more effectively. The findings suggest that learners exhibit positive attitudes towards multimedia-integrated teaching in Technology classrooms, particularly in terms of participation, interaction and comprehension of the content. Kapi, Osman, Ramli and Taib (2018:143) explain that a multimedia application is “a creative presentation of a combination of media such as sound, graphic, text, and animation”. This is in support of Kapri (2017:2180) who stated that multimedia information processing and presentation in a more systematic way, uses more than one media such as text, graphics, animation, audio and video. As a result, the use of multimedia helps improve the knowledge-sharing process while encouraging learners to improve their creative thinking skills.

In the United States (US), Zhou (2023) conducted a study to examine the impact of multimedia learning on academic performance from different perspectives through the method of controlled experiments. The findings state that multimedia learning strengthens learners’ dual perception of new knowledge through high-tech means. Learners’ grades significantly improved compared with using traditional learning methods. Learners’ enthusiasm for learning gradually increased due to the use of multimedia learning like video, games, recording and other methods because multimedia successfully combines entertainment and education. Aligned with the research, Kaliisa and Picard (2017) examined the utilisation, effects and obstacles of mobile technology-supported learning in higher education within the African setting. The results indicated that the integration of mobile learning in African higher education institutions promoted collaboration between learners and teachers, facilitated remote communication, enhanced learner engagement and participation, facilitated authentic learning and reflective practice, and encouraged the development of learning communities. This adds to the global motivation and inspiration of learners and young people at large to appreciate technology and use it to find innovative ways of improving local economies in their respective countries (Austria, Dasig & Valderama, 2015:69).

2.5.3 Using Games as a Teaching Strategy in Technology Classrooms

Game-based learning deals with games that are set to produce various learning outcomes; they are designed to ensure that there is a balance between subject matter and gameplay (Battistella & von Wangenheim, 2016). Games provide an entertaining

yet fruitful way for learners to grasp various concepts. According to Battistella and von Wangenheim (2015:8), games are designed with the main aim of teaching people about a certain subject, expanding concepts, reinforcing development or assisting them in learning a skill or seeking a change of attitude as they play.

Marasco et al. (2023) conducted research in Canada, France and Brazil about Game Design as Reflective Pedagogy in Technology Education. It was found that the game design activities within the context of Technology Education provide a platform for learners to develop a range of skills and competencies, including creativity, innovation, problem-solving, collaboration, critical thinking, adaptability, communication, project management, interdisciplinary learning, cultural awareness, empathy and design thinking. By engaging in these activities, learners not only enhance their understanding of technological concepts but also prepare themselves for success in their future careers and endeavours.

Research conducted by Dreyer (2017) intended to determine whether or not Game-Based Learning (GBL) results in better learning gains when compared to conventional teaching techniques in South African schools. In terms of learning gains, the results showed that there was no significant difference between the groups that used conventional teaching techniques and those that used GBL. However, the research findings indicate a notable disparity in knowledge levels between the groups instructed through GBL and those taught using traditional methods. This suggests that both teaching approaches are viable options for usage in educational settings.

In using video games, learners' attention is easily captured in the classroom. Learners can learn academic content while having fun when playing educationally relevant games. Video games automatically demand active engagement from learners which increases learners' interactions with content and with each other (Granic, Lobel & Engels, 2014). Incorporating video games into the classroom can significantly enhance the teaching of the design process in Grade 9 Technology classes. Video games engage learners effectively by capturing their attention and making learning enjoyable. This method not only motivates learners but also promotes active engagement with both the content and their peers. As Granic, Lobel, and Engels (2014) note, educational games encourage interaction and engagement, which can be leveraged to teach complex concepts such as the design process while

simultaneously fostering communication competence. Therefore, integrating video games as a teaching strategy aligns with the goal of enhancing communicative competence in the learning process.

2.5.4 Group Work in Technology Classrooms to Encourage Social Interaction

Learning and working in teams form part of social interaction in the classroom and at school in general. In the literature, learning is described as a social process that is achieved through interaction (Malamah-Thomas, 1991; Tarone, 2007; Vygotsky, 1978). Contreras León and Chapetón Castro (2016:126) emphasised that interaction creates opportunities for learners to develop dialogic skills while they acquire the ability to establish and maintain personal relationships.

In Indonesia, Wahyuningsih (2018) conducted research to observe and describe the process and outcomes of an intervention targeted at enhancing classroom engagement and fostering learners' self-esteem. The study revealed that the incorporation of group work may enhance classroom engagement, as well as the interaction between learners, between learners and teachers, between learners and educational resources, and between learners and the environment. The introduction of group work effectively enhanced learners' self-esteem by fostering feelings of competence, respect, love, opportunity for achievement, and confidence.

One of the techniques which is a breakthrough to traditional lockstep to Technology teaching is teamwork (Kasim, 2015:97). Lee (2014:2) indicates that teamwork is one of the effective strategies teachers may use in their classrooms to enhance learning; it gives learners several opportunities to collaborate and rely on each other’s contribution towards achieving results in the assigned tasks. The study further explained that working in a team allows for both excellent and struggling learners to learn from each other. This happens while they compare different perspectives, ideas and thoughts during their interaction. Learners develop a sense of ownership of their learning when they actively participate in teams regardless of the environment being prepared by the teacher. A team entails the act of learning together in a small group of two or more team members (Kasim, 2015:97).

The primary objective of the National Curriculum Statement Grades R-12 is to cultivate learners who can be productive in an environment where they are working

in teams, as well as when they are working individually (DBE, 2011:5). The benefit is that teamwork allows for the development of a range of crucial skills, such as the ability to think critically, communicate analytically, work well in a team and accept and appreciate that the opinions and approaches of others are also important. These benefits promote active learning and may enhance the learner's academic performance (Sofroniou & Poutos, 2016:1). When learners work together in teams, it helps them adjust and become comfortable with different learning styles (DBE, 2011:11).

Sofroniou and Poutos (2016:3) shared that teamwork does not only play a crucial role in cooperative learning methods, it is also important in collaborative learning methods. The role of the teacher in the running of teamwork helps to ensure that the process yields productive results. Teamwork supports and encourages dialogical or liberating education as it increases active learner participation while helping to develop a critical social consciousness of each learner (Freire, 2002). The result is that education also becomes the means to transform social reality for the learners.

2.6 STAKEHOLDERS SUPPORT IN TEACHING THE SUBJECT OF TECHNOLOGY

Stakeholders play an important role in managing schools (Paraiso, 2022:65). They are the partners of school leaders in making the schools an environment conducive to teaching and learning. Saxena (2014) defines a stakeholder as any individual or group with an interest in the well-being and achievement of a school and its students, such as administrators, teachers, staff, parents, community members, school board members, city council members and state representatives.

Stakeholders in the context of the study on Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence are important parties associated with the teaching process. Support from subject advisors is important since it indicates the aid that Technology-expert teachers provide. School support highlights the institution's responsibility to create an atmosphere that is favourable to productive discussion while parental support highlights the value of working together with parents to encourage the development of communication competence outside the classroom.

All these parties work together to make the dialogue-focused approach to teaching Technology in Grade 9 learners successful.

2.6.1 District Subject Advisor Support

Engaging in professional development offers a chance for professionals to connect with colleagues and remain informed about the latest research findings, practices and trends in their field. Support from district subject advisors can create opportunities for teachers to dedicate time to improving the implementation of dialogue-based teaching approaches in the technology classroom, particularly when teachers feel a sense of ownership over their professional development (Abu-Tineh, 2015:721). The education policy on district support stipulates that one of the major roles of the subject advisors is to work collaboratively with schools to ensure that learners have access to a progressively higher quality of education (DBE, 2013). The support that is expected to be provided by the subject advisors to monitor the standards of the provision, delivery and performance of education annually is mandated by the Department of Basic Education (DBE) (Cibane, 2020:27). Subject advisors have been proven to instil confidence in teachers' ability to succeed in their schools. However, Moorosi and Bantwini (2016) found that the school districts are inflexible towards and unsupportive of schools.

Nkambule and Amsterdam (2018:2) assert that assistance for Technology teachers in South Africa primarily occurs through training workshops coordinated by subject advisors. However, Nkambule et al. (2018) reveal that teachers do not receive thorough, appropriate and/or sufficient support regarding the use of dialogic methods in schools.

The DBE, in its report, agrees with this observation, since it also recognises that school inspection by district authorities does not prioritise areas requiring assistance (DBE, 2014:22). Nkambule and Amsterdam (2018:1) conducted research investigating the level of support provided in schools within a specific South African school district. The study revealed a growing demand for support among Technology teachers in South Africa is attributed to numerous curriculum alterations following the end of apartheid, along with a teaching workforce inadequately equipped to handle the challenges of curriculum reform. The research demonstrated that the support provided to teachers was insufficient, resulting in teachers feeling unsupported and lacking the necessary

preparation to address the challenges brought about by the new education system. The study's conclusion highlighted a scarcity of evidence, meaning there is insufficient data to determine whether Technology teachers across South African school districts receive adequate support. This lack of evidence makes it unclear whether the support provided to these teachers is sufficient or effective. According to Johnson and Patel (2022:102), the absence of comprehensive data on teacher support creates uncertainty about the adequacy and effectiveness of the resources available, underscoring the need for more targeted research.

Similarly, research conducted by Mouton and Malumbete (2023) examined the difficulties encountered by subject advisors in the Vhembe-West area and shed light on their everyday concerns. The results indicate that subject advisors perceive a lack of support from their superiors and have limited resources at their disposal. According to Juuti, Rättyä, Lehtonen and Kopra (2017), Technology teachers in particular, display a lack of awareness of the necessary subject matter, pedagogical expertise and abilities, particularly when it comes to teaching design processes (investigation, design, make, evaluate and communicate).

2.6.2 School Management Team

The perceived school support has a significant relationship with teacher performance (Farooqi, Ahmed & Ashiq, 2019:142). Researchers recommended that schools should provide support to teachers so that their performance is positively enhanced. In the context of this study, school support refers to the institutional backing provided to facilitate and promote effective dialogue-based teaching methodologies. This encompasses resources, administrative encouragement and a conducive learning environment that collectively empowers Technology teachers to implement and sustain strategies aimed at enhancing learners' communication skills.

School support is crucial for the successful integration of dialogue-focused approaches within the Grade 9 Technology classroom. The School Management Team (SMT) is seen as an important body within the school community in assisting teachers, according to Motlalepula, Mokhampanyane and Schlebusch (2022:242). They are expected to offer educational assistance to the teachers to increase performance in the classroom. Mpanza and Govender (2021:272) conducted a study to look into the experiences of School-Based Support Teams (SBST) and the kind of

assistance they offer to teachers. The results showed that there are still gaps in Technology Education even though it has been implemented in schools. According to the study, SBSTs should be tightly supervised and should receive comprehensive support from the District-Based Support Team (DBST). Teachers should also be supported through on-going capacity building to provide them with the necessary skills.

Hilton, Hilton, Dole and Goos (2015:118) alluded that through the professional development process, leaders gain new knowledge and understanding by participating in workshops alongside teachers as motivation. Gunther and Chatoney (2016) indicate that principals must empower their teachers to take on technology courses to enhance their knowledge, especially those who were in the system prior to Technology being introduced as a subject in South Africa which will result in proper classroom interaction with learners. Teachers require a system, a method and a support structure that can be adaptable enough to enable them to deliver successful lessons (Gunther & Chatoney, 2016). Furthermore, teachers also require a framework that promotes and improves the use of dialogue skills in addition to a supportive learning setting that encourage teachers' decision-making (Mapotse, 2018).

2.6.2.1 Principals

Principal should ensure teachers utilise strategies for their professional growth while also equipping them with resources to support their development (Bozkuş & Bayrak, 2019). As per Karacabey (2020:1), the Turkish education system introduced a vision for 2023, prioritising the role of school principals in initiating and arranging professional learning initiatives tailored to the requirements of both students and teachers. Karacabey (2020) undertook a study to assess the extent of support offered by school principals in the professional development of teachers. The study revealed that school principals provided occasional support for teachers' professional development, with only 25.5% of principals offering sufficient support in this regard. Principals predominantly relied on pertinent resources to aid teachers' professional growth and keep them informed about educational innovations. Furthermore, school principals did not sufficiently engage in activities that could support teacher professional development, such as establishing individual and group development programmes, implementing a monitoring system for professional development,

arranging educational events beyond seminar sessions, seeking adequate assistance from experts in the field and assigning enough individual reading and research assignments (Karacabey, 2020). The results also suggest that principals of high schools offer greater support for teachers' professional development compared to principals of primary schools. Karacabey (2020:61) implies that enhancing teachers' professional development in the teaching of Technology through the dialogic approach, contributes to societal advancement by fostering social interaction.

2.6.3 Parental Support

Đurišić and Bunijevac (2017:140) assert that parental involvement in learners' education commences within the home environment, where parents create a setting for learners to discuss their homework, asking questions about their responses. As learners engage in dialogue, it fosters communication skills, thereby improving their communication competence and encouraging conducive learning experiences, support and a positive attitude towards Technology as a subject. Cheng and Chen (2018:1) concur, stating that parents are the first educators and teachers of their children. Huang and Mason (2017) indicate that children benefit from engaging in informal activities with their parents which engage the child and where parents scaffold their understanding and learning.

According to Ntekane (2018:2), parental involvement enhances teacher performance and improves academic performance. Better parent-teacher communication helps parents realise the effort and difficulties teachers endure, which in turn helps teachers feel valued. Additionally, it helps teachers learn more about the learners, which enables them to deliver greater individualised and effective teaching. In this study, parental support refers to the collaboration between parents and teachers to reinforce communication competence development outside the classroom. It entails parents actively participating in and endorsing the dialogue-focused approach, encouraging at-home activities that complement classroom learning and recognising the importance of effective communication competence as a shared educational goal. Parental support serves as a vital element in creating a holistic learning environment that extends beyond school boundaries. The link between parents and their involvement in education is essential for creating a well-rounded learning experience. When parents actively engage in their child’s education, such as by backing a

dialogue-focused approach and promoting related activities at home, they help reinforce what is learned in the classroom. Recognising the importance of strong communication skills as a shared goal helps build a supportive learning environment that goes beyond school, blending parental support with the child's overall growth and development.

A research study by Simweleba and Serpell (2020:1) looked at whether getting parents to help their children with their homework would help the learners do better in the subject of Technology. The study shows that interventions that empower parents with knowledge and skills for greater involvement in their children's homework can be effective in improving learner performance. Sam et al. (2021) examined the support parents give to their children and the relationship between that support and learners' achievement in Technology classrooms. It was found that parents supported and involved themselves in their children's education. The findings revealed that there was a strong relationship between parental support and learner motivation in Technology. The study recommends that as parents are already supporting and involving themselves in their children's education, it dawns on them to also provide guidance and counselling. The study further concludes that parents should provide all forms of support to their schools including financial and emotional support of which they are all equally important.

In the realm of Technology Education, this kind of support helps schools secure the latest technology and tools, creating a more engaging and effective learning environment. Financial contributions enable schools to update their resources, while emotional support helps boost the morale and motivation of both learners and teachers. By providing this dual support, parents play a key role in enhancing the quality of Technology Education and ensuring learners benefit from a well-resourced and encouraging learning experience.

Ekinci-Vural and Doğan-Altun (2020:64) state that collaborative initiatives involving teachers and families should be carefully designed to enhance the sense of belonging and mutual understanding between the school, the family, and the teacher. Teachers reported assigning homework and projects aligned with the learning objectives outlined in the curriculum and also recommend various activities that can contribute to children's holistic social development. These activities are suggested by teachers

to encourage parental involvement in their children's learning. It has been observed that at times effective outcomes when assigning work to be completed at home is not achieved, and parents do not provide feedback about the activities recommended by the teachers.

In their 2018 research, Munje and Mncube found that there was a discrepancy between the policies and actual implementation of school-parent connections in selected public primary schools in South Africa. The research also identified a need in underprivileged areas for schools to proactively and effectively adopt intervention measures that are tailored to the specific circumstances, taking into account the difficulties faced by parents. Sibanda (2021) sought to offer insights into the collaborative role of parents and teachers in children's education, emphasising the unique contribution of parents within this partnership. The findings of the study reveal minimal parental involvement in school-related activities. The teachers said that parents regard the school as a location where they could conveniently leave their children without much consideration or regard. They said that parents abandoned their children at school and did not engage in any school-related endeavours, such as attending school meetings or assisting with their children's homework. A parent who held the position of SGB chairwoman when questioned about the reasons for the school's underperformance, said that parents were not assisting their children with their academic tasks.

Sibanda (2021) reported that teachers in his survey found that parents failed to adequately prepare their children for school. For example, a teacher characterised learners entering school as "*tabula rasa*," meaning they had no pre-existing knowledge or experiences. The teacher's response implies a lack of awareness of the information that learners have acquired via their own experiences. This teachers' understanding aligns with Freire's concept of knowledge banking where the teacher did consider drawing out prior knowledge or creating inquisitive beings but rather would 'deposit' information into students. As the duration of the school day was insufficient to provide learners with complete support, teachers anticipated that parents would reinforce and support their children's learning by extending the school's activities and assisting with homework, even if some children came from disrupted households or complicated family situations where there were no parents or the parents were unable to provide assistance due to various circumstances.

2.7 THE CHALLENGES OF USING DIALOGUE IN TEACHING THE SUBJECT OF TECHNOLOGY

The era of learners absorbing information from the teacher to regurgitate it in tests and exams has long passed. The classroom environment has become a place where active participation is encouraged as it helps learners grasp concepts faster and potentially perform better academically. In Iraq, Omar (2023), found that learners are challenged in speaking in class because of the fear of making mistakes, shyness, limited vocabulary knowledge and large class sizes. Based on Omar's (2023) findings in Iraq, it is recommended that teachers implement strategies to create a supportive and inclusive classroom atmosphere that fosters and supports learners to overcome the dread that they have of making mistakes and their shyness. Additionally, targeted interventions, such as vocabulary-building activities, can help address the challenge of limited vocabulary knowledge among learners.

Dialogic pedagogy or dialogic teaching is a teaching approach that is only possible through the active and extended participation of both the learners and teachers. This approach allows for interaction in the classroom and makes it possible for knowledge and understanding to be jointly constructed as opposed to teachers transmitting curriculum content while learners remain at the receiving end (Mercer et al., 2019:189).

In research by Gillies and Boyle (2010), dialogic learning was reported to be challenging to teachers due to several factors such as overcrowded classrooms, time constraints, teachers' attitudes and beliefs, lack or limited resources and lack of relevant expertise. Teachers found it difficult to perform activities that are important in dialogue teaching and in addition, they found it challenging to monitor learners' behaviour when they are engaged in a task. Van de Pol, Brindley and Higham (2017:498) found that dialogue teaching is effective in enhancing learning; however, practical implementation was difficult due to challenges and limitations encountered in the classroom.

2.7.1 Teachers' Attitudes and Beliefs About Dialogue as a Teaching Method

People grow and adhere to certain norms and beliefs that are often bred from environments they are exposed to. The school environment also results in certain

beliefs that are passed from one generation of teachers to another throughout the years. A belief can be identified by listening to what people say and observing what they do (Pajares, 1992). Beliefs help teachers believe, the same way they do in guiding people's associations with others and the world in general and these beliefs are applied in the classroom and the school environment (Kagan, 1992). Tao and Chen (2022) explored schoolteachers' views and beliefs on dialogic teaching and the challenges they encountered in the implementation. The results showed that some teachers with professional vision on dialogic teaching, tended to be reluctant to adopt it even though they were attitudinally in favour of this pedagogical approach, for fear of losing face or being challenged by their learners.

Teachers' beliefs and attitudes towards dialogue learning are very important because they have an impact on whether the goals of the curriculum, particularly for Technology, are attainable. Dialogic teaching is a concept that is more theoretical than practical in reality. Most teachers fail when trying to put it into practice (Reznitskaya & Gregory, 2013). Research by Salleh and Yusoff (2016:328) revealed that teachers have limited knowledge of the dialogic approach. As a result, they tend to implement it as they understand it as an individual. As indicated in the above study, there were situations where the teachers were under the impression that they were using dialogic approaches, only to find that they were still using teacher-centred pedagogy. In the same study, it was affirmed that teachers' attitude toward dialogue learning has a significant impact in shaping the attitude of learners towards this approach.

Teachers struggle with putting dialogic learning activities in the classroom into practice because they are not clear about the underlying mechanisms of dialogic learning (Reznitskaya & Gregory, 2013). This necessitates more training for teachers to improve their skills in this regard and implement dialogic learning activities more effectively in the classroom.

2.7.2 Lack of Expertise in Teaching the Subject of Technology

La Fleur and Dlamini (2022:4) state that good professional development leads to increased teacher knowledge and practice, in addition to fostering profound and valuable learning experiences for learners. Khoza (2016:105) reported that teachers perform their daily teaching duties without properly identifying and understanding their subject and relevant goals. Two research studies performed almost two decades

apart, reported that secondary school heads, teachers and officials involved in curriculum development had difficulties differentiating between Technology as a subject and Educational Technology (Dugger & Naik, 2001; Raksha, 2019). Educational Technology is commonly associated with the use of smartphones, tablets, and other devices or machines and when technology is a tool to enhance the teaching-learning process across all subject areas (Dugger & Nail, 2001; Muffoletto, 1994).

Many years ago, Shulman reported on teachers and their practice. He indicated that teachers need both Subject Content Knowledge (SCK) and Pedagogical Content Knowledge (PCK) to be effective in their practice (Shulman, 1986). SCK refers to the amount and organisation of the subject content and requires understanding the structures of the subject matter. PCK refers to teachability and the ability of the teacher to teach one's subject area through a variety of techniques and strategies, some of which come from research whereas others originate in the wisdom of practice. “Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that learners of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons” (Shulman, 1986:9).

Gumbo (2020) undertook a study that investigated the professional development of Grade 9 Technology teachers via workshops focusing on pedagogical content knowledge (PCK) and assessed their training requirements. The findings revealed that while the teachers felt that the workshops developed them, such training did not fully meet their needs or expand their PCK repertoires. It was thus recommended that as Technology is a relatively new subject, intensive training for extended period will assist teachers in acquiring the necessary technological content knowledge and become experts in terms of knowledge and teaching as per Shulman (1986, 1987).

There is a need for properly planned development of teachers’ professional skills globally. Khumalo (2004) cautions that readiness for teaching Technology is demanding as it requires mental as well as professional readiness and preparedness. This is because it is a paradigm shift, and the teachers may find it challenging to adjust accordingly. Mapotse (2014:214) alludes that Technology is a new concept to many

teachers and when it is combined with dialogic teaching, it might be difficult for most to keep up and transform their ways of running the classroom.

The knowledge of a teacher does not only affect the teaching-learning process; it also affects the attitude of the learners toward Technology (Rohaan, Taconis, & Jochems, 2009). Rohaan et al. (2009) emphasise that it is important that Technology teachers have sufficient knowledge as such knowledge is crucial for the development of the technical skills of the learners. Technology as a subject requires skilled teachers because it is mostly concerned with practical aspects of learning (Mapotse, 2014). Regardless of the above fact, it is estimated that about 99% of the teachers teaching Technology are not qualified to teach the subject (DoE, 2004). According to findings of the action research conducted in Limpopo by Mapotse (2014), teachers were generally not comfortable with the use and teaching of Technology. Participants of the study shared that they were coerced into teaching this subject regardless of not having any qualifications or practical skills training. This shows that there is still a long way to go with regard to training teachers or employing teachers who are qualified to teach learners in the Technology classroom. According to a study by Darling-Harmond (2017), workshops and training sessions have facilitated the ease of lesson preparation for Technology teachers.

2.7.3 Lack of Resources to Encourage Dialogue During the Technology Period

Teaching through dialogue demands a diverse set of resources compared to traditional teaching methods. Resources needed for dialogue teaching are interactive technologies like smart boards and tablets, ongoing teacher training, and collaborative learning spaces that promote group work. Assessment tools are also vital for monitoring progress and offering feedback. Despite these resources, effective dialogue can be hindered by overcrowded classrooms and time constraints (Smith & Jones, 2023; Lee et al., 2022; Brown & Green, 2021). The concept of 'resource' encompasses not only teaching techniques and materials but also the time allocated for teaching, flexibility in the classroom, and the expertise and capabilities of the teachers (Owoko, 2010). In addition, a bigger classroom space, coupled with flexibility, gives enough room for teachers to freely practice dialogic teaching.

In Greece, Kolyvas and Nikiforos (2023), found that Technology teachers had limited resources, while learners had to adapt to a new teaching situation, based in many

cases on teacher to learner interaction, as a result, opportunities for direct interaction with classmates were limited (Espino-Díaz et al., 2020). In South African classrooms, several elements are responsible for the lack of dialogue in lessons such as limited availability of qualified Technology teachers, inadequate infrastructure, and lack of limited resources (West & Meier, 2018:3). The idea of 'resource' in teaching goes beyond just materials and methods; it also includes the time available for teaching, the flexibility of the classroom, and the skills and knowledge of the teachers (Owoko, 2010). A larger and more adaptable classroom can create a more conducive environment for engaging in dialogic teaching. However, challenges arise when resources are limited. For example, Kolyvas and Nikiforos (2023) found that in Greece, Technology teachers faced resource constraints that affected their ability to facilitate meaningful peer interactions, leading to limited learner engagement (Espino-Díaz et al., 2020). Similarly, West and Meier (2018) highlighted that in South African classrooms, a shortage of qualified teachers, inadequate infrastructure, and limited resources contribute to a lack of effective dialogue in lessons. School infrastructure and lack of resources are major factors negatively affecting progress made in dialogue teaching (Emmanuel, 2013; OECD, 2011; Skelton, 2014).

Lack of teaching resources eventually leads to didactical neglect because the teacher is unable to focus on the educational needs of every learner. The result can potentially be chaos and stress in the classroom, an environment that is not conducive to dialogue teaching. As the stress and lack of attention continue, some learners may avoid the teacher’s class or even become aggressive toward the teacher or fellow learners (Thompson & Haskins, 2014:3).

2.7.4 Assessment Tools to Assess Dialogue Performance

Dialogic pedagogy has been advocated as a means to engage and motivate learners to engage in studying the subject of Technology (Correia & Harrison, 2020). Therefore, the development of teacher formative assessment practices in dialogue is key for the successful implementation of learner-centred dialogic pedagogy in the classroom as assessment is an integral part of the teaching and learning process. However, teachers may not be skilled or well-trained to properly assess dialogue performance in the classroom. The knowledge of which aspects of engagement need to be assessed is crucial for the teacher to effectively assess learners (Mandernach,

2015:3). Such challenges may lead to learners becoming disappointed about the transparency and fairness of the assessment (Le et al., 2018:105). Le et al. (2018:115) reported that teachers are struggling to move from paying too much attention to rating individual academic work, as opposed to dialogue activities which often discourages learners from participating.

Correia and Harrison (2020) study explored secondary Technology teachers' beliefs about dialogue-based learning and the impact this has on their formative assessment practices in the classroom. The findings show that teachers' beliefs about dialogue teaching method were consistent with how they teach and assess dialogue. Teachers who act as facilitators tend to guide their learners while the teacher who takes on a more leading role, directs the inquiry. This has an effect on the way the learners take responsibility for engaging in the activities and whether they are able to work independently.

In their study, Le et al. (2018) discovered that teachers frequently encounter difficulties when organising dialogue-based activities. These challenges include overseeing learners' engagement in the task, teaching learners how to collaborate, regulating the amount of group discussion time, supplying appropriate materials, assigning specific roles to individuals and fostering a shared belief in the practice of teamwork. Le et al. (2018:115), indicated that teachers found it difficult to assess collaborated tasks as they were not skilled enough to adequately observe how learners collaborated. One teacher indicated that they focused on the final results when assessing tasks performed in a team rather than checking on how each member participated and how much they contributed to the development of the final product.

Ruys, Keer and Aelterman (2012) conducted a study to explore how pre-service teachers plan dialogue-centred activities. The research revealed that teachers often neglected aspects of organising collaborative tasks, such as setting group guidelines and guiding activities. This shows that there is still a gap in the assessment process of dialogue tasks in Technology classrooms. In the CAPS framework, which covers both formative and summative assessments, the focus on evaluating dialogue in Technology classrooms seems to fall short, especially with formative assessments. Formative assessments are meant to provide continuous feedback and help guide learner learning, including their skills in dialogue and collaboration. However,

research shows that many teachers skip important steps like setting clear group guidelines and overseeing group activities. This gap means that formative assessments under CAPS might not fully capture or support the assessment of dialogue and teamwork (Johnson & Wang, 2022; Taylor et al., 2023).

Recent studies echo these concerns. Davis et al. (2022) suggest that formative assessments often miss out on the nuances of assessing dialogue, which limits opportunities for improving collaborative learning (Davis et al., 2022). Additionally, Nguyen and Patel (2023) emphasise that effective formative assessments need to include specific criteria for dialogue and group work, which are often lacking in current frameworks (Nguyen & Patel, 2023). This highlights a pressing need for CAPS to enhance its methods for assessing dialogue, ensuring that group work is better supported and assessed.

2.7.5 Dialogic Teaching Approach in Overcrowded Technology Classrooms

In South Africa, especially in rural and under-developed areas, classrooms are overcrowded due to various factors. There is a shortage of proficient teachers and the school facilities cannot accommodate the increasing number of learners in those areas (Mapotse, 2015; West & Meier, 2020:1) and although the average national Learner Educator Ratio (LER) is 33:1, there are classrooms where it is 50:1 and higher (West & Meier, 2020).

A study by Ainuddin, Tareen and Kakar (2023) explored the teacher and learner relationship in overcrowded classrooms at a secondary level in the Quetta district of Pakistan. The findings revealed that most classrooms were overcrowded due to a shortage of teaching staff and scarcity of building infrastructure. In response to the overcrowded classrooms identified in research, it is recommended to address the shortage of teaching staff by recruiting and training additional teachers. Simultaneously, investing in building infrastructure to accommodate the growing learner population can help alleviate overcrowding challenges. Furthermore, implementing innovative teaching methodologies and classroom management strategies, as suggested by Mapotse (2015) and West and Meier (2020), can enhance the quality of teacher-learner interactions in the face of crowded learning environments

Inadequate infrastructure plus a sharp increase in learner enrolment over the past several years means that it is nearly impossible to reduce the high LER shortly (Green, Adendorff & Mathebula, 2014:6). Tshangana, Nomtshongwana and Buka (2023) undertook a study to investigate the encounters of teachers managing overcrowded classrooms in schools situated in the OR Tambo Coastal District of South Africa. The results suggested that teachers encountered stress due to overcrowding in their classes. When learners are in overcrowded classrooms, they tend to gradually drift towards didactical neglect of the dialogic teaching approach (Marais, 2016:2). West and Meier (2020:6) define didactical neglect as the teacher's failure to adequately address the educational needs of each individual learner. Maharaj, Nkosi and Mkhise (2016:385) recommend an LER of 1:30, suggesting that it would ensure that teachers give special attention to each learner.

Ayu (2017) conducted research with the objective of identifying interactive activities conducive to effective learning. These activities are intended to inspire and involve learners in learning tasks, fostering their interest in education, particularly within crowded classroom settings. It was found that teachers were required to adopt a new point of view on overcrowded classrooms and acknowledge that, despite the fact that they have many drawbacks, they also have the potential to provide a great deal of opportunities for the teaching and learning process. Teachers need to improve their inventive awareness and capacities in order to devise activities that are both successful and participatory in order to cope with classes that were overcrowded. A classroom that is excessively crowded does not support the implementation of effective teaching and assessment methods (Marais, 2016:2). Much time is wasted on getting learners to pay attention which means that teachers do not have enough time to concentrate on managing classroom activities (Ayu, 2017:1). Therefore, the teachers fail to put into practice various teaching techniques including discussion, active learning and higher-order questioning. Teachers are also unable to pay attention to all learners, and that reduces the productivity of the classroom sessions (Imtiaz, 2014:251). According to Aya (2017:1), this affects learners' enthusiasm for learning and results in reluctance in actively participating in classroom activities; in such cases, teachers revert to the traditional way of teaching (Opoku-Asare et al., 2014:128).

A study by Schaffalitzky (2021), investigating the achievements and constraints faced by 29 teachers attempting to coordinate dialogue in Technology classrooms, came to the conclusion that teachers faced several difficulties, particularly in assuming the position of a facilitator and assisting learners in their participation and reasoning due to overcrowding in the classrooms. Based on Schaffalitzky's (2021) study findings, it was recommended that professional development programmes for teachers in Technology classrooms should prioritise training on effective facilitation techniques, with a focus on supporting learners' reasoning and interaction. Schaffalitzky (2021) found that overcrowding in Technology classrooms significantly hampers teachers' ability to facilitate dialogue effectively, making it challenging for them to support learners' participation and reasoning. The study underscores the need for targeted professional development programmes that focus on enhancing teachers' facilitation skills to overcome these constraints. This is echoed by recent scholars, who argue that effective facilitation of dialogue is critical for promoting deep learning, but is often undermined by classroom overcrowding and inadequate teacher preparation (Johnson & Wang, 2022).

Teachers try to create and sustain a dialogic learning environment; however, overcrowded classrooms often lead to difficulties in managing and maintaining learner discussions with learners becoming passive when tasks need to be completed (Sosibo & Nomlomo, 2014:89) Research by Mankgele (2023), which examined the perspectives of teachers and learners on overcrowded classrooms and the impact that this phenomenon has on the teaching and learning process in secondary schools located in the Sekhukhune East District, found that overcrowded classrooms have a detrimental impact on the efficiency of teaching and learning. The correlation between classrooms that are too packed and the quality of instruction and learning that takes place is very weak. Crowded classrooms deprive learners of active participation and limit their thinking process; it also limits the ‘hands-on’ nature of Technology Education (Mapotse, 2012:29). A study by Botha (2022) indicated that handling learners’ behavioural concerns presented challenges for teachers in overcrowded classrooms. Based on Botha's (2022) findings regarding teacher challenges in overcrowded classrooms, recommendations may include implementing proactive disciplinary strategies, such as positive behaviour reinforcement, to manage learner disciplinary issues effectively.

2.7.6 Time Constraints in Using Dialogue in a Technology Classroom

Technology Education requires teachers to have patience and put in more time to help learners improve. However, a total of two and a half hours per week which is about 8%-time allocations each week (DBE, 2011), has been reported as being insufficient time for learners to complete their projects and insufficient time for teachers to assess the projects (Mapotse, 2012:29).

Schools in South Africa typically hold their learning sessions from eight in the morning to two thirty in the afternoon, with the exception of those that operate evening programmes. Within the context of learner contact time, the delivery of classes is not the only activity that takes place; feedback to learners is also included in this period (Matola, Fomunyam & Moyo, 2022). Matola et al. (2022) suggested that the time allotted for teaching may not be sufficient for learners to pose questions and for teachers to determine the requirements and particular needs of learners. One-on-one meetings with learners are very important because they provide feedback to learners about their learning and teachers have the opportunity to reflect on the success of their teaching. Matola et al. (2022) concluded by alluding that due to time limits, dialogue in a Technology classroom must be strategically incorporated. To keep conversations on track, it is important to set clear learning objectives and use controlled arrangements like pair or small group work to guarantee active involvement within allotted time frames.

In the classroom, teachers usually spend valuable teaching time on administrative tasks such as checking attendance lists and managing learner behaviour, which leaves limited time for integrated reading and writing tasks (Imtiaz, 2014:251; Mustafa et al., 2014:178). Consequently, teachers resort to working after school hours on administrative tasks. The teachers may also find it difficult to assess learners' performance and achievements as Technology activities need the implementation of collaborative learning (Le et al., 2018). The statement points out that teachers often have to work extra hours to manage administrative tasks, which affects their ability to properly assess learner performance. This issue is worsened by the need for group work in Technology classes, which requires a well-thought-out assessment strategy. Le et al. (2018) suggest that the difficulty in assessing performance stems from the collaborative nature of Technology activities. To tackle this issue, it is clear that

answering the research questions about how Grade 9 Technology teachers use dialogue to enhance communication competence involves recognising that limited time and resources for assessment impact the effective use of dialogue in teaching. This highlights the need for better support systems and targeted training for teachers to effectively incorporate and assess dialogue in collaborative learning settings.

2.8 THEORETICAL FRAMEWORK

As indicated in Chapter 1, a theoretical framework consists of the theories put forth by experts on the topic the researcher intends to study (Kivunja, 2018:46). The theoretical framework gives the researcher a clear view of what is happening globally and locally with regard to theories and views available in the literature. This aids the researcher in establishing a clear path for making well-informed conclusions about their study (Maputse & Gumbo, 2013:20). The theoretical framework guides the researcher in researching interest (Imenda, 2014:189). The present study was informed by the Social Constructivist Theory formulated by Vygotsky (1978).

2.8.1 Social Constructivist Theory in the Teaching and Learning of the Subject of Technology

Vygotsky (1978) states that Social Constructivist Theory helps to support learnercentred activities, where learners collaborate with teachers and peers to complete difficult tasks. Vygotsky (1978) argues that children first acquire information through communication and collaboration with people. This means that social relations play an important role in the growth of reasoning which implies that the cognitive development of a learner is dependent on interaction with peers (Vygotsky, 1978:57).

Social interaction plays a crucial role in helping children develop cognition and this depends on the child's interaction with peers. As learners interact, they develop a sense of belonging and ownership, thus giving them self-confidence. That is, the interaction helps to improve technological vocabulary and communication skills as learners practise in the class. When learners are faced with a new task, they often need help from another person. They internalise the task while being guided and only then are they able to perform the task on their own (Adams, 2018:3). The social constructive theory emphasises that the learner is important to the learning and

teaching environment as they bring meaning and solutions to the challenges at hand (Adams, 2018:3). Throughout the process, all participants are encouraged to engage through dialogue in a critical manner that is also constructive, when it comes to each other's ideas (Mercer et al., 2019:186). Verbal interaction helps improve vocabulary and communication competence which assists them in gaining information, understanding, clarity through dialogue and participation with others, according to Vygotsky (1978), leading to knowledge construction. The theory acknowledges that the interaction between teachers and learners is dynamic, and it builds an environment conducive to teamwork. Therefore, the social constructivism theory affirms that learning is a combination of constructing, creating, inventing and developing one's knowledge and meaning (Adams, 2018).

Based on Vygotsky's theory, this research argues that involved learners are prosperous learners, they perform better academically while they often help their peers who have difficulties in learning. Social development is important for the learner's cognitive development and improving communication competence. Vygotsky (1978) maintains the view that young learners are curious and contribute to their learning and discovery of new knowledge.

A powerful learning environment is one where active participation is promoted in the process of learning and acquiring skills, interaction, collaboration and communication. That is, teachers need to move from a teacher-centred to a learner-centred approach using teaching methods such as dialogic teaching in the classroom. Taking the above into account, this study focused on social interaction, the zone of proximal development (ZPD) and scaffolding as components of social constructivist theory.

2.8.1.1 Social interaction

As a core component of the educational process, social interaction is a crucial part of learners' development. Social interaction can be referred to as the reciprocal response to different types of social initiations (Shultz, Wozencroft & Cihak, 2017:242). Masi and Singh (2018:1) found that interaction greatly influences the learner's overall experience at school. The school environment provides many opportunities for a child to learn the necessary skills to communicate positively. These possibilities are accessible in the classroom as well as in the surrounding

environment. This means that learners should be allowed to interact through formal learning as a way of strengthening their technological cognitive development and enhancement of technological communication competence.

Learners are cognisant of the activities of their peers and take note by reiterating similar actions, whether positive or negative. The school is a social space where different forms of interaction should be encouraged and may be verbal, written or gestural (Masi & Singh, 2018:25). Social interaction leads learners toward a culture where they are comfortable contributing to the teaching and learning process (Rice & Redcay, 2015:3). They do this because they have the freedom to express their viewpoints and share their experiences, engaging in a more proactive manner and guiding activities. Hence, a teacher needs to be a facilitator of the activities during learner interaction because self-monitoring and self-regulation amongst learners lead to good academic results.

2.8.1.2 The zone of proximal development (ZPD)

As learners practice social interaction and learn various skills, they reaching a level where they need help to get to the next level. A phenomenon that takes place when the learners have reached their comprehension level and need for support to get to the next level is known as the ZPD (Powell & Kalina, 2009:242). Dialogue and interaction with peers support learners in moving from what they know and can do without assistance and what they can do with guidance and collaboration; this is known as the ZPD in the learning process. In this instance, the more advanced individual helps the newcomer to achieve individual growth. This means that with scaffolding, learners can do difficult tasks that they could not complete on their own. The theory of Social Constructivism (SCT), particularly Vygotsky's concept of the Zone of Proximal Development (ZPD), is central to understanding how learners advance through social interaction and collaborative efforts. The ZPD refers to the range of tasks that learners can perform with guidance but not independently. According to Powell and Kalina (2009:242), when learners reach a level of comprehension where they need additional support to progress further, they are operating within their ZPD. Dialogue and interaction with peers or more knowledgeable individuals are crucial in this process, as they provide the necessary

scaffolding to help learners bridge the gap between what they can do alone and what they can achieve with assistance.

Recent scholars have expanded on this idea, emphasising that "interaction within the ZPD allows learners to develop higher-order thinking skills by engaging in guided problem-solving" (Rogoff, 2014). Additionally, "scaffolding provided by more capable peers or instructors is essential for learners to tackle more complex tasks that exceed their current abilities" (Wood, Bruner & Ross, 1976). This support is crucial because effective dialogue and collaboration within the ZPD can significantly enhance learners' cognitive development and problem-solving capabilities (Palinscar & Brown, 1984). These insights underscore the importance of social interaction and structured support in facilitating learners' progression from their current level of understanding to more advanced skills and knowledge. Powell and Kalina (2006:242) supported the above report, stating that the key concepts of ZPD are assistance and experience. These concepts should, however, be at a level that the learner can handle so that he or she can be receptive to learning.

2.9 SITUATING THE GAP IN THE LITERATURE

Technology education has made significant developments, with various studies highlighting the integration of technological skills into the curriculum to better prepare learners for future challenges. Research has explored different teaching strategies, the role of teachers in technology-driven learning, and the impact of Technology on learner engagement and success. For example, Smith and Jones (2023) discovered that incorporating technology into classrooms greatly improves learners' problem-solving and creative skills. Garcia et al. (2023) also emphasised the need for teachers to use innovative approaches to effectively weave technology into their lessons.

Despite these advancements, current research has notable gaps that need addressing. A key limitation is the lack of focus on how dialogue-based learning can be applied to the design process in Technology education. Most studies have centered on the general advantages of Technology use, overlooking how interactive dialogue can enhance teaching and learning in the design process. Brown and Li (2023) point out that there is a pressing need to investigate how dialogic methods can deepen understanding and foster creativity in Technology education. Additionally,

many existing studies fail to examine how peer interactions and dialogue contribute to learners' grasp of Technological concepts.

This study seeks to fill these gaps by examining the role of dialogue in teaching the design process within Grade 9 Technology classes. By focusing on how dialogic learning can be integrated into design process teaching, the research aims to provide a clearer picture of effective teaching strategies. It will also offer practical advice for teachers on creating an engaging and collaborative learning environment that boosts learners' design abilities and technological comprehension. This emphasis on dialogue responds to recent calls for more research into interactive and reflective teaching methods, as noted by Johnson and Wang (2023).

2.10 CHAPTER SUMMARY

The international and national literature on Technology as a subject served as the foundation for this chapter's study of the literature, which was then followed by the policies that guide teaching of the subject of Technology in South Africa. The chapter also covered Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence. A discussion about how teachers incorporate dialogic teaching methods when facilitating the design process ensued. It also covered how teachers dealt with their difficulties when employing dialogue-based teaching methods. The review found that dialogue teaching still presents difficulties for teachers as teachers in Technology classrooms were hindered by challenges related to overcrowded classrooms, lack of experience in teaching Technology, time constraints while employing dialogue, assessment tools to assess dialogue performance and lack of expertise in teaching Technology. The chapter ended with a discussion of the theoretical framework that guided this study offering a description of social interaction, the zone of proximal development and scaffolding. The methodology utilised in this study is outlined in Chapter 3, detailing the approach taken for the research design, data collection and data analysis phases.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research methodology which guided the study in an attempt to answer the following research question: *How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning of the design process?* The chapter includes a description of the research paradigm, the research approach, and the research design as well as a justification for their choice. The research methods relate to sampling, data collection methods and data analysis. The final sections discuss the trustworthiness of the study and how this is effected and the ethical procedures that were followed.

3.2 RATIONALE FOR EMPIRICAL RESEARCH

Around the world, Technology Education is a large field of study. Of interest is the use of dialogic teaching and the growth in its research taking into account how it might help learners improve their communication competence. According to Dan (2017:2), empirical research generally entails systematic data gathering and analysis (observation and evidence). This suggests that empirical research is crucial since most individuals trust only what they can see, hear or experience. Dan (2017) also indicates that empirical research is used to evaluate a variety of assumptions and enhance human understanding.

In contrast, Loseke (2017:12) asserts that an empirical investigation aligns with the interpretivist/constructivist approach, emphasising that understanding reality requires personal experience and interpretation. Empirical research was conducted to assist in drawing conclusions based on reliable proof.

3.3 RESEARCH DESIGN

The aim of the research design, according to McMillan and Schumacher (2014), is to define a plan for generating evidence that will be applied to answer the research questions. It is a strategy that directs the researcher's observations, collection, analysis and interpretation (Yin, 2009:26). Furthermore, the study design immerses

the researcher in the empirical world, allowing the research questions to be linked to facts (Punch & Oancea, 2014:142). A research design can be post hoc, co-relational, or exploratory. Figure 2.1 depicts the research design process.

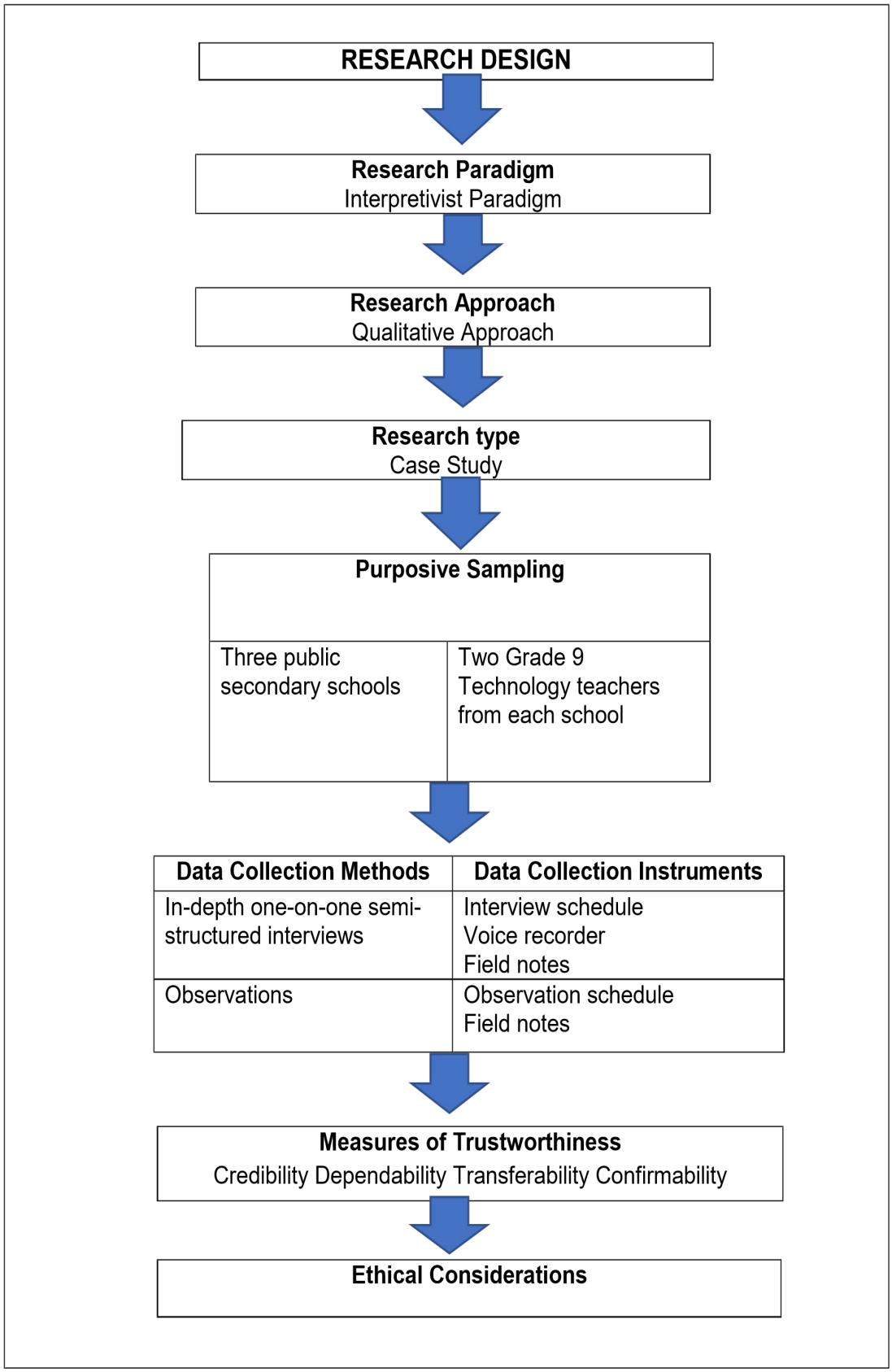

Figure 3.1: Research design process flow chart

3.3.1 Research Paradigm

A research paradigm, according to Ganiyu, Ebohon and Ajayi (2021:2), is a set of accepted opinions and concepts among experts in a field regarding how issues need to be perceived and handled. It is a perspective on the world. Pervin and Mokhtar (2022:420) further state that researchers use different paradigms depending on the research purposes and the positions they carry in their research.

There are three main paradigms that influence education research, and these include the positivist paradigm, the interpretivist paradigm and the critical paradigm (Maree, 2016). The positivist paradigm has the notion that context is unimportant (Kivunja & Kuyini, 2017:31) and thus, was not appropriate for this research. The positivist paradigm requires quantitative research techniques to be exact in the description of parameters and coefficients in data that are obtained, analysed and interpreted, as well as to grasp correlations buried in the data.

The critical paradigm, also known as the transformational paradigm (Al-Riyami, 2015), is a paradigm whose ontology is founded on relativism. The characteristics of research conducted within the critical paradigm, according to Kivunja and Kuyini (2017:35), are the treatment of research as an act of construction rather than discovery.

In this study, the research was based on reality to discover how teachers implemented dialogic teaching guided by a qualitative research approach. This means that the lens through which the researcher would view the findings would be interpretivist.

3.3.1.1 Interpretivist paradigm

Interpretivist researchers, as described by McQueen (2002:17), adopt methodologies aimed at gaining a deeper understanding of the connection between individuals and their surroundings, as well as the influence individuals exert on shaping the social dynamics within their environment. In this study, the researcher endeavoured to grasp and interpret the perspectives of teachers.

Erciyes (2020:181) states that research paradigms can be distinguished by their ontology, epistemology, and methodology. According to Ayele and Mutyaba (2021:2), ontology is the study of the nature of reality, while epistemology is the study of acceptable knowledge and methodology is the study of how knowledge is made. This

means that researchers should recognise and comprehend the ontological and epistemological viewpoints of research paradigms since these perspectives might influence a researcher's whole study.

- **Ontological perspective**

Dredge, Airey and Gross (2015:31) define ontology as the study of being that provides the foundation for understanding the world in which we exist as people and as members of communities. In this case, the researcher can choose between a realist and a relativist viewpoint. Moreover, Dredge et al. (2015) add that ontology's value lies in its ability to unlock our understanding of reality by studying the true nature of things, substances, conceptions, experiences and words, basically everything. This study was based on an interpretivist perspective. The reality within the study's framework is the interactions and experiences that Technology teachers have with learners while teaching them; for example, the design process in a classroom setting. Technology teachers thus experience the teaching of the design process firsthand, and this phenomenon can only be comprehended from their perspective. To ascertain the nature of the actual teaching of the design process for Grade 9 learners during the Technology period, the researcher conducted interviews and observations with the Technology teachers.

- **Epistemological perspective**

The Greek word *epistêmê*, which means knowledge, is where the name epistemology comes from, according to Ayele and Mutyaba (2021:6). Epistemology is the philosophy of knowing, or how we learn new things, to put it simply. The main topics of epistemology are what makes knowledge legitimate and how to acquire it. It concerns the most suitable methods for learning about the nature of the universe (EasterbySmith, Thorpe & Jackson, 2015). To verify the findings of the study, the researcher obtained information about the experiences of Technology teachers through observation sheets and in-depth interviews in which the teachers discussed their own experiences with teaching the design process through a dialogic method. The epistemological standpoint of this study required the researcher to investigate the essence of knowledge, as well as the methods of understanding and acquiring knowledge about social phenomena. The researcher observed and understood the perceptions of Grade 9 Technology teachers regarding the design process and their

integration of dialogue into their teaching of the design process. The researcher can only grasp this reality through the interpretations provided by the participants, with the reality of this phenomenon being derived from the perspectives of the participants.

- **Axiology perspective**

According to Ayele and Mutyaba (2021:5), axiology is the study of how ethics should be integrated into research design and execution, regardless of the paradigm a researcher chooses to employ. According to Ayele and Mutyaba (2021), it also suggests the ethical concerns that must be considered from the outset of the study. Khan (2015) concurs that the axiology philosophy addresses the value or calibre of the study while emphasising ethics and aesthetics. The researcher used transparency in this study because it was not possible to eliminate this factor. Throughout the entire research process, the researcher reflected on own thoughts and feelings to be as transparent as possible. This is in accordance with the study's advice that axiology be considered at every stage of the study.

The University of South Africa's professional principles, which pertain to the fundamental values of respect, competence, responsibility and integrity, influenced the researcher's ethical behaviour in this study. Additionally, it was overseen by the university ethics committee, whose consent was obtained before starting the study project (*cf.* Appendix B). More detailed discussions of ethical behaviour decisions are found in this chapter (*cf*. Section 3.6).

Rooted in the interpretivist paradigm, this study employed a qualitative research approach which includes research methods such as observations and interviews. These techniques are in alignment with the fundamental concepts of social constructivism because they enable the researcher to investigate how teachers interpret their experiences, meanings and social norms of reality in particular contexts. The interpretivist paradigm enables researchers to examine the world from the perspectives and experiences of the participants (Thanh & Thanh, 2015:24). In this study, the researcher developed and analysed the data obtained through the experiences of Technology teachers, using an interpretivist lens to find answers to the research questions. The implication is that the interpretivist paradigm builds and maintains a variety of interpretations of the perspectives of individuals to gather

research findings. Consequently, the researcher successfully collected significant data. By conducting interviews and observing the lessons, the researcher explored the experiences of Technology teachers as they delivered design process classes using dialogue as a teaching method.

3.3.2 Research Approach

As stated by DeFranzo (2011:1), qualitative research is primarily exploratory in nature. It aims to uncover the underlying factors behind issues, attitudes and motivations. It provides insights into situations and aids in generating new ideas. Given the researcher's focus on understanding the experiences and viewpoints of participants, qualitative research was selected. Qualitative research, as described by Aspers and Corte (2019:142), employs a multimethod approach, utilising an interpretivist, naturalistic perspective toward the subject matter. This implies that qualitative researchers observe phenomena in their natural contexts, seeking to comprehend or interpret events based on the significance individuals attribute to them.

According to Creswell (2015:85), qualitative researchers gather data through document analysis, behavioural observation, or conducting interviews. To understand how various participants see the world, the researcher observed and conducted interviews with participants in their Grade 9 Technology classrooms. During the interviews, the researcher and the Grade 9 Technology teachers interacted to establish an understanding and interpretation of meanings. Additionally, verbal notes from the observation sheet and interview notes were taken. According to McMillan and Schumacher (2016:305), the thorough narrative of data collected from participants is the focus of qualitative research. This demonstrates the researcher's deep engagement with the participants' environment to gain a more comprehensive understanding of their perspectives. The compatibility between social constructivist theory and qualitative research methods stems from their common understanding of reality, knowledge, and human experience. As Jameson and Miller (2022:64) explain, both perspectives highlight the subjective nature of reality and the way knowledge is built through interactions, making them naturally suited to work together in research.

The qualitative research approach was chosen since it offers to opportunity to elicit rich answers from participants' face-to-face encounters (Goldkuhl, 2012). According to Teherani et al. (2015), qualitative research focuses on the events that occur and

the results of those events from the viewpoints of individuals involved. The researcher employed a qualitative research approach to better understand the influence of dialogue on teachers' teaching experiences. Furthermore, Hammarberg, Kirkman and de Lacey (2016:499) mention qualitative approaches for addressing questions regarding experience, meaning and viewpoint, usually from the participants' perspectives.

Qualitative researchers think that the greatest way to understand human behaviour and activity is to observe it in its natural state, free of external limitations and control, (McMillan & Schumacher, 2010:322). Furthermore, McMillan and Schumacher (2010) attest that it is a widespread technique in which the researcher attempts to explain and comprehend occurrences in their natural context. The researcher served as the data collection human instrument, collecting first-hand data and recorded events that occurred throughout the observation and interviews.

Qualitative research entails fieldwork to familiarise the researcher with the topic under scrutiny, thus it should be limited and manageable. The researcher chose a reasonable sample of six participants for this study. As a result, the choice was best suited for this study since it examined a phenomenon as a whole. In this study, the ontological assumption regarding dialogue in selected schools is that it fosters communication skills, which is a tool to have when approaching life. Without communication, there is no interaction, and without interaction, there are no boundaries in learning which will temper learners' progress in the classroom.

A qualitative technique allows the researcher to use a thematic approach to data analysis, which provides detailed explanations of the data and makes it easier for readers to understand. The advantage of a qualitative procedure, according to Creswell (2015:191), is that the researcher has first-hand experience with participants, which means that the researcher may capture information as it happens. The thematic approach in qualitative research is a solid method for analysing and interpreting data, focusing on identifying and exploring patterns or themes within the dataset. This technique involves carefully organising and describing the data in detail, which helps reveal important insights and makes the findings clearer and more accessible to readers. Creswell (2015:191) highlights that a significant advantage of qualitative research is the opportunity for researchers to engage directly with

participants, capturing data as it naturally emerges. This direct interaction allows for a deeper grasp of participants' perspectives and experiences.

Recent scholars affirm the value of this method. Braun and Clarke (2021) argue that thematic analysis is both flexible and in-depth, enabling researchers to delve into complex phenomena and uncover detailed insights about participants' experiences. They emphasise that focusing on themes helps provide detailed and meaningful explanations. Similarly, Nowell et al. (2017) stress the importance of maintaining rigour in thematic analysis, advocating for a clear and transparent process to enhance the credibility and reliability of the findings. This approach not only helps in organising qualitative data but also enriches the interpretive process, offering a comprehensive view of the research topic.

According to Creswell (2015), using this strategy is an advantage since unexpected elements may be noted during observation and the researcher has control over the line of questioning during interviews. Quality data were gathered because of personal engagement with each participant. Each participant offered an account of their personal teaching experiences in the classroom, demonstrating the suitability of various teachers (Mayer & Smith, 2015). The collecting of connected experiences from each participant was facilitated by participants from different schools (Eisner, 2017). This is advantageous to the qualitative researcher since the data were accurate (Berkowitz, 2013) and collected from the people who experienced the phenomenon under study. Observations were analysed together with interview data. The aspects observed in the Technology classes were analysed to see whether they corroborated with what the participants indicated during the interviews.

3.3.3 Research Type

To investigate how Grade 9 Technology teachers in the Tshwane South District use dialogue to enhance learners' communication competence, a case study was employed. Case study research is designed to understand specific and distinct occurrences (Welman et al., 2010:25). Case study research may be used to explain, investigate and describe in-depth what happens in the programme and why, according to Yin (2009). A case study, according to Creswell (2014), is a thorough examination of specific arrangements based on a larger data set. It is an in-depth analysis of a

single entity using numerous sources of data collected in the context (McMillan & Schumacher, 2010).

Yin (2014) indicates that with a case study, the researcher can explore a phenomenon in its real-world environment. Lichtman (2014) indicates that a case entails a thorough investigation of a specific instance. The researcher's purpose was to investigate how Grade 9 Technology teachers use dialogue to enhance learners' communication competence in Tshwane South District. Schoch (2018:246) states that case studies are an in-depth manner of analysing a phenomenon utilising techniques such as interviews, document analysis, observation and others to acquire data.

Schoch (2018:246) claims that case study research has advantages in terms of technique and outcomes. The researcher was able to focus on a specific case within the constraints of location and time because of the case study technique. Yin (2009), on the other hand, emphasises that case studies as a research type, offer both advantages and disadvantages. One of the advantages is analysing individual situations in depth. Krusenvik (2016:5) shows that the information that was not expected can be uncovered right away. As a result, case study research is an excellent tool for learning about the experiences of participants. Another advantage of this strategy, according to Crabtree and Miller's (1999) study (quoted in Baxter & Jack, 2008), is the close collaboration between the researcher and the participants while allowing them to express their stories. A primary advantage of this approach was the thorough investigation it made possible leading to a deeper understanding of the design process. Furthermore, the researcher's understanding of the dialogic method was deepened, which has helped to identify subtle parts of it and provide insightful information for the study.

A case study provides a complete understanding of research ideas while taking place in real-life, realistic circumstances (Korstjens & Moser 2017:275; Leedy & Ormrod, 2015:269). Starman (2013:38) suggests that a case study may enhance a researcher's professional development by offering a unique and context-specific experience that enhances research skills. The disadvantage of a case study, according to Krusenvik (2016), is that it is impossible to generalise from a single example and that it has a bias toward verification. The case study approach has restricted generalisation because the focus of this case study was focused on a limited

number of participants, and as a result, the findings were not readily applicable to a larger population. To address this limitation, the researcher selected cases from the Tshwane South District that represented a wide range of experiences and viewpoints by using purposeful sampling techniques.

In addition, McMillan and Schumacher (2010:205) concur that case studies are prone to bias and ambiguity which is another possible disadvantage of case studies. The researcher was aware that bias may have an impact on data collection and processing. In response to this concern, the researcher followed strict methodological guidelines during the study, which included transparent reporting and thorough documenting of data collection protocols. To make sure that biases did not unnecessarily affect how the results were interpreted, the researcher recorded interviews. Qualitative researchers must reduce bias by avoiding their own viewpoints, opinions or expectations to dominate the study (Bogdan & Biklen, 2012:54).

Yin (2011) emphasises that research always begins with a desire to gain a close and in-depth knowledge of a single or multiple cases. In a case study, individual behaviour or an event is investigated rather than the group. In this study, the researcher was able to observe and comprehend what it is like to be in a specific circumstance through observing lessons (Cohen, Manion & Morrison, 2011) and then was able to interview each participant to develop an understanding of the challenges affecting the teaching of the subject of Technology in three schools.

Gay, Miles and Airasian (2011:447) assert that every researcher employs a specific theory when doing research. The researcher used a case study based on the social constructivist theory to better understand the participants' experiences. According to the social constructivist theory (Creswell, 2014:8), individuals have the ability to grasp the environment in which they live and work. This theory emphasises co-construction of knowledge through social interaction and interpretation. Case study research design and social constructivism work well together, supporting and enhancing one another.

Case study research design offers a strong foundation for thoroughly examining the details of social factors in their natural environments, enabling a thorough investigation of how people and groups create meaning and comprehension.

When case studies are compared with one another, the researcher can use the differences and similarities to have a significant impact on the literature (Vannoni, 2014:2015). A common reality is that the evidence generated by a case study is powerful and credible (Gustafsson, 2017:3). Case studies have the advantage of producing a more persuasive theory since the ideas are more deeply rooted in various empirical pieces of data. As a result, several examples allow for a more in-depth examination of research topics (Gustafsson, 2017). The implementation of several case studies may be exceedingly time-consuming and expensive, as stated by Gustafsson (2017:3). Overall, the data generated by this form of study is regarded as strong and dependable, according to Baxter and Jack (2008:550), but it may also be exceedingly time-consuming and expensive to undertake. In this study, the researcher collected data in three different secondary schools, all of which are in the same location but are separated by a significant distance.

3.4 RESEARCH METHODS

Farrow, Iniesto, Weller and Pitt (2020:8) define research methods as how researchers carry out a certain study, investigate a subject, or try to respond to a query. According to Farrow et al. (2020), research methods might differ substantially, but they always aim to collect data to deliver results that are dependable and methodical. The following section discusses participant selection, data collection, and data analysis.

3.4.1 Selection of Participants

The selection of participants should have a well-defined rationale and serve a particular purpose relevant to the research inquiry (Collingridge & Gantt, 2019). The population, as defined by Polit and Beck (2017:249), encompasses the entire set of cases that the researcher is interested in studying. In qualitative research, the selection of a population is not aimed at achieving generalisability but rather at identifying the specific individuals who are appropriate for participation in the study (Polit & Beck, 2017:491). In this particular study, the target population was determined to be Grade 9 Technology teachers, regardless of their years of teaching experience.

3.4.1.1 Sampling techniques

Alvi (2016) describes a sample as a subset of the population specifically chosen for research purposes. The procedure of choosing a smaller group or section of a

population to represent the whole population is referred to as the sampling technique (Johnson & Christensen, 2008). According to Cohen, Manion and Morrison (2018), purposive sampling is a method employed by the researcher to select appropriate participants who meet predefined criteria in order to address the research problem. As described by Christiansen and Bertram (2014:60), purposive sampling involves the researcher deliberately selecting particular individuals, groups or objects to be part of the sample. Therefore, in this research, purposive sampling was utilised, involving the selection of six Grade 9 Technology teachers from three public technical high schools in the Tshwane South District.

3.4.1.2 Selection procedure

The selection of participants is based on their backgrounds and their capacity to offer pertinent details about the phenomenon under investigation (Johnson & Christensen, 2008). Consequently, Alvi (2016) claims that in purposive sampling, a researcher includes subjects in a study with a predetermined goal in mind. As a result, the standards for the components that are incorporated into the research have already been determined. In conducting this study, the selection procedure involved several steps to ensure a representative sample of schools and participants in the Tshwane South District. The initial phase of the selection process involved the researcher acquiring a list of secondary schools within the district. This list was obtained through official channels, specifically from the educational authorities responsible for overseeing schools in the district. Once the list was obtained, a process of convenience sampling was employed by the researcher to select the schools for inclusion in the study.

Convenience sampling, as described by Patton (2015), is a non-probability sampling technique where researchers choose participants or cases based on their easy accessibility and proximity. In the context of this study, convenience sampling was deemed appropriate due to its practicality and efficiency in selecting schools that met the criteria of teaching Grade 9 Technology. Given the time constraints and logistical considerations, convenience sampling allowed for the swift selection of schools without the need for complex randomisation procedures.

From the list of secondary schools in the Tshwane South District, three schools were conveniently selected for inclusion in the study. These schools were chosen based

on their geographical proximity, availability of Grade 9 Technology subjects as they are technical high schools, and willingness to participate in the research. Subsequently, within the selected schools, a further convenience sampling approach was employed to select six teachers who taught Grade 9 Technology. This sampling strategy ensured a manageable yet diverse representation of teachers and schools within the district, facilitating comprehensive data collection and analysis.

Overall, the selection procedure aimed to strike a balance between practicality and representativeness, allowing for the inclusion of schools and participants that best suited the objectives of the study. By employing convenience sampling techniques, the research was able to efficiently identify and engage with relevant stakeholders in the Tshwane South District, thereby enhancing the overall validity and reliability of the findings.

Table 3.1 represents the biographical information of the Grade 9 Technology teacher participants who participated in the in-depth interviews.

Table 3.1: Summary of the characteristics of the participants

SCHOOLS	GRADE 9 TECH TEACHERS	GENDER	AGE	TEACHING EXPERIENCE	QUALIFICATIONS
A	T1	Male	40-45	20	National Diploma in Education (N. Dip. Ed)
A	T2	Female	45-50	15	Bachelor of Education Degree (B.Ed.)
B	T3	Female	31-35	13	Bachelor of Education Honours Degree (B.Ed. Hons)
SCHOOLS	**GRADE 9 TECH TEACHERS**	**GENDER**	**AGE**	**TEACHING EXPERIENCE**	**QUALIFICATIONS**
B	T4	Female	24-30	2	Bachelor of Education Degree (B.Ed.)

SCHOOLS	GRADE 9 TECH TEACHERS	GENDER	AGE	TEACHING EXPERIENCE	QUALIFICATIONS
C	T5	Female	30-35	9	Bachelor of Education Honours Degree (B.Ed. Hons)
C	T6	Male	40-45	21	Bachelor of Education Degree (B.Ed.)

3.4.2 Data Collection

Data collection, according to Kabir (2016), is the act of obtaining data in a structured, ordered manner that allows one to answer research inquiries and evaluate results. Data collection is a fundamental aspect of any research plan, regardless of the field of study (Showkat & Parveen, 2017:3). Interviews and observations were the data gathering methods used. Interviews with sampled participants were conducted and lessons were observed in the three schools to gather data.

3.4.2.1 Interviews

Sweetman, Badiee and Creswell (2010) define an interview as a mutual exchange involving both the interviewee and the interviewer. The interviewer poses questions to the interviewee to gather information, comprehend their thoughts, beliefs, perspectives, opinions and behaviours, and to gain insight into their viewpoints and perception of the world. To collect information on participants' experiences, viewpoints and ideas regarding a specific issue, researchers conduct organised conversations with them during interviews.

The semi-structured interview was deemed most appropriate for this study. According to O'Keeffe et al. (2016), semi-structured interviews follow a subject outline and allow for both standardised questions and freedom so that pertinent themes come up naturally. Semi-structured interviews allow the researcher to investigate participants' ideas, feelings and opinions about a particular issue, delve deeply into personal and sensitive topics and gather rich, open-ended data (De Jonckheere & Vaughn, 2019).

The interview schedule, which McLeod (2014) defines as a list of present questions to be asked precisely as written, served as the tool for gathering data (*cf*. Appendix I). The advantage of using an interview schedule was that the researcher could compare data from the participants' responses easily. To guarantee uniformity and clarity in the interview process, the researcher rehearsed a set of questions before conducting interviews. To guarantee accuracy and moral behaviour during interviews, protocols including getting informed consent, taking notes, and recording interviews were used. Each interview lasted between 20 and 30 minutes and were audio-recorded which gave participants enough time to discuss pertinent subjects without feeling overly burdened. By recording the interviews, the researcher was able to listen to them again and again to ensure that no important details were missed. The interviews were carried out in a quiet classroom, to maintain privacy and reduce outside interference. The primary language that both the researcher and the participants could understand was English, which was used for communication. After the interviews were over, the participants received gratitude for their cooperation and willingness to take part in the study, which recognised their important input to the research project.

3.4.2.2 Observation

Kumar (2022:1) defines the observation method as a strategy for studying and describing the behaviour of a topic. It entails the simple act of closely observing the occurrences till a hunch or insight is obtained. It involves keenly observing behaviours, interactions and events without direct intervention. The instrument for observation in this study for all participants was an observation schedule/protocol. Risvi (2010:655) asserts that an observation schedule helps in the interest of capturing authentic and reliable classroom practices. This document outlines specific criteria and behaviours to be observed during classroom sessions, providing a structured framework for data collection (*cf.* Appendix H).

The observation schedule was chosen for its ability to capture real-time interactions and behaviours within the classroom setting accurately. It ensured consistency in data collection and allowed for the systematic recording of relevant observations. According to Kumar (2022:7), in non-participant observation, the observer takes a position, from where he can observe in detail the behaviour of the subjects, with the

least disturbance to the group**.** In this study, the researcher observed six classes, with two teachers from each of the three public secondary schools in the Tshwane South District of Gauteng, South Africa. These classes, which focused on the topic of 'Building the Bridge,' were chosen based on scheduled appointments that aligned with the teachers' lesson periods. This approach provided an opportunity to explore the teachers' experiences as they guided learners through the design process, using dialogue as a key teaching method. The researcher acted solely as an observer during the observations, refraining from active participation in classroom activities to maintain objectivity and minimise potential biases. As a non-participator, the researcher maintained the integrity of the gathered data, as the researcher's presence may influence participant behaviour or outcomes. By maintaining a neutral observer role, the researcher accurately documented natural classroom dynamics. The aspects to observe included learner engagement, teacher-learner interactions, and the implementation of the dialogic method. These observations provided valuable insights into the teaching design process within the classroom. Upon entering the classroom, the researcher greeted the teacher and learners courteously, introducing the purpose of the observation while emphasising confidentiality and anonymity.

According to Efron and Ravid (2013:88), having an outsider in the classroom could affect how the learners behave. The researcher positioned herself discreetly to commence observations. All participants were provided with informed consent forms outlining what the research is and why it was conducted. Participants were allowed to review and sign the consent forms voluntarily before observations commenced (*cf.* Appendix E). During interviews, the researcher primarily took notes on participant responses, key themes and observations relevant to the research questions. According to Phillippi and Lauderdale (2018:381), field notes are frequently recommended in qualitative research to gather pertinent contextual data. Detailed notes were recorded to ensure comprehensive data analysis. Recording detailed notes during interviews facilitated accurate data interpretation and analysis. It ensured that important insights and perspectives shared by participants were captured effectively, contributing to the validity and reliability of the study findings. Observations continued throughout the entire classroom session, which was 45 minutes, allowing for a comprehensive understanding of daily teaching and learning interactions. After each observation session, the researcher conveyed appreciation to

the participants for their cooperation and willingness to contribute to the study. Appreciation was conveyed for their time and invaluable insights shared during the observations.

3.4.3 Data Analysis

According to Creswell (2017), data analysis needs to be comprehensive and methodical. Data analysis, according to Neuman (2011) is the systematic organisation, integration and analysis of data. The researcher searches the data for connections and patterns during this procedure. Thematic analysis was used to analyse the data because this study was qualitative in nature. According to Braun and Clarke (2006:7), thematic analysis is the systematic procedure of identifying, analysing, and condensing patterns (themes) within a dataset. McKenney and Reeves (2018) state that thematic analysis is concerned with finding, examining and interpreting meaningful patterns in qualitative data. Braun and Clarke (2006) emphasise the benefits of utilising thematic analysis in qualitative research, asserting its accessibility, transparency and adaptability to enhance the credibility of the analysis. However, Dawadi (2020:62) states that despite being commonly used for qualitative research, thematic analysis may have a drawback in that its approach is not always transparent.

The researcher went through six analysis stages, suggested by Braun and Clarke (2006). These phases are better understood as a recursive process rather than a linear approach (Braun & Clarke, 2006). The following steps were followed during data analysis:

Phase 1 Familiarisation: The researcher listened to voice recordings and transcribed the information verbatim. Byrne (2021:8) states that familiarising oneself with a dataset requires reading and rereading the entire collection several times. In this step, the researcher extensively engaged with the data obtained from observations and interviews. This included thoroughly examining transcripts, notes and recordings in order to get a profound comprehension of the subject matter and its surrounding circumstances.

Phase 2 Generating initial codes: Coding, according to Byrne (2021:9), is the process of giving short, concise descriptive or interpretive labels to data points that

can be pertinent to the goals of the study**.** The researcher systematically identified and labelled interesting features or patterns in the data by assigning descriptive codes to segments of text or data points. In this process, the researcher highlighted keywords, phrases and concepts that appeared significant or relevant to the research questions.

Phase 3 Searching for themes: To ensure the validity of the data analysis in situations where participants' responses were unclear, the researcher used member checks (Braun & Clarke, 2006). Next, the researcher organised the codes into potential themes and patterns based on similarities and connections between them.

The researcher looked for recurring ideas, concepts or phenomena that emerged across the data, grouping related codes to form initial themes.

Phase 4 Reviewing themes: The researcher meticulously analysed and improved the selected themes, ensuring they precisely conveyed the fundamental nature of the data, reflected the research objectives and aligned to the theoretical concepts. This involved reviewing the coherence and relevance of each theme about the coded data and adjusting as necessary.

Phase 5 Define and name of themes: The researcher further developed and clarified the selected themes by defining their boundaries and characteristics. In this step, the researcher included articulating clear descriptions and definitions for each theme, supported by evidence from the data. Additionally, the researcher assigned concise and meaningful names to the themes to convey their central focus or content.

Phase 6 ***Writing the report:*** the report was crafted by weaving together the findings from the observations and interviews into a unified story. The researcher carefully elaborated on each theme discovered, making sure the results were organised and communicated effectively. By linking these themes to existing theories and research, the researcher offered a richer understanding of their meaning and impact. The final narrative not only showcased the importance of the observations and interviews but also connected them to broader academic and practical contexts, drawing well-rounded conclusions from both the specific details and the wider implications.

3.5 MEASURES FOR TRUSTWORTHINESS

The trustworthiness of the study pertains to the degree of trust in the data, interpretation and methodologies employed to uphold the quality of the research (Polit & Beck, 2014:435). Trustworthiness focuses on the credibility of the study (Nowell, Norris, White & Moules, 2017). Bertram and Christiansen (2014) suggest that qualitative researchers enhance the credibility of their findings by ensuring they are reliable, dependable, confirmable and transferable. This fosters reader confidence in the findings by ensuring they accurately reflect real-world occurrences. To guarantee the study's trustworthiness, the researcher adhered to the criteria proposed by Lincoln and Guba (1985) which includes credibility, transferability, dependability and confirmability.

3.5.1 Credibility

Credibility refers to the qualitative researcher's confidence in the truthfulness of the study's findings, indicating the researcher's ability to verify the accuracy of the research results. It serves as a method for confirming the reliability and validity of the researcher's findings. Korstjens and Moser (2018:121) argue that credibility ensures that the research findings present plausible information derived from the participants' original data and accurately interpret their views. Noble and Heal (2019:67) support this view, defining credibility as the trustworthiness and believability of a study. To enhance credibility in this study, the researcher employed strategies such as peer briefing, triangulation and member checking.

The researcher conducted member checking by sharing preliminary findings with participants, seeking their feedback to ensure the accuracy and validity of interpretations based on their experiences. Participants also had the option to change their responses where necessary. Apart from participant acceptance of the interview transcripts, the recordings of the interviews are preserved for verification reasons. The researcher made certain that enough data was given. Throughout the research process, the researcher engaged in peer briefing sessions with the supervisor through Microsoft Teams to provide feedback and insights to validate the study's methods and findings. Debriefing is acknowledged as an essential component for encouraging students' critical reflection and enhancing the learning outcomes of the simulation activity (Rutherford-Hemming, Lioce & Durham, 2015).

Noble and Heal (2019:67) describe triangulation as a method used to increase the credibility and validity of research findings. In the context of this study, triangulation was used to establish the study's credibility. One-on-one semi-structured interviews, observation and field notes were employed as data collection methods. Collecting observation notes and capturing audio recordings of the six participant interviews helped to boost the research's credibility. Against guaranteed accuracy, the notes were matched to the recordings. Posing the identical questions to all participants helped to build trust. The researcher double-checked that the research design was error-free and that the proper technique was employed to conduct the study.

3.5.2 Transferability

Transferability, as defined by Anney (2014:277), is the extent to which the findings of qualitative research may be used in different situations with different participants. Due to the unique experiences of each Grade 9 Technology teacher and their social context, the study's conclusions are not applicable to other contexts. That being said, similar situations might employ the methods this study used, but the results would be different. The research methods and conclusions were thoroughly explained in this study to facilitate their transferability to other research endeavours.

Younas, Fabregues, Durante, Escalante, Inayat, and Ali (2023:1) define a thick description of qualitative findings as critical to improving the transferability of qualitative research findings as it allows researchers to assess their applicability to other contexts and settings. Throughout the dissertation, the researcher included thorough explanations of the research setting, participants and findings to guarantee transferability. This gives readers the opportunity to evaluate the study's relevance and suitability for use in different contexts. To improve transferability, the researcher used purposive selection procedures, which ensured the sample represented the target population by selecting participation according to specific characteristics relevant to the study topics.

3.5.3 Dependability

Dependability is the degree to which research results can be repeated with comparable participants in a comparative situation, as Merriam and Tisdell (2015) has revealed. This study used an audit trail to demonstrate dependability. An audit trail,

according to Anney (2014:278), entails a procedure and evaluation for data validation. Data collection, coding, analysis and interpretation of this study were all documented in detail in an audit trail that covered every step of the study process. This audit trail allowed for the study's replication and verification by others by providing an open record of the researcher's decision-making process. Throughout the dissertation, the researcher consistently provided thick descriptions of the research process, data collection methods and analysis decisions. These detailed descriptions enhanced the dependability of the study by allowing readers to assess the rigour and reliability of the research.

3.5.4 Confirmability

According to Korstjens and Moser (2018:122), an audit trail is the method required to guarantee dependability and confirmability. The researcher kept a thorough audit trail that detailed every step of the research, including gathering data, analysing it and coming to a conclusion. The audit trail played a crucial role in verifying the study's conclusions and guaranteeing impartiality and openness.

The researcher also kept a reflexive journal in which she considered her prejudices, presumptions and biases as she worked on the study. The reflexive journal can be used as a teaching tool to encourage introspection, critique and self-analysis, according to Bashan and Holsblat (2017:2). By reducing the effect of researcher subjectivity on the interpretation of results, this reflective approach increased confirmability.

3.6 ETHICAL CONSIDERATIONS

Ethics in research refers to the standards and principles that inform choices about data collection, analysis and distribution of study findings according to Mirza, Bellalem and Mirza (2023:442). McMillan and Schumacher (2014:203) define ethics as opinions on what is proper, inappropriate or right or wrong. This implies that when conducting a study, the moral standards and laws that control how research involving humans, animals or private information is conducted, should be adhered to.

By putting the rights, dignity and well-being of every participant first, these guidelines guarantee that research is carried out in an ethical, responsible and courteous manner.

3.6.1 Informed Consent and Voluntary Participation

The College of Education Research Ethics Review Committee issued ethical approval to the researcher from UNISA before the commencement of the study, with the reference number for this approval being 2022/02/09/44174543/26/AM (*cf*. Appendix B). After obtaining ethical approval from the university, the researcher sought permission from the Gauteng Department of Education (GDE) and the Tshwane South District (*cf*. Appendix C) to conduct the study. Upon receiving consent from both entities (*cf*. Appendix D), letters requesting permission were sent to the principals of the three selected schools (*cf*. Appendix F). Furthermore, consent forms were provided to selected Grade 9 Technology teachers (*cf*. Appendix E).

3.6.2 Protection from Harm

In this study, precautions were made to guarantee that participants would not suffer any injury during the study. To reduce any dangers or discomfort for participants, the research questions were carefully crafted. For example, measures were taken to ensure the confidentiality and anonymity of responses and to provide participants with the option to withdraw from the study at any time. In addition, the principles of beneficence and non-maleficence were upheld to protect the participants' physical, psychological and emotional wellbeing. According to Smith and Noble (2018), it is the duty of researchers to put participants' safety and welfare first in their research projects and to make sure that ethical norms are followed to minimise any possible harm that may result from involvement.

3.6.3 Privacy and Confidentiality

To protect the privacy and confidentiality of all research participants, certain protocols were put in place throughout the course of the study. Pseudonyms *(cf*. Table 3.1) were used to avoid identification of study participants, ensuring that participant identities and sensitive information were safeguarded effectively. All protocols for data transfer and storage followed strict security guidelines and confidentiality agreements were set up to guarantee that only authorised parties could access the data. In order to build trust and respect participants' rights, which lowers the possibility of potential injury or confidentiality breaches, Smith and Jones (2020) underline how important it is to ensure privacy and confidentiality in research. The research procedure was conducted with integrity and ethics which prioritised privacy and confidentiality.

3.7 CHAPTER SUMMARY

This chapter provided an overview of the research methodology and explored the significance of empirical research. It utilised ontological, epistemological and axiology perspectives to define the research design and paradigm of the study. Additionally, it discussed the research approach and the implementation of a case study strategy. The selection of participants and data collection techniques were also addressed broadly in the section on study methodologies. Thematic analysis in data analysis was discussed, along with a detailed explanation of trustworthiness measures such as confirmability, reliability, credibility and transferability. The ethical considerations of the research were addressed, focusing on permission, informed consent, confidentiality, and protection from harm. Chapter 4 presents the data analysis and interpretation of findings.

CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 INTRODUCTION

The research methodology and design that informed this study exploring the Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process, were described in the preceding chapter. In this chapter, the study's empirical findings are presented, analysed, and interpreted to address the research question: *How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning design process?*

To fulfil the study's aim, the findings are organised according to the sub-questions:

1. What are Grade 9 Technology teachers' understanding of the design process to enhance communicative competence?
2. How do Grade 9 Technology teachers teach the design process to enhance communicative competence?
3. How are Grade 9 Technology teachers supported in using dialogue to enhance communicative competence?
4. What are Grade 9 Technology teachers' challenges in using dialogue to enhance communicative competence?

4.2 DEMOGRAPHIC INFORMATION OF THE PARTICIPANTS

The study did not make a deliberate effort to balance genders since participants were recruited on a voluntary basis rather than through a methodical approach aimed at achieving demographic parity. This voluntary approach meant that gender balance was not a consideration, leading to an imbalance that was not corrected during the study. Participants were given pseudonyms to ensure their privacy, and their ages ranged from 24 to 45 years. The emphasis was placed on the participants' willingness to contribute and the confidentiality of their identities, rather than on achieving a gender-balanced sample. Based on the collected data during the semistructured interviews, participants have between two to twenty-one years of experience in teaching. In the context of this study, it was assumed that participants with more

experience would have more experience in using different types of teaching methods including the dialogic method. Three of the participants were qualified with a Bachelor of Education degree (B.Ed.), two with Bachelor of Education Honours (B.Ed. Hons), and one with a National Diploma in Education (N. Dip. Ed.). The demographic details show that there are usually more women than men in teaching roles in South African townships, as Davids (2018) points out. However, it's also important to point out that in these townships, most teachers are Black South Africans, reflecting the community they serve.

4.3 PRESENTATION, ANALYSIS AND INTERPRETATION OF EMPIRICAL FINDINGS

The findings in this section are reported by presenting the relative information collected from the interviews. This data were analysed through the thematic data analysis process described in Chapter 3, Subsection 3.4.3. Data analysis was conducted after the completion of data collection. In this study, interviews and observations were transcribed after their completion to ensure the accuracy and reliability of the data. Creswell and Creswell (2018) emphasise that while preliminary notes may be made during interviews, full transcription and detailed analysis are carried out post-data collection to uphold the rigor and validity of the research process. Table 4.1 presents an overview of the main themes and sub-themes that were identified from the qualitative interview data supported by data from the classroom observations.

Table 4.1: Themes and sub-themes emerging from the data

Research Questions	Themes	Sub-Themes
What are Grade 9 Technology teachers' understanding of the technology design process to enhance communicative competence?	1. Understanding of the design process in the subject of Technology	1.1 Teachers' understanding of the design process
How do Grade 9 Technology teachers teach the technology design process to enhance communicative competence?	2. Teaching the design process in the subject of Technology	2.1 The teaching of the design process
How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning of the design process in the subject of Technology?	3. Teachers' Use of the Dialogue Method	3.1 Question and answer technique 3.2 Discussion technique 3.3 Practical demonstration technique
How are the Grade 9 Technology teachers supported in using the dialogue to enhance communicative competence?	4. Teachers' Support in Using the Dialogue Method	4.1 Subject advisors' support 4.2 School support 4.3 Parental support
What are Grade 9 Technology teachers' challenges in using the dialogue to enhance communicative competence?	5. Challenges of Using the Dialogue Method	5.1 Speaking at the same time 5.2 Overcrowded classrooms 5.3 English as a medium of instruction

The next section is the presentation of the key findings as summarised in Table 4.1 above.

4.3.1 Theme 1: Understanding the Design Process in the Subject of Technology

In Grade 9 Technology class, the depth of a teacher's knowledge about the design process plays a role in how learners interact with hands-on problem-solving tasks. Research indicates that teachers who thoroughly understand every step of the process, from identifying a problem to assisting learners in brainstorming ideas and creating prototypes while refining them, are more capable of fostering learners' imaginative thinking skills, according to Siddiqui et al. (2020). According to Van

Rensburg (2021), teachers who grasp and exemplify every stage of the design process help learners perceive it as more than a series of steps; they see it as a method that promotes trying things and striving for progress constantly. This solid base empowers teachers to craft interactive learning opportunities that involve hands-on activities and make Technology not just a subject of relevance but also one that equips learners with practical skills for real-life problems. Here is a thorough overview of these findings.

4.3.1.1 Sub-theme 1.1: Teachers' understanding of the design process

Teachers' knowledge of developing relevant skills assists in their understanding of the design process through the use of various techniques. Concerning teachers' understanding of the design process, participants acknowledged that the process has specific steps that need to be followed:

T1*: In the technical design process, any design artefact needs to be sketched.*

T2 agreed and responded that: *I let my learners understand that they must start with the drawing skills first.*

T3 had this to say regarding the understanding of the design process:

To be able to make the design process clear and to have a common base for communication, a few elements must be distinguished to explain the design process in relation to all kinds of design situations at hand and to guide and train learners in the development of design skills.

T4's understanding was shared as shown below:

My understanding is that learners need to understand the process as it is applied to solve technological problems. The identified problems allow learners to find the best solution.

Participants indicated that they began by drawing when designing artefacts. Furthermore, it has been noted that for the design process to be explicit, a few aspects need to be differentiated. The implication is that the design process provides guidance with the specific steps that need to be followed and this equips learners with design process knowledge. T4 has indicated that they themselves need to understand the

process of how to solve technological problems which should then be taught to learners. In Technology classes (T3 and T4), learners were building a bridge. A bridge design process activity can provide learners with a hands-on opportunity to explore engineering principles, structural stability and problem-solving skills (Grover & Pea, 2018). Therefore, integrating the dialogic method into these activities enhanced learner engagement and deepened their understanding. The teachers (T3 and T4) began by introducing learners to the concept of bridge engineering and its importance in society. They engaged learners in dialogue by asking questions such as, "What are the different types of bridges? What factors should be considered when designing a bridge?" Learners were encouraged to share their prior knowledge. The implication is that the design process as a step-by-step process, affording the learners the opportunity to engage with peers to discover solutions, thus developing their cognitive thinking. In support of the above statement, Loeng (2020:2) indicates that individual cognitive learning entails individuals taking initiative and responsibility for their own learning.

In two of the Grade 9 classrooms (T1 and T2) learners were learning about a basic electrical circuit design. The process of designing an electrical circuit involves several steps, understanding the requirements, identifying the components, circuit diagram, calculating values, building the circuit, testing, troubleshooting, evaluating and iterating. It was observed that activities were well explained, and instructions were clear. Learners were divided into small groups and assigned specific problems related to electrical circuits. The teacher encouraged learners to discuss the processes and solve the challenges collaboratively. It was observed that this approach fostered peer to-peer interaction and allowed learners to construct knowledge together. This observation aligns with Stein and Hurd’s (2000) view indicating that when learners collaborate in small groups and talk, dialogue allows participants to explain, recognise, clarify, and fill the gaps in their understanding. In support of this perspective, Zhang (2020) argues that social constructivism emphasises the important role of learners in constructing knowledge. Open-ended questions were asked, encouraging critical thinking and reflection. Learners were guided to explore concepts, identify misconceptions and develop a deeper understanding of electrical circuits.

It was found that learners develop their learning through the design processes, which moves them through the zone of proximal development as interaction takes place in a learner-centred classroom among peers where learners progress from what they cannot do to what they can with help and support. West (2019) concurs that during the scaffolding process, the teacher assists the learner in mastering an idea or concept that the learner is first unable to understand on their own. This implies that through the teacher's understanding of the design process, learners are led in creating a dialogical environment that develops communicative competence and leads to in-depth learning.

Investigation is another essential skill utilised in the design process. As outlined by the curriculum (DBE 2011:12), investigation involves various skills such as recording, identifying, comparing, classifying, and interpreting. Through exploration, learners have the chance to assess existing products, fostering a comprehensive understanding (DBE, 2011:12).

When asked about investigation skills T1 and T2 responded as follows: *I understand that learners need to go out and research or investigate the product they want to make, what material they use, and how long it takes to make the project.*

In agreement, T3 and T5's response was: *Learners are given the opportunity to investigate the circumstance in order to create a suitable machine that can solve the problem, fulfil the requirement, or fulfil the desire that is presented in the scenario.* (T3)

Similarly, T5 added, *I tell the learners, or I give them directions on what to look for when they are doing their research.*

Based on the participants' responses, it seems that they understood what the skill of investigation entails. The study has shown that firstly, learners should research the product they wish to make in order to solve the problem, secondly, indicate materials to be used and thirdly, they need to state the duration of the project. However, T3 stated that learners are allowed to conduct their own investigations so that appropriate machines can be designed to solve problems. Meanwhile, T5 has indicated that learners are provided with guidelines on how to conduct their research. In other classes (T5 and T6), it was observed that teachers started by introducing learners to

the purpose and importance of tar roads in transportation infrastructure. Learners engaged in dialogue by asking questions such as, "Why are tar roads commonly used?

What factors should be considered when designing a road?" It was observed that in the classes, learners were organised in brainstorming sessions where they worked in small groups to generate ideas for their designs. Dialogue was encouraged among group members, promoting the exchange of ideas. Based on their research and brainstorming, learners developed conceptual designs for their projects. The participants highlighted that learners should gather information independently and present it to the class. This depicts that learners are in charge of their own work.

When learners are scaffolded in their Technology subject learning, it increases learner motivation and improves the likelihood that learners will retain new information as well as promoting a positive classroom environment (Joiner & Bergeman, 2020:1). Participants also indicated that they encouraged problem-solving in various and innovative ways as far as obtaining data was concerned. The implication is that participants had a good understanding of the design process and recommended that learners use creative problem-solving methods for data collection. The study discovered that participants allow learners to take control of their learning during the design process where they gather information on their own, allowing them an opportunity to engage with one another, creating room for dialogic interaction. This means that confidence is instilled in learners as they gather their own information. Consequently, an assumption can be deduced that these four participants created a learner-centred classroom which was conducive to independent learning. The above finding supports the Department of Basic Education's (DBE, 2011) belief that all learning in a Technology classroom should be organised using the design process, which is a non-linear iterative process.

Participants were asked about their understanding of the making process. The making process, according to CAPS (DBE, 2011:49), offers learners the opportunity to utilise tools, equipment and materials to devise a solution for the identified challenge. This process fosters the development of skills like cutting, joining, shaping and measuring, amongst others. It is crucial that making occurs in a secure environment (DBE, 2011:68).

Regarding the above, T3 highlighted: *I'm of the view that my understanding of the making process enables me to encourage learner independence and problem-solving.*

T3 mentioned that learners are encouraged to work on their own. This depicts that learners are trained to believe in what they can do without the aid of a teacher. This is where learners, according to the theory of the ZPD, have moved from what they know and can do without assistance and to what they can do with guidance and collaboration and gathered knowledge on their own. The statement echoes Sephoto's (2018) findings, which reveal that participants expressed their encouragement for learners to independently gather information in diverse and innovative manners when tackling design-related issues. It was revealed that teachers' scaffolding helped in the making process where learners were able to work independently to develop their own products.

Participants were asked about their understanding of choosing the relevant tools for their product. As per the CAPS guidelines (DBE, 2011:13), schools are tasked with the responsibility of furnishing each learner with the necessary tools and materials to fulfil the requirements of the subject, as well as to enhance the teacher's requisite knowledge and skills. The participants indicated that they guide learners to use the correct tools for the task given.

The participants' sentiments are outlined as follows: *Ergonomics, states that in using the right tool for the right job for perfect results, Safety first.* (T1)

T2 shared the same sentiment as T1 and stated: … *before deciding on the tools, they must first know all the safety measures.*

In conclusion, T4 shared the same views: *When choosing tools for making, simple basic tools and equipment are preferred. Learners' choice is based on properties and suitability of materials and availability. Materials must be easy to work with like cutting, bending, or rolling according to the product to be made. The safety of using the type of material must also be considered.*

From the above responses, it was observable that the making process requires crucial skills and abilities, including the ability to create a strategy for building a product,

observe safety precautions, evaluate the effectiveness of the process and use the appropriate tools. These types of activities have the power to actively engage learners in dialogic interaction in the making process necessary for successful learning and transferring knowledge to new situations. As they build their products, there is an interactive discussion on what to do next and this promotes dialogical discussions. This is consistent with García-Carrión, de Aguileta, Padros and Ramis-Salas (2020:5) who stipulate that when learners are participating in cooperative activities, they must communicate to exchange ideas and create shared knowledge. Dialogue is not just the way in which learners will finish the work; it is the aim of the cooperative activity and education as a whole. The implication is that the participants had a good understanding of the relevant tools needed for the activity and were able to advise learners on the importance of using the correct tools for the correct job and creating solutions. Of importance is that making should happen in a safe environment (DBE, 2011:68).

The ultimate goal of an activity is evaluation and assessment. Teachers need to have a good understanding of assessment and its integral role in the teaching and learning process. Learners should also be able to assess products, decisions and outcomes at various stages of the design process (DBE, 2011:10). As outlined in CAPS, learners are anticipated to evaluate their learning tasks, conclusions and the overall results of the design process.

When evaluating final products, this is how T3 responded*: Evaluation sits at the centre of the instructional design model. It provides dialogic feedback to all other stages of the design process to continually inform and improve instructional designs, which enhances this process by fostering interactive and reflective communication between instructors and learners.*

T3 believes that in evaluation, feedback is important as learners will be able to identify shortcomings or mistakes through feedback. This implies that the participants encourage dialogue as learners are supported in the form of feedback. Dialogic feedback is an essential component of the communication process and without feedback, communication is considered incomplete (Zahid, Qinghe & Sohail, 2021:3). The implication is that dialogue interaction is an important form of feedback as it allows the teacher to analyse the effect of the product. Zahid et al. (2021) state that

feedback is a social interaction process. In the design process, communication represents the final stage, characterised in CAPS (2011:68-69) as a reflection of the preceding stages. It was revealed that feedback is communicated to the learners through the dialogic approach where teachers provide the learners with suggestions for refinement, revision or further development allowing learners to engage socially and find ways for correction.

4.3.2 Theme 2: Teaching the Design Process in the Subject of Technology

Introducing the design process to Grade 9 learners in Technology class enables them to link knowledge with hands-on skills they can apply practically. Research indicates that when teachers lead learners through every step of the process, starting from problem identification and idea generation to model construction and enhancement, learners not only acquire competencies but also develop their creative thinking and problem-solving abilities in innovative ways (Source; Siddiqui et al., 2020). Van Rensburg (2021) highlights how this method enhances learning by motivating learners to experiment with their concepts and refine them for progress. The engaging and relatable design approach employed by teachers fosters learners ' self-assurance in tackling obstacles and applying their knowledge in scenarios. A comprehensive overview of these findings is provided below.

4.3.2.1 Sub-theme 2.1: The teaching of the Design Process

Technology's main technique for resolving design problems is the design process. In the teaching of the design process, learners do research after identifying a problem. Thus, the design process can be utilised in the classroom in the form of dialogic communication which promotes social interaction and collaboration. Finding information in books, newspapers or online may be part of the research process to aid learners in creating concepts and identifying limitations for their designs. Learners look at current designs in this phase, which can serve as a springboard and assist learners in coming up with questions. Learners also learn about and investigate key design components throughout the research stage. To create a good design, guided questions assist in forming a dialogic environment where learners exchange views of their designs which enhances their communication competence encouraging critical thinking about the components of the issue that must be resolved.

When asked about how the participants teach the design process, they commented as follows:

T1: *When teaching the design process, I let the learners do the drawing process first. It is very important when one needs to design a product.*

In addition, this is what T2 had to say: *I teach learners how to draw free hand, a drawing with measurements, the drawing must be an isometric drawing.*

To sum it all up T4 and T3 indicated as follows: *I teach them how to do simple 2D and 3D sketches showing dimensions and scale, orthographical projections are also included.* (T4)

My HoD and I stayed behind after school to prepare for the next day's lesson. I create a scenario in which the purpose or problem that needs to be answered is determined before learners begin the design process. For instance, I discuss the situation in which an electronic circuit may be applied to fulfil a requirement, resolve an issue, or open potential prospects when I teach about electrical systems and control. This gives learners the chance to ask questions to get clarification, engage in dialogue, and then come to their own conclusions about the issue at hand. Most importantly, learners may integrate their ideas to find the best technological solution. (T3)

It has been noted that T1 allowed learners to do the drawing themselves when being taught the design process. It can be concluded that the participants allowed learners to showcase their designs through discussion that focused on addressing using specific technical words to clarify their designs once they are finished with the drawing process. It was observed that teachers demonstrated communication competence during the design process by engaging in open and questioning discussions, actively listening to learners' ideas and providing constructive feedback. It was observed that in some classes (T2, T4, & T5), the teacher used a learner-centred approach by introducing a dialogic strategy. The implication is that communication is crucial when designing a product, which means that dialogic engagement is highly recommended as it will help identify mistakes before learners continue with the process. Dialogue learning teaches learners how to learn, how to listen, how to develop learning techniques, how to assess learning and how to see learning objectively

T4 explained that learners are taught how 2D and 3D sketches are drawn and when drawing using measurements, the drawing should be isometric, which is a graphic image of an object in which all three-dimensions are represented on a two-dimensional surface (Al-Deen & Nawas, 2020:5). From T4's response, one can assure that through the teaching of 2D and 3D sketches, learners were given the opportunity to ask questions, allowing dialogue between the participant and the learners. The implication is that dimensions, scales and orthographical projections are fundamental when communicated through a dialogic interaction in these sketches.

T3 and the HoD created real-life scenarios for their classes, which implies that teachers go the extra mile to make sure that learners are given innovative activities to complete. Through an open exchange of ideas that increases learners' understanding of a problem or topic, a dialogue ignites active learning. Learners should be involved in activities that make use of a range of media to enhance their problem-solving abilities and foster their capacity to conceptualise, perceive, generate and model three-dimensional visual pictures in space or on paper from two-dimensional plans (Singh-Pillay & Naidoo, 2020:74). It was observed that the teachers help guide learners in the design process and permit learner-led decision-making by motivating dialogic interaction as learners seek clarity around learning. The ideal environment for learning is well established as learners are given the authority to own and share their thoughts through a dialogic process with one another.

When asked how teachers teach the investigation skill, the participants responded as follows: *When I teach, I allow learners to ask questions to people and sometimes use the internet.* (T1)

T2, T3 and T5 concurred: *I normally let them visit the site where real-life projects are built.* (T2)

T3: *I allow learners to explore and have an opportunity to be independent.*

T5*: I give them an opportunity to bring whatever information they have to class so that I can approve the relevant one and advise them on how to search for important information.*

The responses revealed that learners were allowed and encouraged to question and discuss issues with others and were encouraged to search for information using the internet. As learners ask people questions, one can assume that a dialogue is formed as people respond, it can, therefore, be deduced that dialogue learning was encouraged in this study. This perception of shared knowledge in the community and availability of support, according to Bouilheres et al. (2020:3053), stimulates social interaction. Dahdal (2020) suggests that engaging in social interaction allows learners to be social actors in bringing necessary change to social issues and concerns. T2 and T3 concur in that learners are allowed the freedom to explore on their own without restrictions providing an opportunity to be independent. Learners are given the opportunity to reflect on and analyse through the dialogic method. As noted by Khamkaew and Trussat (2024:47), Vygotsky recognised that learning occurs within the Zone of Proximal Development (ZPD), which extends beyond an individual's current level of independent competence. Within this zone, interaction with others plays a crucial role in the learning process. Therefore, an assumption can be made that this enhances communication competence and encourages dialogic interaction as learners talk without restrictions. T5 allows learners to bring whatever information they have to class for approval and guidance on what to do. It is revealed that learners are given an opportunity and encouraged to interact with people creating an opportunity for dialogue to take place making it easy for learners to own and direct their learning. When scaffolding learning, the teacher is the knowledgeable agent who guides teaching so that learners master and internalise the content that permits higher cognitive functioning (Vygotsky, 1978).

During interviews, participants were asked how they provide learners with opportunities to report their findings. Teachers responded as follows:

T5: *I let them report their findings in class when they are done with their investigation. I evaluate their investigations and make sure that they have the correct information as a report back.*

T6: *I allow them to report their findings during normal teaching periods. Sometimes due to the numbers that we have in the class, you might find that is a lengthy exercise, so I ask them to come during their extra time after school, to my workshop.*

Both participants reported that learners reported their findings in class. Recent research highlights that the dialogic method significantly enhances learner engagement by creating an environment where learners can openly share their thoughts and ideas. According to Thompson and Roberts (2023:94), the dialogic approach fosters a dynamic learning environment that energises learners, as it encourages them to articulate their perspectives and engage deeply with the subject matter. This method is praised for its ability to stimulate enthusiasm and active participation in the learning process. The implication is that learners were demonstrating their learning through dialogue as they communicate so that, teachers identify their strengths and weaknesses and bring further amendments in the form of feedback if needed. When learners demonstrate and speak to the class, they are primarily practising skills such as communication competence as well as building self-confidence in speaking in the class forum (Sugeng & Suryani, 2018:178). It was observed that teachers promote interaction between learners which leads to a more positive outcome in the learning process by allowing learners to report their investigation findings to the class. This means that the learners are moving towards completing the task independently having moved through the ZPD (Malmberg & Nilsson, 2018:10).

Concerning how participants teach the design process, they responded as follows:

T1: *I allow learners to draw three possible answers and select one from the three.*

T2 holds the same opinion:

Three working drawings must be drawn in the workbook of the learners.

In the interest of time, T5 responded as follows: *Due to time constraints in the design process, we usually just focus on the materials they will use and I encourage the learners to work individually after school or during break where they can design as they wish, and during that design process they come and give me an update, I go to class and check how the model is going and how far they are.*

Without any element of disagreement, T6 added: *I make them take pictures of possible solutions that are already on the market and develop ideas from them after evaluating them.*

T1 and T2 required learners to draw three working diagrams and then choose the best to work with. This implies that extensive dialogue takes place before learners can select and thoroughly describe one of their suggested designs in this stage. Learners learn through the design process as they can present their designs to the group, establishing a dialogue within the group and revealing their understanding through various stages of design. It has been noted that learners might be asked to sketch out their ideas while justifying their choice (Herbet & Jenson, 2019:743). T5 alluded to the fact that the time allocated to teach Technology is limited as only two hours per week was allocated. Learners are encouraged to work individually after school or during breaks to ensure that they have sufficient time to complete their projects. Furthermore, Herbet and Jenson (2019:746) revealed some teachers open their classrooms during lunch and after school to provide learners with the time and space to work on their projects as the time allocated for Technology lessons is limited.

T6 reported that learners take photos of possible solutions that are already on the market and develop ideas from them after evaluating them. When using a picture to convey an idea, learners can see the image in addition to hearing about it during the teaching and learning process (Fitri, Hermansyah, Pratiwi, & Aswadijaya, 2021; Kenza-Tacarraoucht, Zano, & Zamorano, 2022). The implication is that choosing an effective design involves of the discussion of many suggestions, knowing as much as you can about each potential solution, and keeping the problem in mind. The final design should be the one that the learners feel satisfies the requirements or resolves the issue that was initially identified.

Regarding the teaching of the making process, this is what participants had to say:

T1: *I let learners work together by providing materials they're going to use and bringing them to school. They are given a chance to make their products during the technology period.*

In contrast, T2 responded as follows: *Learners are given an opportunity to make their projects at home as we do not have enough time at school.*

However, this is what T3 had to say*: I normally don't give learners an opportunity to do their projects at home because it will limit their independence. Parents might help*

them which will disadvantage them. So, I take them to the computer centre to explore materials they can use and have an idea of what project to make.

To encourage independence, T4 answered: *I divide learners into groups of 4 to 6 to work together and give them a case study. Having understood the case study presented, they will bring relevant materials needed for the making process.'*

In a different view, T5 responded: *I let them make the models themselves and monitor them, even if it's not during school time I'll instruct them to show me everyday step by step how far they are in completing the project to ensure that it's their own work.*

T6: *I only give them some tips on how to make the project.*

Participants revealed that they differ in their teaching styles with the making process. T2 reported that they allow learners to do their projects at home while T1 indicated that materials come from home and learners work together in class. T3 indicated that learners are not allowed the opportunity to make their projects at home because it will limit their independence, and parents might help them which in the long run, will disadvantage them. According to T3, this implies that learners should be able to use the making process to solve technology issues on their own. Tasks were given to learners that encouraged them to look for information, detect challenges and come up with solutions on their own. T3 faces a dilemma when assessing projects due to parents' involvement in their children's design process. This is consistent with a study by Chilliba (2019) that shows learners often receive help at home with parents doing their projects for them which does not assist in the learner taking responsibility for learning. In the framework of Social Constructivism Theory (SCT), T3's challenges with assessing projects due to parental involvement underscore the crucial role of scaffolding in education. Scaffolding, as described by Wood, Bruner, and Ross (1976), involves offering temporary support to help learners build their problem-solving skills independently. Recent research highlights that effective scaffolding is essential for learners to tackle challenges autonomously, and this process can be disrupted when external help, such as from parents, interferes with their ability to take ownership of their learning (Lee et al., 2022). This supports SCT's emphasis on gradual independence, where learners gain more control over their problem-solving abilities,

consistent with the principles of guided participation and self-directed mastery (Nguyen & Patel, 2023). However, de Souz and Chiu (2021:3) suggest that the involvement of parents determines the future of the learner and parental involvement is seen to bridge the gap between the school and home.

T4, T5 and T6 state that learners must work by themselves, and help is given where necessary and in need. This will enhance learners' communication competence as they create a dialogic environment through interaction with their peers. As indicated earlier, learner-centred classrooms which promote dialogue help learners reach achievable learning goals at potential developmental levels through the vital aspect of scaffolding. It was revealed during observations that teachers encourage learners to work independently and collaboratively but give help where necessary to improve communication competence and reach learning objectives.

Participants were asked how they teach learners to choose the relevant tools for their product. The responses from the participants on how they teach learners to choose the relevant tools for their product are presented below:

T2: *I allow them to choose the tools we use in class most of the time; for example, scissors, glue gun, cupboard, wood, etc*

T3 and T5 responded as follows: *Every tool for its job. They first must understand their product first, then they will know which tool to use and how.* (T3)

They first decide or brainstorm about the tools they will use then in that design process they will bring the material to class and before they start making the models, we check if it is really what they need whether they need to use dangerous or heavy tools. Then I encourage them to use something lighter or advise them to use the workshop where I will monitor if they are using the correct tools. (T5)

Making enables learners to choose the relevant tools, equipment, and materials to utilise in creating a solution for the identified problem. The process of making facilitates the acquisition of skills such as cutting, joining, shaping and measuring, amongst others. T2 indicated that learners are allowed to choose the tools used in class. Whereas T3 stated that learners need to understand their product first to know which tool to use. On the other hand, T5 explained that learners must brainstorm

ideas about the tool they will use, learners are also encouraged to use lighter tools and work in the workshop where they will be monitored. Making should happen in a safe environment (DBE, 2011:68).

When teaching learners to evaluate their products, the question sought to learn more about how learners assessed their decision-making concerning a certain problem and what strategies they employed to address technology issues. Throughout the design process, learners must evaluate their choices, measures and outcomes (DBE, 2011:10). Below are the reflections of the participants:

Learners must check if their product is stable enough to pass the test. (T1)

They will check the stability of the products; can it withstand all kinds of forces. They must draw a table for a checklist of all the evaluation processes. (T2)

They look at the strengths and weaknesses of their product according to the problem situation that has been given and then they also comment on materials. (T6)

T3: *I give them a platform to conduct evaluations to test the effectiveness of the instruction to create the desired learning outcome.*

The following participants shared the same thoughts:

T4: *They must draw a table for a checklist of all the evaluation processes. This will help them identify what they have missed so that they can go back and rectify it before they can present their product to the class.*

T5: *Using a table that I draw up with questions, they answer the questions based on different products that could have been done, but then they usually check which product is best fitting for their project.*

T1, T2, T3, and T6 reported that learners should check the reliability of the product. This implies that it is the learner's responsibility to make sure that their product is in good standing. T4 and T5 indicated that learners should use a checklist to identify faults and rectify them as well as choose the best-fitting product for their project. It was observed that learners used a checklist or rubric which assists them in evaluating the products created for the assignment.

Learners are urged to create a checklist in order to evaluate their assignments. T4 requires learners to use a checklist to evaluate themselves before they are evaluated by the teacher. They self-assess allocating marks for their product but need to motivate the reason for the allocated marks where they engage in a whole class dialogue with the teacher. The justifications offered by learners must be strong. Furthermore, projects are exhibited so that learners choose the one they think is best.

Teaching learners to communicate their final product, according to CAPS, means that learners should keep a record of the steps taken from the start when identifying a problem to the attainment of the solution during the design process (DBE, 2011:68). Learners communicate verbally, in writing, graphically or electronically to provide evidence of the process after participating in the design process:

Participants responded accordingly:

T1: *We let them test their products as a group while others are observing, and they must pass all steps.*

T2: *Learners stand in front of the class in groups and operate their products. It must pass all the steps e.g., if it is a roller coaster it must be able to turn and not break.*

T5: *They usually work in groups, to communicate. I ask them to choose a speaker, and what we normally do, I ask all of them to tell their names, and a basic introduction, and from that, I ask them to use this specific speaker so that the speaker can explain what's going on with the project if the speaker is audible enough is easier for them to communicate their project.*

T6: *Through drawings and through a model of that product, the group leader represents all group members as if it is teamwork.*

All participants reported that learners work in groups and a group leader is usually the one who communicates the final product for it to pass the test. The speaker must be audible enough to make communication easier.

The findings revealed that the selected Grade 9 Technology teachers guided learners to apply knowledge of the technological design process to improve their knowledge and understanding. Winner (2018) stresses the significance of incorporating Social

Constructivist Learning theory within the philosophy of technology so that it can influence how a teacher should teach the technological design process guided by a sound theoretical basis. For example, once teachers teach learners what an isometric drawing is, they might call any three-dimensional object they see an isometric drawing. This is integration, as the learner's fit new information into their existing knowledge. However, as learners learn the differences between an isometric drawing and an oblique drawing, they can adjust their diagram to accommodate this new knowledge. An isometric drawing and an oblique drawing both show the object from an angle, but they have different rules for how to project the dimensions and angles. Brey (2017) also acknowledges that social constructivism positively influences technological design teaching and dialogue approach. Brey (2017) further outlined that social constructivism can incorporate new ideas and analysis within technological teaching methodologies which can thus transform the philosophy of Technology.

4.3.3 Theme 3: Teachers' Use of the Dialogue Method

Several strategies were employed to integrate the dialogic method during the Technology lessons observed. The dialogic method emphasises the promotion of discussions and collaborative learning among the teacher and learners resulting in an interactive learning setting (García-Carrión et al., 2020:3). Dialogic teaching aims to help learners improve in communication competence. As learners communicate, they allow themselves to engage with one another creating an opportunity for social interaction. Dialogic teaching is a pedagogy that seeks to shift classroom talk away from rote learning toward a productive interaction between teachers and their learners (Halloush, Abdelrahman & Abu-Dalbouh, 2020:650).

Lack of dialogue in the classroom may result in learners being passive. When learners become passive, lesson outcomes will not be reached. In order to assist teachers, enhance the quality of classroom discussion and increase learning outcomes in Technology subjects, Hardman (2019:1) suggests that a dialogic teaching intervention is being developed. Various studies have shown the effect of using and not using dialogic methods. For example, Howe et al. (2019) observed and documented dialogue between teachers and learners in 72 different classroom settings. It was found that learners with teachers who encouraged classroom dialogue involving many learners, outperformed learners with teachers who did not encourage such dialogue.

As introduced in Table 4.1, the use of the dialogic method in the teaching of Technology was explored concerning three sub-themes that emerged: the answer technique, discussion technique, and practical demonstration technique. Below is a detailed presentation of these findings.

4.3.3.1 Sub-theme 3.1: Question and answer technique

To explore how Grade 9 teachers use the dialogic method in the teaching of Technology to enhance learners' communication competence, teachers in the three schools aired their views and T1 responded as follows:

I introduce general related questions to the recent topic that learners are familiar with in a setting where the learners feel comfortable.

In the same vein, T2 indicated that: *I ask questions and learners individually are given an opportunity to answer questions.*

Sharing the same sentiments, T3 said: *I allow learners to discuss their preferred answers, defend their answers, question their classmates, and explain their reasoning through dialogue and questions debated.*

T5's response was: *I usually use the direct teaching method, when we need to do the animations and drawing parts of things and give them an opportunity to ask open-ended questions that allow them to examine different points of view to employ more strong vocabulary and improve communication competence.*

T6 showed that: *I encourage learners to expand and refine others' ideas, give them the self-assurance and chance to ask questions and choose those who are shy to respond freely.*

The participants seem to have had a fundamental sense of what the dialogic method means. Participants showed that they create an environment where learners feel comfortable questioning their peers and debating their views. The study shows that learners are more likely to interact in classroom discussions when they believe that their opinions matter. Allowing learners, the chance to voice their thoughts and select methods that work best is the first step in fostering a learner dialogue.

Open-ended questions were asked to assist learners in using and developing Technology vocabulary to improve their communication competence. Participants'

responses on the usage of a dialogic method when teaching Technology to Grade 9 learners align with Vygotsky's social learning theory by fostering a conducive classroom learning environment to encourage learners to feel free and be innovative during engagement with the subject matter (Vygotsky, 1978). Webb (2017) affirms that learning can be meaningful for learners in a conducive learning environment that stimulates innovation as learners feel comfortable and free to engage in answering questions posed by the teacher and learners themselves. To add to this, Slavin (2019) articulates that a learning environment should be situated in social interactive activities where teachers and learners work and engage through collaborative interactions. This suggests that an interactive question-and-answer learning setting can be advantageous for learners in Technology classes to engage in discussion and to enhance their confidence levels as they feel more at ease. The interaction can also lead them to reflect on their views about the subject matter and become creative thinkers which could contribute immensely to classroom practice.

It was observed that shy learners were not left behind as T6 gave them the opportunity to respond freely to the questions. Wells (2020) indicates that some learners in higher schooling become shy as they do not understand the subject content and cannot grasp and understand new concepts on their own. The implication is learners should be scaffolded through support from a teacher or peers so that they can be motivated to participate in discussions when there is a conducive learning environment. Prawat (2018) supports the significance of creating a conducive learning environment by stating that sometimes shy and unprepared learners are disengaged in Technology subject content that they would find it difficult to comprehend but if favourable classroom conditions or factors are created to encourage learning from each other, they will feel free to ask for teacher and peer support. The implication is that as learners question their peers, it creates a social interactive environment where their questioning skills develop as they engage and provide structured time for each other, especially the shy learners to feel safe and affirmed in posing those questions in classroom discussions. As they defend their answers, it helps them clarify each other's points, affirm their initial thinking, remember what was discussed, deepen their understanding of key concepts and better see others' perspectives. This means that learners move from what they know and can do without assistance to tackling greater problems thus being successful in what they can do with guidance and collaboration.

The implication here is that when learners ask questions of their peers, it creates a dynamic and engaging classroom environment that boosts their questioning abilities and provides a supportive space, particularly helping shy students feel more comfortable and confident in participating. As they explain and defend their answers, learners refine their understanding, reinforce their ideas, and gain deeper insights into key concepts. This approach helps them move from solving simpler problems on their own to tackling more complex challenges with collaborative support. Recent research underscores this, noting that "interactive and nurturing learning environments are crucial for developing critical thinking and problem-solving skills" (Johnson & Wang, 2023).

Open-ended questions were asked to assist learners in using Technology vocabulary to improve their communication competence. These questions gave learners the freedom and space to answer in as much detail as they liked. Extra detail helps to qualify and clarify their responses, yielding more accurate information, it also encourages learners to actively interact by giving longer answers that help build a wider range of Technology vocabulary. Teachers who stimulate vocabulary learning in Technology classrooms contribute to improving learners' communication competence (Smagorinsky, 2019:42). Due to the wide range of terms used in technology, learners not only learn words vocally but also via visual representations that are connected to them. Some learners gain more knowledge by having to design, draw and reflect on their drawings, as some learners are poor at writing but good at drawing.

It was observed that teachers' questions in the Technology teaching inspired learners to reflect, which helped them to clarify their understanding and improve their communication competence. Engeström (2017:134) asserts that effective communication through question and answer makes learning easier, develops the bond between the teacher and the learner and fosters a supportive environment for learning.

4.3.3.2 Sub-theme 3.2: Discussion technique

In this sub-theme, teachers encouraged interaction by using the discussion strategy as their main dialogic teaching strategy to cultivate thoughts and ideas among learners. This is what the participants had to say regarding the discussion technique:

T4: *I provide learners the chance to voice their thoughts in a secure setting without worrying about judgement or criticism.*

T3: *I offer important vocabulary. I ask groups to discuss the last lesson or their experiences in a group setting. Each group is asked to provide one sentence summarising what they have learned or understood. The person who just spoke during the class discussion is being asked to recommend the person who should speak next.*

T6: *I use the instruction method; I also use an interactive method where they interact as learners. I also use the project and experimental method where I bring a practical object to the workshop for them to experience whatever concept we are doing and discuss as a group.*

*T*4: *I encourage learners to actively engage in the learning process through class discussions and exercises that reinforce their involvement.*

T3: *I structure the lesson to focus on the learner's needs, encouraging their active involvement in discussions, stimulating their critical thinking, and fostering their creativity. Learners get excited when involved in a lesson and it ignites their creativity and enhances their communication skills.*

T6: *I encourage a balance between learners so that they can give each other a chance to speak.*

The three participants (T3, T4, T6) indicated the significance of the discussion technique in their teaching approaches by outlining that it encourages social interaction as it allows learners to engage as they voice their thoughts, provides free space to summarise what has been taught, promotes active participation during learning and balances teaching and learning as every learner is afforded an opportunity to speak. This encourages the use of the dialogic method in the classroom.

Based on their responses, participants believe that the discussion technique helps learners process information, stimulate critical thinking and learn from each other, enhancing their understanding and communication skills. Ahmad (2021:49) suggests

that discussions add interest, engage learners and provide feedback for both teachers and learners.

T6 indicated a balance between learners which allows every learner an equal opportunity to interact. Therefore, it was observed that each learner was given a chance to speak. T6 also uses the project and experimental method where she brings a practical object to the workshop for learners to experience whatever concept they are doing and discuss as a group. This means that the project and experimental method are essential for Technology teaching because they allow practical activities to engage the teacher and learners, provide joint planning that can lead to a better understanding of Technology, and clarify puzzling aspects of topics with which learners typically struggle. It was found that participants felt that classroom discussions offer a good opportunity for interaction and that the teacher is not the sole source of authority in the classroom. When learners are given an opportunity for interaction, teachers get an opportunity to check learners' understanding of the subject and comprehend ideas thoroughly by expressing their own viewpoints and questions during discussions (Abdulbaki, Suhaimi, Alsaqqaf & Jawad, 2018:119).

The researcher observed as T3 suggested that the groups discuss the last lesson or their experiences in a group setting as it is important for their vocabulary development. This suggests that learners solve problems on their own and learn from one another through group interactive conversations. Discussion techniques help learners develop their critical thinking skills and communication competence (Ho & To, 2022:14). In the process, members of a group help each other in need, collaborate to reach goals, share resources and provide opportunities for social interaction, companionship and support. Pressley and Woloshyn (2017) attest that group discussion is a central feature of social constructivist learning theory that infuses cognitive instruction strategy which promotes the development of learners' thinking skills during a learning process that strengthens their dialogue skills.

4.3.3.3 Sub-theme 3.3: Practical demonstration technique

When learners are unable to understand the applications of theories, practical demonstration is the best technique to use. All participants indicated that Technology is a practical subject where learners must learn from the demonstration. Their responses were as follows:

T1&T2: *I make them feel ownership of the topic by giving them the opportunity to demonstrate artefacts. Technology is a very practical subject, sometimes I bring artefacts to demonstrate how things work like showing them syringes to demonstrate how hydraulics work.*

T2 indicated that: *When working with different types of forces, we bring objects to class and see how they react to forces.*

T5 said: *I use the learner-centred method when it is calculation time because I certainly need them to do the calculations by themselves where I must motivate them with the demonstration and use of calculators.*

It is deduced that participants applied practical demonstration methods to achieve numerous purposes in their teaching such as creating a sense of ownership of the lessons. By giving learners an opportunity to see specific artefacts, T1 claimed that learners are given a sense of ownership over the subject. This suggests that because T1 was able to give learners the opportunity to show their skills with Technology, which encouraged learners to be active in their learning, learners became eager as scaffolding took place to help them transition from dependent to independent learning. As T2 responded, learners are allowed to demonstrate practically. This indicates that scaffolding serves as a bridge to new skill levels during a presentation, which is a time when core social and emotional abilities are established. This bridge is created by modelling the skill, providing hints and asking questions about the artefact in order to encourage social engagement. T5 indicated that the learner-centred method is used when it is calculation time because learners are expected to do the calculations by themselves, which implies that T5 offers new information or demonstrates how to solve the problem. T5 then gradually steps away from the learners allowing them to practise alone. The learners receive support or scaffolding before becoming independent, such as taking part in group exercises. The researcher observed that the practical demonstration technique increased learners' understanding of the concepts demonstrated and increased learner enjoyment of the classroom as they interacted, hence helping them enhance their communication competence (Nguyen & Patel, 2022). It is significant to highlight that including learners in the practical demonstration can be advantageous for obtaining conceptual knowledge required for the learners to develop their learning performance through scaffolding to move

through the zone of proximal development (AI-Samarraie, Shamsuddin & Alzahran, 2020:16).

Certainly, an overview of the participants' views towards practical demonstration indicates that learners feel positive. Participants believe that practical work enables learners to learn more about Technology as a subject. According to Yılmaz, Yılmaz and Demir-Yılmaz (2019:421), social learning is related to the experiences we get from others or the environment through observation, as seeing how things work helps one learn faster and have better experiences. Thus, participants' responses led to the finding that doing practical demonstrations enables learners to have a better understanding of Technology as a subject. Participants articulated that learners learn from practical demonstrations in Technology lessons because they can see how everything works instead of theoretically being told what would have happened, enabling them to understand technological concepts**.**

It was observed that in some classes (T2, T4, and T5) the teacher used a learner-centred approach by introducing a dialogic strategy. The teachers began the lesson by inviting learners to share their past knowledge and relevant experiences. Teachers encouraged active involvement and included learners in the learning process with an open discussion. Sun et al. (2022), conducted a study that employed a questionnaire survey to explore the influence of teacher–learner interaction on learning. The study found that the level of teacher-learner interaction positively affected learners learning effects. When learners presented their work to their peers for design reviews, teachers supervised the sessions to encourage dialogue through constructive feedback. These exercises gave learners the opportunity to present their design ideas, explain their designs and justify their decisions. The observations implied that teacher interaction during the design process involved providing feedback and support to learners.

During the lessons, all learners were urged to actively participate in the dialogue. As they communicated, everyone was given the opportunity to participate. It was observed that this enabled a lively interchange of ideas, ensuring that many points of view were explored, and learners were able to expand on one another's concepts. They enquired, gave input and made recommendations to develop and broaden basic ideas. Learners were able to enhance their ideas and think of alternate strategies

thanks to this collaborative process. The statement above correlates with a study by Soller (2019) which analysed patterns of dialogue during collaborative learning activities. They found that through dialogue, learners can effectively build on each other's ideas, ask critical questions, provide constructive feedback and offer suggestions to enhance learning outcomes. The observations revealed that learners in this study who showed signs of having a deeper understanding of the problem created a supportive and stimulating learning environment that motivated other learners to actively participate while others lost interest in the learning process.

4.3.4 Theme 4: Teachers' Support in Using the Dialogue Method

Support for teachers is an essential component of the work of education systems all around the world (Nkambule & Amsterdam, (2018:1). Support is needed for teachers as they try to find their way in the profession, make sense of reform initiatives and put policy into action (Nkambule & Amsterdam, 2018). Given the convincing evidence that dialogic teaching, often known as classroom discussion, is essential for enhancing learner communication competence, it is evident that teachers need major support. The support could take the form of infrastructure, organising workshops for professional and subject-specific development and providing necessary equipment to carry through dialogue learning in the subject of Technology. Three sub-themes emerged which include district support, school support and parental support.

4.3.4.1 Sub-theme 4.1: Subject advisors' support

Teachers of Technology need to be supported by subject advisors to ensure that the teaching and learning process is effective in the classroom, particularly when using the dialogic method. The need for teachers to be supported in a dialogue as a teaching method cannot be over-emphasised (Adewumi, Mosito & Agosto, 2019:26) as teachers' opinions toward its implementation are either neutral or unfavourable as in many cases, they are not equipped with the skills to accommodate all learners in large classes. Teachers in Adewumi et al.'s (2019) research experienced challenges when implementing the dialogic method and among the difficulties was the absence of official support systems.

A few participants attested to receiving assistance of some kind from the district office and some participants experienced the opposite in terms of the district support. In

response to a question on the amount and quality of support they received from the district office, the following responses were given:

T1: *We don't really receive much support from the district, I personally go on the internet to get annual teaching plans, past question papers, and simulations or projects rather.*

Sharing the same sentiments, all participants responded as follows:

T5: *The district is not putting much effort into Technology as a subject.*

T2: *The district provides the written work on what is needed to be done.*

T3: *My facilitator often comes to my school to help me engage learners in my teaching and learning. He helps maintain order and guides me as to how I can divide the groups and get them all involved in learning.*

T4: *Our facilitator makes sure that we meet in what we call road shows, where we learn about the whole curriculum; for example, what the design process is and what should happen in the design process.*

T6*: Our facilitator visits our school at the beginning of each term to bring us the material needed for that specific term. Although the district does not give us enough budget for our projects*.

T1 and T5 indicated the lack of support from the district office. Aligned with this, Ragavan (2022:93) emphasises the necessity for district authorities to assist technology teachers with providing relevant workshops and resources. T1 indicated that to provide quality work, the Internet is suggested for relevant teaching aids which implies that T1 goes out of his way to make sure that the lesson has the appropriate teaching and learning materials for a dialogic approach.

McLennan, Muller, Orkin and Robertson (2017:225) emphasise that district support in South African public schools should become an integral part of an overall strategy to build the capacity of subject specialists to support teachers with new innovative approaches in their attempt to improve teaching and behavioural practices. By using dialogic teaching, with support from the district, teachers may readily master how to

incorporate real-world situations and scenarios and encourage learners to use their expertise to examine and solve related technology challenges.

Responses from participants, however, suggest that the district officials do not give much support to the subject of Technology. T2 received information of the written work that is needed to be completed and T3 indicated that the subject advisor visits the school to help with classroom management encouraging group work and the use of dialogue. In support of the above viewpoint, Margolis (2020:18), states that this will result in the concept of scaffolding denoting a special type of support given by district officials to a teacher when performing a task that an individual might otherwise not be able to accomplish. This implies that the facilitator should assist in engaging learners, maintaining order and dividing groups for effective dialogue learning in school.

Effective support for the professional development of teachers is believed to induce changes in pedagogical content knowledge (PCK), teaching practices, and/or attitudes and beliefs related to learning and teaching (Wilkinson et al., 2017). The National Curriculum Assessment Policy Statement (CAPS) envisions improvement of the quality of learning and teaching and should delegate professional development of teachers to provincial departments through their districts to improve and implement dialogue practices (DBE, 2012:4).

During observations, T4 acknowledged that facilitators host workshops on a variety of topics and T6 noted district official's visits to the school and providing the needed material. According to Tran, Truong, Dinh, Do, Tran and Phan (2020:449), teacher professional development (TPD) is important for helping learners do better in school and making education better overall in regular schools. T6, however, had mixed responses and articulated his disappointment that the district does not give them a large enough budget needed to carry out Technology projects. The implication is that in the subject of Technology, learners do projects, so if the school does not have a budget for apparatus and equipment, it becomes challenging for teachers as learners cannot complete their projects.

Munje and Jita (2020) suggest that the South African Department of Basic Education (DBE) considers individual school contexts when allocating technology resources, to better existing challenges. It was observed that participants differ in their experiences

regarding support from the district. Some participants (T1 and T5) reveal that district officials do not support technology subjects, and as a result, teachers find their own resources from a variety of places such as the internet. Whereas participants (T2 and T4) received the necessary support from the district office for dialogue implementation which assisted them in achieving the learning objectives. T6 acknowledged that subject advisers visit the school, but felt the support was inadequate in terms of funds for teaching resources.

4.3.4.2 Sub-theme 4.2: School support

Effective classroom dialogue depends on teaching that successfully engages learners in supervised learning. It is important for the school to provide the necessary equipment, like components needed for the project, and textbooks, as well as allocating time to allow teachers to implement dialogue during lessons. An effective school is one that prioritises learners' overall development and, in doing so, contributes to the betterment of society and the country (Singha & Sikdar, 2022:545).

The participants shared how they receive support from their schools:

T1: *The Head of Department (HoD) assists where learners are too many in the classroom to engage in dialogue learning. To avoid disruptions, we divide the learners in half. She takes the first half and monitors them while I engage with the remaining half in dialogue learning, When I'm done, we exchange. She engaged with the half that I was busy with to make sure that dialogue learning was a success or not, depending on how they answered, will determine if the lesson was a success, while I was busy with the last half.*

T2: *There are two teachers teaching Technology in my school. We asked for our periods to be at the same time, in that way, we get more time to group the learners in a debate form so that they can engage in a dialogue using the topic that is provided for them.*

T5 added: *The school provides material from its own budget based in line with what is required for a project. The products that technology learners make are developed in line with the design process and input from both the teacher and classmates as a form of dialogue, it is crucial that they embrace themselves, boosting their self-*

confidence and promoting good communication competence. The school is really on our side, and it makes teaching and learning easier. (T5)

Our school goes out of its way to help the technology department at schools. Occasionally we organise trips for learners to go to industrial companies and see all the machines that are taught in class, they make notes and come back to class and have a class discussion of what they saw and how it works. (T6)

However, one participant reported on a different experience

T4: *Our school is under-resourced, and we struggle to get textbooks, so most of the time we communicate in our WhatsApp groups as Technology teachers to discuss the challenges and advantages of collaborative or dialogue learning as you put it, and how we can integrate it into our lessons.*

The four participants' responses indicated that they receive the necessary help to achieve learning outcomes. T1 mentioned that the Head of Department (HoD) assists in sharing learners to accommodate them all in a monitored dialogue. This viewpoint is supported by De Felice, Hamilton, Ponar and Vigliocco's (2022) study which emphasised the role of social interaction in improving teachers' pedagogical practices and facilitating the exchange of innovative ideas. It was observed that all learners are included in dialogue learning despite the overcrowding of their classes, they are well managed. The formal role of a HoD involves conducting classroom teaching, overseeing the department's smooth operation, and arranging extracurricular activities relevant to the subject or learning area. This ensures the proper promotion of the subject, learning domain, or educational phase, as well as the learners' education. By offering support, the HoD has helped the teacher give learners the opportunity to freely express their opinions and ideas. As a result, they may feel more confident and gain presentation and communication competence that will be useful in their future work in the Technology industry.

T2 reported that there are two teachers teaching Technology and with two teachers they can combine their skills and achieve more than what can be achieved alone. As their teaching periods are scheduled at the same time that they are able to team teach, they share learners evenly and set them up in a debate so that they can engage in dialogue and exchange ideas which assists with overcrowding of classes and class

management. T5 added that school budgets for project materials allow Technology learners to create products based on design and teacher-learner input where dialogue is exercised. This fosters self-confidence and communication competence, facilitating the teaching and learning process, which suggests that the school is supportive of teaching and learning, and as a result, teachers can implement dialogue as all required resources are being provided. This way, dialogue will help encourage the development of a cooperative learning environment where learners may benefit from their peers' knowledge, hone their cooperation abilities and solve problems or talk about Technology concerns together.

T6 reported that the school assists Technology teachers by arranging educational excursions, so that learners can see the theory put into practice. While on the excursion, learners make notes which are later discussed in the classroom where a dialogue environment is created. The implication is that when learners learn by seeing, they get to understand more, see theory in practice and create more room for vocabulary enrichment which will be of good use for dialogic learning.

However, T4 expressed a different view with a school that struggles with limited resources and textbooks, relying on WhatsApp groups for Technology teachers to discuss challenges and benefits of dialogic learning. This implies that teachers share their classroom frustrations and ways of implementing dialogue through WhatsApp groups, given that the school is under-resourced. It was revealed that teachers are given some support from the school to implement dialogic teaching as time is provided and the dialogic method is well managed while other teachers share lessons, material and ways to introduce dialogue with limited resources through WhatsApp groups.

4.3.4.3 Sub-theme 4.3: Parental support

Teachers reported a lack of parental support with parents handing over the responsibility of their children to the teachers. Parents from disadvantaged backgrounds are more likely to have a negative opinion of parental participation. Dialogue is essential in tackling the concern raised by teachers about the lack of parental support, particularly among parents from disadvantaged backgrounds who often defer their children's educational responsibilities to the teachers. By fostering open and effective dialogue, teachers can connect with parents through meaningful conversations. This engagement can help change parents' perceptions and motivate

them to become more involved in their children's education. Such a communicative approach helps bridge the gap between home and school, creating a collaborative environment that enriches learners' educational experiences. This means that their lack of parental involvement does not have a motivating effect and is not favourable to learners' learning (Munje & Mncube, 2018:81). The participants were asked about the support they get from parents to use dialogue when teaching Technology, and their responses were as follows:

T1: *Parents are failing us. When we arrange an excursion for learners to go and experience the real world of technology, parents don't pay or attend meetings. parents don't want to be involved. Parental involvement is a huge problem.*

T3: *Parents here don't want to take part in their children's schoolwork. When I give learners a topic to discuss at home and practise peer interaction, less than half of a classroom come back ready for the lesson.*

T4: *Parents are failing us, learners don't practise it at home, it becomes difficult for us to start from scratch, and it becomes time-consuming due to the large numbers of learners in the classroom.*

In contrast, T2, T5, and T6 noted the level of support they get from parents.

T2*: The parents' step in when the school is failing to provide all materials, they are very helpful. When we give them a list of materials to buy, they buy without question.*

T5: *With parents actively involved, they help prepare learners for the classroom environment, I'm grateful that these parents are on board and are doing the most.*

T6: *Parents at this school are our number one cheerleaders. They help us by making sure that learners attend Saturday classes, as sometimes there is not enough time during the week. Parents help us with donations and pay for the trips without complaining.*

In the past, parents were thought of as 'patrons', which implies that they trusted teachers to function *in loco parentis* in topics pertaining to education during the school day (Bua & Martin, 2020). T3 reported that parents are reluctant to participate in their children's schoolwork, and less than half the classroom learners return prepared for

lessons when given topics to discuss at home. T1 says that parents often refuse to pay for Technology excursions for learners or attend meetings, highlighting a significant issue with parental involvement. This suggests that parents are not involved with their children's education, which is in contrast to what T6 indicated. Parents who are involved with their children's education, provide assistance with schoolwork or taking them on outings (Đurišić & Bunijevac, 2017:141). These activities foster a school-centred family dynamic and promote social engagement as parents engage with their children's schooling. Parental involvement in various circumstances affecting their children at school tend to vary.

T4 alluded that parents are neglecting to assist in their children's education, making it challenging to start from scratch and time-consuming due to the large number of learners in the classroom.

In contrast, T2 reported that parents are particularly helpful when schools fail to provide all necessary materials. When provided with a list of materials, they purchase them without questions. Parents help mediate the process of learning by providing support that reflects cultural values (Gusrayani, Djuanda & Sudin, 2019:4). This implies that parents assist teachers in terms of providing the relevant resources to make teaching and learning a success. T5 reported that parents actively participate in preparing learners for the classroom environment, which is greatly appreciated as they are actively involved in their children's education. Judging by how impressed T5 was, it was observed that parents give themselves time to interact and engage in their children's schoolwork, making it easier for learners to understand and be motivated. Parents play a crucial role in ensuring learners attend Saturday classes and support with donations and trips, even when there is limited time during the week.

Parental involvement will help parents and teachers work together to identify and solve any academic or behavioural difficulties the learners may be experiencing. The learner's potential for success and progress is maximised thanks to this cooperative effort, which guarantees a constant and coordinated approach to assistance. Tan and Goldberg (2019) confirm Hill and Tyson's (2009) assumption about positive results of parental involvement in children's learning to be increased positive attitudes about schooling and increased motivation to learn. It was found that on one hand, three participants (T1, T2, and T3) concurred that parental support at their schools was

limited. However, on the other, three participants (T4, T5, and T6) indicated that parental involvement and support assisted the teaching in supervising and monitoring their children's work.

4.3.5 Theme 5: Challenges of Using the Dialogue Method

Participants reported that in using the dialogic method, they were faced with a number of challenges. Sub-themes which emerged from the analysis include speaking at the same time, overcrowded classrooms and English as a medium of instruction.

4.3.5.1 Sub-theme 5.1: Speaking at the same time

Speaking is a crucial part of learning and teaching (Jollibekova & Abdiganiyeva, 2021:115); however, it becomes a problem when speaking out in class is not controlled. Prior to the start of the discussion, it is essential that the purpose of the discussion activity is set by the teacher (Jollibekova & Abdiganiyeva, 2021:116). In this way, the discussion points remain relevant to this purpose, and learners remain on point and do not talk about irrelevant things and causing disruptions.

Four participants had the same sentiments (T1 & 2 & 3 & 5) the participants all reported that with discussions in class, there are challenges as *Learners end up not giving each other an opportunity to speak.* It was observed that one class (T3) was chaotic where learners were uncontrollable. Learners did not handle disagreements well and had conflicts during discussions. They speak all at once and they can be disruptive. T6 brought up the issue of time:

T6: *It's time consuming.*

As indicated by the participants, it seems that learners speak at the same time denying other learners an opportunity to talk. This implies that learners get excited and want to be heard which causes disruption in the classroom. To and Liu (2018) conducted a study involving the challenges of peer and teacher-learner dialogue. It was found that the learners lacked the ability to settle socio-cognitive disputes that are unsupervised through peer discussion. García-Carrión et al. (2020:4) found that unsupervised dialogue results in disputation dialogue which is discovered to be the least cooperative and fruitful one; it describes interactions characterised by conflict, rivalry, and independent decision-making. It was found that due to over-excitement of

engagement, learners did not give one another the opportunity to speak as they all wanted to be heard. It was also observed that in a particular classroom (T1) learners exhibited signs of distraction and disinterest and engaged in unrelated conversations and activities during class time. Smith, Johnson, Brown and Anderson (2019) conducted a study aimed at investigating the factors influencing learner engagement and attention in a classroom environment, with a particular focus on the role of distraction. The results indicated that learners exhibit various signs of distraction, including fidgeting, daydreaming, and using electronic devices for non-academic purposes.

T6 acknowledged that dialogue teaching needs time so that when learners are engaged in dialogue it is time coming and when there is noise and disruption with learners competing to be heard, the teacher wastes time trying to control the situation as well as posing pertinent questions about the topic. This suggests that the participation of dialogue needs to be controlled, therefore teachers must find a strategy to help maintain order during dialogic interactions to maintain classroom management. The utilisation of wait time is the most difficult approach, particularly in whole class dialogue where insufficient wait time and teacher interruptions frequently limit open and tangible questions (Lehesvuori et al., 2021:4).

It was observed that the noise level in classes affected the teaching and learning process. One class (T3) was chaotic where learners were uncontrollable. Learners did not handle disagreements well and had conflicts during discussions. They were not able to engage in respectful and constructive dialogue to resolve differences. The implication is that facilitating group dialogue seemed to present several challenges in the Technology classroom. While some learners dominated the discussion, others were reluctant to participate. It was observed that in some classes (T1, T2, T4, and T6), the noise level was very high which made it difficult to facilitate dialogue. Goswami, Hassan and Sarma (2018) conducted a study on issues relating to the effects of noise on learners at school, especially the effects of environmental and classroom noise on learners' academic performance. The study found that there was a significant drop in learners' performance when the background noise level interfered with the lesson. The implication is that the excessive noise makes it difficult for learners to concentrate, follow instructions, and engage in discussions or group work

effectively. The observations revealed that found that, due to noise level, some learners experienced difficulties receiving immediate feedback.

4.3.5.2 Sub-theme 5.2: Overcrowded classrooms

The rise in school enrolment, and large class sizes have made social interaction challenging for teachers in the classroom (Akoto-Baako, Heeralal & Kissi-Abrokwah, 2021:181). Regarding overcrowded classrooms, participants also acknowledged the issue of large class sizes. The response is as follows:

T3: *The challenge comes when classes are overcrowded. For example, the ratio in the technology classroom should be 1:30, but we have 40 learners in the class making it difficult to manage all of them during dialogue interaction.*

There is a common problem regarding the teacher-learner ratio in schools generally, as indicated by T4 and T5. The implication is that schools are admitting more learners than the infrastructure and resources can accommodate, creating large class sizes and overcrowding in classrooms. This has an impact on the teaching and learning process. Akoto-Baako et al. (2021:170) have reported that the escalation in enrolment results in larger class sizes, impeding teachers' ability to provide individual attention to learners and thereby affecting the teaching and learning process. Consequently, teachers struggle to offer scaffolding or engage learners effectively and in addition, it was difficult to control learners and the noise level which often leads to disciplinary problems during dialogue interaction.

In the South African context, the Education Labour Relations Council (ELRC) stipulates that the accepted teacher-learner ratio stands at 1:40 (West & Meier, 2020). Classroom overcrowding in Grade 9 Technology classes presented several challenges that disrupted the learning environment. It was observed that in all five classes (T3), there were 40 to 45 learners. The 6th class was very overcrowded with about 50 learners in the classroom. There was a limited physical space for learners to move around, work on projects and conduct experiments. The researcher was squeezed into a corner to observe as there was no space. This limitation can hinder hands-on activities and practical learning experiences, which are crucial in Technology classes. This finding concurs with Taylor and Panton's (2019) study which found that the influence of classroom density, characterised by overcrowding, affected

learner engagement and communication during group activities. T6 also had a problem with overcrowding in the workshop and as a result, it was challenging to provide individual attention to each learner. Learners had difficulty receiving immediate feedback and clarification, which can hinder their understanding and progress in the subject. The observations revealed that overcrowding limited opportunities for learners to work together effectively, impeding their ability to learn from and support one another.

Overcrowded classrooms result in a variety of stressors that could negatively affect a learner, including lack of didactic support, and excessive noise, resulting in uncontrollable dialogue lessons (West & Meier, 2020). Akoto-Baako et al. (2021) suggest that reduced class sizes enable the teacher to engage in deliberate social interactions, offer scaffolding and address both group and individual needs in the classroom. Matsepe, Maluleke and Cross's (2019) research within the Sekhukhune Region of Limpopo Province revealed that teachers encounter various difficulties during teaching and learning due to the high numbers of learners in the classrooms. These challenges encompass difficulties in maintaining learners' interest and in overseeing dialogue among learners.

4.3.5.3 Sub-theme 5.3: English as a medium of instruction

According to Ntombela (2023:1), English is widely used and dominates the educational system worldwide. The dominance of the English language in schools according to Ntombela (2023), has not produced the often-promised results, due to language barriers. The use of English as the Language of learning and teaching (LoLT) in Technology classrooms has been cited as a challenge, particularly in using the dialogic method, the participants shared the following:

T5: *English which is the medium of instruction is also a problem.*

To which T6 agreed.

The two participants indicated that the use of the English language as the LoLT is a challenge when learners engage in dialogue. This suggests that there is a language barrier and learners' proficiency is not adequate, and as a result, learning outcomes are affected. Thus, the response by participants indicates that learners taught in English struggle to comprehend the content covered in Technology as a subject.

English is a barrier to effective learning for many learners who use it as their second or additional language (Munyaradzi & Manyike, 2022:8). Learners whose first language is not English are disadvantaged since they are forced to learn in what is considered a 'colonial' language, which is English (Stats SA, 2011). It was observed that teaching in English as the LoLT was a challenge as all learners come from a vernacular background, and it seemed that their English proficiency was not adequate to cope with learning content subjects and communicating using the dialogic method in Technology class was difficult. To address the challenges faced by learners whose first language is not English, several strategies can be employed. One effective method is to implement bilingual education, allowing learners to learn in both their native language and English. This approach helps bridge the gap between their vernacular background and the requirements of learning in English. Research by Smith and Garcia (2022) indicates that bilingual education significantly enhances comprehension and retention in subjects taught in a second language. Additionally, targeted language support programs aimed at improving English proficiency can provide learners with the necessary skills to better grasp content subjects. Brown and Li (2022) highlight the critical role of language support in aiding students through academic challenges. Furthermore, using the dialogic method in Technology classes can be enhanced through scaffolding techniques. Teachers can gradually build learners confidence and proficiency in English by engaging them in structured and interactive communication exercises. Johnson and Wang (2022) note that scaffolding in language learning fosters greater student engagement and understanding. Together, these strategies strive to create a more inclusive and supportive learning environment that recognizes and addresses language barriers.

Table 4.2: Summary of findings through social constructivist theory

SOCIAL INTERACTION	ZONE OF PROXIMAL DEVELOPMENT	SCAFFOLDING	OTHER FINDINGS
The study revealed that four participants expressed the sentiment that classroom discussions provide a rich platform for interaction. They shared that learner engagement flourished when learners believed that their opinions matter.	It was found that two participants believed that practical demonstrations enabled learners to have a better understanding of the Technology subject, unlike relying solely on the lecture method.	The use of questioning in Technology teaching inspired learners to reflect, clarify understanding and improve communication competence. The act of asking questions serves as a scaffolding technique by guiding learners, promoting reflection, clarifying understanding, and improving communication competence within the context of the learning process.	It was found that learners were encouraged to use break times to complete their given tasks due to the limited time allocated to the Technology subject.
The study discovered that all six participants allowed learners to take control of their learning during the design process where they gathered information on their own allowing them an opportunity to engage with one another and report investigation findings to the class creating room for dialogue interaction.	Delving into the study's findings, a captivating finding unfolded that all participants in this study held a compelling belief that learners develop their learning through design processes which led to learners moving through the ZPD as interaction takes place among the peers, resulting in a learner-centred classroom.	One participant provided scaffolding by influencing their understanding of the making process to guide learners, encouraging their independence and fostering problem-solving skills.	The findings showed that two participants encouraged learners to draw a table for a checklist of all the evaluation processes to help them identify their mistakes so that they can correct them before they can present their product to the class.

SOCIAL INTERACTION	ZONE OF PROXIMAL DEVELOPMENT	SCAFFOLDING	OTHER FINDINGS
A consensus emerged among all six participants that during the investigation skill, learners were encouraged to interact with members of the	The findings disclosed that all the six participants believed that communicating feedback through a dialogic approach,	Based on the study's findings it was concluded that all six participants seemed to be guiding learners in applying knowledge of the design	The findings revealed that two of the six participants shared the same sentiments that language was a problem as English is learners' additional
The study confirmed that one participant mentioned that the noise level during dialogue interaction led to disciplinary problems, due to overexcitement of engagement. Learners did not give each other the opportunity to be speak and be heard. The study also revealed that three participants agreed that due to overcrowding, it was difficult to control learners which led to disciplinary problems for learners during dialogue interaction.			It was established that six participants differed in their experiences regarding support from the Technology subject advisors. Two participants revealed that subject advisors did not put much effort into Technology subject whereas the other two participants got the necessary support needed from the district office subject advisors. One participant had mixed feelings about the support received from subject advisors since there was a lack of support regarding teaching resources but there were visits from subject advisers visiting the school just to check if they were on par with the annual teaching plan (ATP).

4.4 CHAPTER SUMMARY

This chapter presented, analysed and interpreted the data gathered through semi-structured interviews and observations. It used the verbatim responses of teachers to explain the interpretation of the findings. It presented and discussed themes and subthemes that emerged from the data. The findings revealed that in this study, teachers employed the dialogic method as a teaching approach. They illustrated their knowledge of social constructivist theory by recognising each learner's ZPD, providing support through scaffolding, and involving learners in meaningful one-on-one conversations. Concerning the technology design process, the findings revealed that despite Grade 9 Technology teachers doing their utmost to guide learners to apply knowledge of the technological design process to improve their knowledge and understanding, two of the six participants mentioned that they lacked sufficient support for implementing technological design learning approaches as subject advisors did not put much effort in guiding them in the teaching of Technology as a subject. The findings are summarised in the final chapter which also includes overall conclusions and offers recommendations.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This research aimed to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process.

The study's research objectives were to:

1. Examine the Grade 9 Technology teachers' understanding of the design process to enhance communicative competence.
2. Investigate how the Grade 9 Technology teachers teach the design process to enhance communicative competence.
3. Find out how the Grade 9 Technology teachers are supported in using dialogue to enhance communicative competence.
4. Identify the Grade 9 Technology teachers' challenges in using the dialogue to enhance communicative competence.

This chapter provides a recap of the research outcomes, draws conclusions based on the findings, discusses the contributions of the study, identifies its limitations, offers recommendations, proposes areas for future research, and offers concluding remarks.

Chapter 1 introduced the study, including an overview, background information, theoretical framework, problem statement, research questions, aims, and objectives. It briefly touched on the research methodology, trustworthiness measures, ethical considerations, and mentioned the study's limitations.

Chapter 2 provided a comprehensive literature review of previous studies related to the research topic. It analysed and synthesised findings from various studies conducted previously. The Social Constructivist Theory (SCT) served as the theoretical framework for this study. The chapter delved into the use of dialogue in technology classrooms across international, national, and local contexts. Additionally, it outlined the policies established by the Department of Education aimed at ensuring quality assurance.

Chapter 3 focused on discussing the research methodology, which included aspects such as the research design, methods employed, measures ensuring trustworthiness, and ethical considerations.

In Chapter 4, the study's findings were unveiled. Through a thorough presentation, analysis, and interpretation, the data gathered from semi-structured interviews and observations were elucidated. The discussions were organised around themes and sub-themes derived from participants' direct responses.

5.2 SUMMARY OF RESEARCH FINDINGS

The research purpose is a statement of ‘why’ the investigation is being conducted or the objective of the examination (Singh, 2019:28). After addressing the research questions, attaining the mentioned objectives, and developing themes, the various participants who were post-level one teachers, from the sampled schools contributed to the findings and suggestions discussed below. This section discusses the key scholarly findings based on the SCT.

5.2.1 Key Scholarly Review Findings

The theoretical framework which underpinned this study was explained (*cf*. Chapter 2, sub-section 2.4.1) which is the social constructivism theory. The theory suggests that learners should be actively involved in their learning, engaging in hands-on activities, problem-solving, and critical thinking. It also highlights the importance of collaborative learning, where learners interact with peers and engage in dialogue to construct new knowledge. The key findings are reviewed according to the Social Constructivist Theory (SCT) components which are, social interaction, the zone of proximal development (ZPD), and scaffolding. Figure 5.1 shows the implementation of interactive learning activities that fall within the framework of SCT.

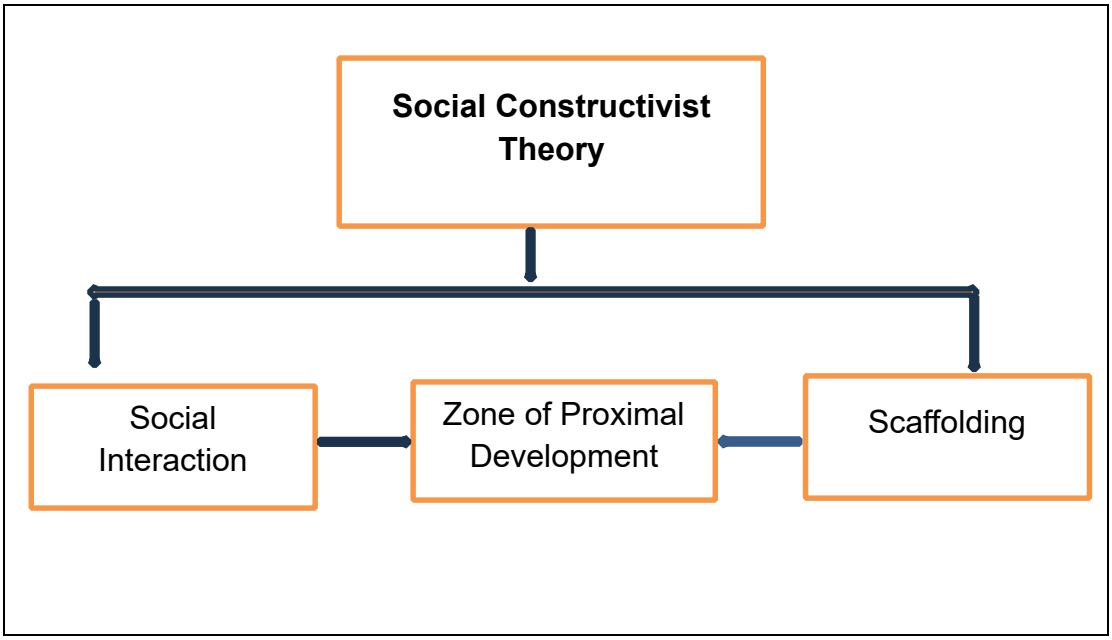

Figure 6.1: Implementation of interactive learning activities

The findings show social constructivism as a contributory factor to the social interaction, zone of proximal development and scaffolding which comprise of the implementation of interactive learning activities that fall within the framework of social constructivist theory.

5.2.2 Social Constructivist Theory as a Contributory Factor

The notion of social constructivism is crucial in influencing the educational setting in classrooms. The research used social constructivism as a theoretical framework to endorse the notion that learning is a process facilitated by social interactions. The research conducted by Saleem, Kausar and Deeba (2021) sought to investigate social constructivism as a learning theory and its impact on teaching techniques, learner motivation and the overall teaching and learning process. Saleem, Kausar and Deeba's (2021) study aimed to examine social constructivism as a learning theory and its implications for teaching methods, learner motivation and the whole teaching and learning process. The findings stated that due to social constructivism, the role of learners has been changed from passive listeners to active participants and co-constructors of knowledge among peers, which also transfers the responsibility of knowledge development from the teachers to learners. The theory

emphasises that knowledge is actively constructed through social interactions and collaborative activities.

Likewise, Akpan, Igwe, Mpamah and Okoro (2020:51) affirm that social constructivism is called collaborative learning because it is based on interaction, discussion, and sharing among learners. In the classroom, this means fostering an environment where learners engage in meaningful dialogue, work together on projects, and actively participate in the learning process. It was revealed that the Grade 9 Technology practical demonstration technique increases learner understanding of the concepts demonstrated and increases learner enjoyment of the classroom as they interact, hence helping them enhance their communication competence. Social constructivism contributes to a dynamic and learner-centred approach, encouraging critical thinking, problem-solving and the development of a deeper understanding of Technology as a subject.

5.2.2.1 Social interaction

Within the framework of this study, social interaction is fundamental to the success of dialogue teaching in Grade 9 Technology classrooms for enhancing communication competence. It creates a dynamic and collaborative learning environment where learners can learn from each other, receive immediate feedback and apply their communication competence. Interactions with peers and the teacher offer immediate feedback and opportunities for reflection. Constructive feedback from classmates and the teacher helps learners identify areas for improvement in their communication. It was revealed in this study that feedback is communicated to the learners through a dialogic approach, teachers provide the learners with suggestions for development allowing learners to engage socially and correct mistakes (*cf*. Chapter 4, sub-section 4.3.2). Zahid, Qinghe and Sohail (2021) agree that feedback is a social interaction process. Concerning social interaction, the study found that participants felt that classroom discussions offer a good opportunity for interaction and that the teacher is not the sole source of authority in the classroom (*cf*. Chapter 4, sub-section 4.3.2). Meanwhile, in another study, Carmona-Medeiro and Domingo (2021:1) discovered the importance of a meaningful understanding of the role of social interaction in learning to promote communication competence. A consensus emerged among all six participants that during the investigation, learners were encouraged to interact

with members of the community as part of the research, creating opportunities for dialogue and making it easy for learners to own their lesson (*cf*. Chapter 4, sub-section 4.3.1.).

Social interaction in dialogue teaching enables learners to practise communication and develop competence in a more authentic, real-world context.

5.2.2.2 Zone of proximal development

When it comes to improving communication competence in a Grade 9 Technology classroom the Zone of Proximal Development (ZPD) is an extremely helpful tool. Since Irshad, Maan, Batool, and Hanif (2021:234) state that ZPD is the difference between a learner's autonomous talents and what they are capable of doing with the assistance and supervision of other people, it is important to distinguish between the two. Throughout the course of this study, it has been shown how teachers offered learners both direction and assistance. This led to the finding that the teachers guided learners in the design process and permitted learner-led decision-making by conceding dialogic interaction as learners seek clarity around learning (*cf*. Chapter4, sub-section 4.3.2.). By pairing learners of differing abilities and skill levels, it was possible for them to support and learn from each other. This allowed communication and collaboration, as they work together to solve problems and complete tasks. In this study, learners collaboratively explored topics within their ZPD, where they challenged and supported each other, fostering growth in communication competence through shared learning experiences (*cf*. Chapter 4, sub-section 4.3.2.). This implies that learners were allowed to demonstrate their learning through dialogue as they communicated amongst themselves so that teachers can identify their strengths and weaknesses and bring further amendments in the form of feedback if needed. According to Irshad, Maan, Batool and Hanif (2021:235), the ZPD highlights the area which is between a child's current development, as a result of independently solving problems, and the extent of development - as appraised by problem solving under the guidance of an adult. Breive (2020) conducted a case study that explores the co-creation of a ZPD in a teaching learning activity in a Norwegian high school. The findings illustrated how a learner and a teacher co-create a ZPD by expanding each other’s action possibilities, and how the co-creation is fundamentally based on mutual trust and responsibility. The study illustrated the importance of being receptive

to learners' contributions and, above all, trusting learners' abilities to take responsibility for moving teaching-learning activities forward.

5.2.2.3 Scaffolding

Scaffolding, according to Vygotsky (1978), involves teachers providing structured support to learners within their ZPD, allowing them to tackle tasks beyond their current capabilities. Based on the scaffolding component, to help learners move from the ZPD, social interaction activities are needed (McLeod, 2019). The ZPD in this study was applied in various ways to support learners' learning and skill development. It was indicated that participants designed tasks and projects that challenged learners just enough to encourage their growth and development, without overwhelming them. This was achieved by providing scaffolding, that helped learners bridge the gap between what they already know and what they need to learn (*cf*. Chapter 4, sub-section 4.3.2).

The study also revealed that teachers' scaffolding helped in the making process where learners were able to work on their own to develop their products. Learners worked in pairs or groups, with more advanced learners guiding and supporting their peers. This suggested that through scaffolding, learners were able to solve problems on their own and learned from one another through group conversations (*cf*. Chapter 4, sub-section 4.3.3.1). This type of collaborative learning allows for peer teaching and learning, fostering a sense of active participation and engagement. This is supported by Spadafora and Downes (2020) as alluded to in their study that scaffolding is a method of teaching, where a more knowledgeable individual provides a framework that allows a less knowledgeable individual to be able to think at a higher level than they would have been able to on their own. The participants allowed learners to work independently moving away from scaffolding and give assistance where necessary to improve communication competence and reach learning objectives. The implication was that learners were scaffolded through teacher or peer support so that they could be motivated to participate in discussions in a conducive learning environment.

5.3 KEY EMPIRICAL FINDINGS

This study has determined that teachers in Tshwane South District Grade 9 Technology classes employ dialogue as a teaching strategy. They incorporate various techniques like the discussion technique**,** and practical demonstration technique to facilitate discussions, but there are challenges that impede the promotion of dialogue in Technology classes which include overcrowding in the classrooms, English as a medium of instruction and learners speaking at the same time. The main research question was: *How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning design process?*

Four questions were devised to address the main question. Research conclusions were derived from the responses provided by the participants to these research questions.

5.3.1 RQ1: What is Grade 9 Technology teachers' understanding of the technology design process to enhance communicative competence?

Teachers who apply the dialogical strategy in teaching the technological design process have a deep understanding of its benefits. The dialogical method involves engaging learners in meaningful conversations and collaborative decision-making throughout the design process.

It is vital that participants understand that design process in order to provide guidance and equip learners with design knowledge. In this study, it became clear that through the teacher's understanding of the design process, a dialogical environment for communicative competence was created. Integrating the dialogical strategy into the technological design process can create a more learner-centred, collaborative, and reflective learning experience for learners. This helped learners ask questions to get more information and then come to their conclusions about the issue at hand. West (2019) concurs that during the scaffolding process, the teacher assists the learner in mastering an assignment or idea that the learner is first unable to understand on their own. It was found that learners developed their learning through the design processes, which leads to a zone of proximal development as interaction takes place among peers, resulting in a learner-centred classroom. According to Akdemir and Özçelik

(2019:1147), the importance given to learner-centred teaching methods and techniques is increasing as a reflection of the constructivist approach.

Grade 9 Technology teachers' understanding of the design process with the focus on solving technological problems, afforded learners the opportunity to engage with peers to discover solutions thereby developing their cognitive thinking. In support of the above statement, Loeng (2020:2) indicates that individual cognitive learning entails individuals taking the initiative and responsibility for their own learning before their interaction. Learners developed their learning through dialogue during the design process in a learner-centred classroom, where interaction took place amongst their peers and where learners could draw on what they could do without assistance and move to doing extended tasks and create solutions with guidance from the teacher or support from their groups.

5.3.2 RQ2: How do Grade 9 Technology teachers teach the technology design process to enhance communicative competence?

Teachers who employ the dialogical strategy to teach the technological design process use various methods to facilitate meaningful dialogue and engagement. The study found that teachers encourage learners to actively participate, share ideas, and constructively challenge one another's viewpoints. Instead of providing all the answers, teachers posed open-ended questions that stimulated communicative competence. Learners were encouraged to showcase their designs and through discussion that clarified the purpose and components of their designs, assisted them in completing with the drawing process. Teachers guided learners throughout in the design process scaffolding their learning but encouraging learner-led decision-making by ensuring that dialogic interaction assisted in seeking clarity of learning. The move to work independently with assistance when needed, enhanced learners' communicative competence.

Teachers' use of the dialogic strategy produced learners who engage in dialogue who are more likely to pose questions, offer their opinions and advance in collective knowledge. Participants in this study gave the impression that they know the importance of dialogue. It is shown in how they formed a setting that was conducive and encouraging for learners to ask each other content-related questions. According

to Shanmugavelu, Ariffin, Vadivelu, Mahayudin and Sundaram (2020:45), in a question-and-answer period, teachers may demonstrate and practise a range of questioning strategies to inspire learners and foster critical thinking. It was found that teachers in this study introduce general related questions to the recent topic that learners are familiar with in a setting where the learners feel comfortable having discussions.

The participants specified the implication of the discussion technique in their teaching by mentioning that it promotes social interaction as it permits learners to participate as they voice their views. Mthethwa (2021:10) suggests that the core concept of constructivism as a learning theory is that teaching should be predominantly learnercentred and should give learners the opportunity to actively engage in and participate in their education. It was found that participants felt that classroom discussions offer a good opportunity for interaction and that the teacher is not the sole source of authority in the classroom. The findings in this study show that teachers encourage independence by using discussions technique in promoting dialogue amongst the learners.

This study found that through the practical demonstration technique, learners were given ownership of the topic by given the opportunity to speak or demonstrate their work. According to Thabethe (2018:47), through active learning, technology enables learners to manipulate technological concepts in the context of problem-solving. Furthermore, Thabethe (2018) stipulates that in a situation where learners actively participate in the learning process, a platform is created for them to formulate ideas about the problem, test those ideas through experiments and simulations and evaluate those ideas through real-world problem-solving, consciously steering them away from memorisation and toward the use of prior knowledge.

5.3.3 RQ3: How are Grade 9 Technology teachers supported in using dialogue to enhance communicative competence?

Participants had differing experiences of support from the district or subject advisors. Some participants revealed that subject advisors did not put much effort into the Technology subject, they did not get enough support which made it difficult for them to implement the dialogic strategy effectively. Although participants acknowledged that subject advisers visited the school, there was inadequate teaching resource support from the district in terms of funds and emphasised insufficient financing for instructional

materials. Mapotse (2017:685) suggests that Africa will continue to face severe consequences if teachers are not adequately prepared to teach Technology subjects, both domestically and globally. As noted by Lee et al. (2022) argue that without proper teacher preparation in Technology education, learners risk falling behind in technological skills, which can severely limit their future career prospects and widen the educational gap. Kim and Park (2023) also emphasise that a shortage of qualified teachers in Technology subjects can cause economic setbacks by creating a skills gap in the workforce, thereby stalling innovation and economic growth. In a similar vein, Davis et al. (2023) stress that insufficient teacher training in Technology education not only exacerbates the technological divide but also hampers learners' readiness for higher education and careers, intensifying regional disparities in global competitiveness. This situation calls for urgent measures to be taken to address the issue by district and subject advisors.

Support within the school is also vital. Some participants were given support to implement dialogic teaching as enough time was provided by the school, lessons were shared as was resource material. However, in some case school support was limited as some participants were not satisfied with the efforts taken by the school to support the teaching of technology particularly with the supply of resources such as relevant teaching materials like using stimuli, such as newspaper articles or video clips, to get learners engage in dialogue where they can ask questions and jointly explore topics to encourage dialogue in classrooms. Mapotse (2017:685) found through interactions with Technology teachers that many of them expressed a need for their schools to allocate budgetary resources specifically for the Technology subject they teach, particularly in terms of technological resources.

Support from parents varied with participants even though the parent-teacher relationship has an effect on children’s education. On the one hand, three participants indicated that there was parental involvement and support with supervising and monitoring their children’s work, while on the other, three participants concurred that the parental support was disappointing and demotivating. According to Llamas and Tuazon (2016:59), parents become comfortable when the education system requires their involvement in school activities. Parental involvement in learning acts as a gel

that helps to make learning for children pleasant and encourages them to work even more as they seek to make those closest to them proud (Ntekane, 2018:4).

5.3.4 RQ4: What are Grade 9 Technology teachers' challenges in using the dialogue to enhance communicative competence?

Although the dialogical strategy is highly effective in enhancing communicative competence, it does come with some challenges. Participants indicated that the high teacher-learner ratio led to overcrowding in classrooms which hindered the capabilities of the participants. It was difficult to control learners which led to disciplinary problems during dialogue interaction. An overcrowded classroom is not conducive to effective teaching and assessment strategies (Marais, 2016:2). In this study, the number of learners in the classrooms was high which is opposed to the Learner Educator ratio (LER) which is 40:1 according to the Education Labour Relations Council (ELRC). The overcrowding in the classrooms impedes the teaching and learning environment as teachers are unable to give all learners undivided attention. In addition, overcrowding results in limited opportunities for learners to work together effectively, impeding their ability to learn from and support one another.

As learners spoke at the same time denying other learners an opportunity to talk, this led to raised noise levels which implies that learners got too excited and wanted to be heard which disrupted the lessons. Cicekci and Sadik (2019:25) state that noise in the classroom environment is an impediment that affects learners' attention.

English as the LoLT is a challenge as learners have to engage in dialogue with a language that is not their mother tongue. Language was identified as a challenge since all learners come from a vernacular background, and teaching and learning take place in English, which they do not understand well. With poor English language proficiency, it creates a language barrier, making it difficult for learners to engage in effective dialogue. Since all learners come from different indigenous African language backgrounds, and teaching and learning take place in English, a language in which they may not have full proficiency.

5.3.5 Main RQ: How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning design process?

Effective dialogue is crucial for developing learners' communication competence and essential for their academic success (Kim, 2019). However, the study revealed teachers need training to develop their Subject Content Knowledge (SCK) as well as their Pedagogical Content Knowledge (PCK) (Shulman,1986, 1987). Armed with SCK and PCK, these well-prepared teachers are able to create an environment where learners feel comfortable in working together with their peers, questioning, debating and sharing their views. It is in this learner-centred classroom that learners are encouraged to move from what they can do without assistance to challenging tasks that need support and scaffolding. Hence, it was found that learners develop their learning and communication competence through the design process, which moves them through the zone of proximal development as interaction takes place in a learnercentred classroom among peers where learners progress from what they cannot do to what they can with help and support.

Teaching techniques such as question-and-answer and practical demonstrations increases learners' understanding of the subject content and concepts. Techniques such as group projects and peer review play a key role in fostering communication. Interactive methods encourage learners to express their ideas, ask questions and collaborate, thus improving their communication competence (Mann & Walshaw, 2019). Brainstorming sessions where learners work in small groups assist in generating ideas for their designs. Dialogue through discussion is encouraged among group members, promoting the exchange of ideas and encouraging learners to showcase their designs that focus on using specific technical words to clarify their designs, which thus assists in promoting communication competence. Based on their research and brainstorming, learners are scaffolded in developing conceptual designs for their projects. This interaction increases learner enjoyment in the classroom realising that their opinions matter, hence helping them enhance their communication competence. Allowing learners the opportunity to voice their thoughts and select methods that work best is the first step in fostering a communication competence. This

is accomplished through dialogic interaction with both teacher and learners, with teachers facilitating meaningful classroom dialogue (Darling-Hammond et al., 2019).

English is the LoLT but could prove challenging when learners engage in dialogue as English language proficiency may not be adequate. To ensure that learning outcomes are not affected, teachers should assist in developing learners' language skill though the use of clear, concise language and scaffold complex concepts to ensure inclusivity for all learners (Kleifgen & García, 2019). By integrating thorough training, effective teaching techniques, robust resources, institutional support and strong language skills, teachers can create a dialogic classroom environment. This environment conducive to learning, enhances communication competence and deepens learners' understanding of the design process, (Alexander, 2019).

However, continuous professional development is vital so that teachers keep abreast of innovations and changes to the curriculum. Programmes, workshops and support from both the District and school focusing on these areas, provide teachers with the knowledge and skills needed to engage learners effectively in the classroom.

5.4 RECOMMENDATIONS

The findings of this study are crucial for legislators and policymakers to address the deficiencies in the teaching of the subject of Technology. Therefore, based on the findings, the following recommendations are offered for district subject advisors, schools, teachers and parents.

5.4.1 Recommendation for District Subject Advisors

- Create mentorship programmes that connect skilled Technology district subject advisors with Technology teachers who are recently employed.
- Encourage less seasoned teachers to advance professionally by sharing techniques, insights and real-world experiences.
- Distribute resources for the creation and improvement of the Technology curriculum in accordance with national standards and educational objectives.
- Offer guidance and support to Technology teachers

5.4.2 Recommendation for Schools

- Offer regular professional development opportunities for teachers to deepen their understanding of the dialogue strategy. These workshops or training sessions should be facilitated by experts in communication and should include hands-on activities and opportunities for reflection. This could include online discussion forums, video conferencing platforms, or collaborative document creation tools.
- Allocate dedicated time for teachers to collaborate, share resources, and discuss best practices related to the dialogic method. This can be done through regular team meetings and departmental meetings.
- Recognise and celebrate the efforts of teachers who successfully implement dialogue-based activities to enhance communication competence.
- Ensure that teachers have access to a wide range of resources and materials that support the implementation of the dialogue strategy in their classes. This may include comfortable seating arrangements, interactive whiteboards, microphones and other audio-visual equipment.

By implementing these recommendations, schools could create environments that support Technology teachers in effectively using the dialogue strategy to enhance communication competence and promote learners' success.

5.4.3 Recommendations for Teachers

- Define specific communication competence they want their learners to develop, such as active listening, persuasive speaking or effective questioning.

Communicate these objectives to their learners, so they understand the purpose of the dialogue activities.

- Encourage active participation from all learners and establish guidelines for respectful communication.
- Give learners enough time to process their thoughts before responding to dialogue activities as this will allow learners to formulate their ideas effectively, leading to more thoughtful and coherent contributions.

- Begin with simpler dialogue activities and gradually increase the complexity as learners develop their communication competence.
- Regularly provide constructive feedback on learners' dialogue skills, focusing on strengths and areas for improvement.
- Collaborate with their colleagues and share successful good practices in dialogue-based activities in an environment where they can exchange ideas, discuss challenges, and find solutions together.

5.4.4 Recommendation for Parents

Parents play an important role in supporting teachers in implementing the dialogue strategy.

- Encourage dialogue-based activities at home to reinforce what their children are learning in the classroom which could include engaging in conversations, discussing current events or even playing games that involve communication and critical thinking.
- Create an environment that encourages their children to express their thoughts, ideas, and emotions freely at home. They should welcome their children's contributions to discussions, debates, or storytelling activities. This fosters their confidence and ability to participate in dialogic methods.
- Teach their children the importance of respectful and constructive communication.
- Encourage them to listen patiently, ask questions, and provide meaningful input. Model good communication practices and encourage them to approach disagreements or conflicts with empathy and understanding.

5.5 AVENUES FOR FURTHER RESEARCH

Teaching using a dialogue strategy enhances interaction among the learners. Therefore,

- The same research topic should be conducted in public primary schools in the Tshwane South District so that learners can get used to the dialogue strategy at an early stage.
- The same research topic should be directed to subject advisors regarding how they would provide support to Technology teachers in terms of dialogue teaching.

5.6 LIMITATIONS OF THE STUDY

This study faced certain limitations. Firstly, it was restricted to a small sample comprising only three public secondary schools within the Tshwane South District. Additionally, the number of participants was limited due to the qualitative nature of the study. Secondly, this study adopted a qualitative approach, which inherently constrained its scope, unlike employing a mixed methods approach that might have provided a more comprehensive understanding of the research problem. Moreover, the study relied on two data collection methods, namely interviews and observations, each with limitations regarding the quantity and quality of the data that could have been obtained.

5.7 CONCLUDING REMARKS

Technology teachers need to have a profound comprehension of the dialogue teaching strategy as part of their teaching skills. This will equip learners with communication competence that can be beneficial beyond the classroom.

Consequently, it is crucial to provide continuous teacher professional development for Technology teachers within the Tshwane South District focusing on the dialogic teaching method, and to promote professional learning communities among the teachers. Teachers can be supported in using the dialogue strategy to enhance learners' communication competence in several ways. Providing teachers with professional development workshops or training sessions focused on the dialogic method can help them understand the theoretical underpinnings, effective strategies and best practices for facilitating dialogue in the classroom. The study acknowledged that offering teachers access to a wide range of resources and materials can be beneficial. This may include sample dialogue activities, lesson plans, conversation starters, prompts and assessment tools that align with the objectives of enhancing communication competence.

To improve learners' communication competence, this study was conducted to learn about the experiences that teachers had using dialogic teaching method in Grade 9 Technology classrooms. The researcher, being a teacher observed the difficulties and contradictions that characterised the teaching of Technology. A beneficial impact on Technology subject was the intended contribution of this study. Since Grade 9 is an exit phase and requires more attention and appropriate teaching approaches, the

researcher is fully aware of the challenges involved in teaching this Technology subject for this grade of learners. Since Grade 9 is the last year of General Education and Training (GET), this study will add to the body of knowledge regarding the problems that impede the effective and efficient implementation of the teaching of Technology in classes using dialogic method.

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REFERENCES

Abu-Tineh, A.M. 2015. The perceived effectiveness of the school-based support program. *European Journal of Training and Development*, 39(8):721-736.

Adams, P. 2018. Exploring social constructivism: *Theories and practicalities of Education,* 34(3):243-257.

Adewumi, T.A., Mosito, C. & Agosto, V. 2019. Experiences of teachers in implementing inclusion of learners with special education needs in selected Fort Beaufort District primary schools, South Africa. *Cogent Education*, 6(1):1-10.

Ahmad, M. 2021. Criticizing Duolingo as a learning app: Perspectives of learning game designer and language teacher. In *Proceedings of INTED2021 Conference: 10610-10619.*

Ainuddin, M.R., Tareen, D.D. & Kakar, A.Q. 2023. Exploring the teacher and learner relationship in overcrowded classrooms at a secondary level in district Quetta. 1(1):160-170.

Akoto-Baako, H. & Kissi-Abrokwah, B. 2021. Perceived influence of large class size and psychological classroom environment on students' academic performance in senior high schools in Kumasi Metropolis, Ghana. *Asian Journal of Education and Social Studies*, *19*(3):10-23.

Al-Deen, A.I. & Nawas, B. 2020. Higher Education Council reviews distance learning experience. *The Jordan Times,* 16 August. http://jordantimes.com/news/local/highereducation-council-reviews-distance-learning-experience

Alfayez, F.A. & Alshammar, A.K. 2017. Challenges Hindering a Supportive Culture of Dialogue in Saudi Arabia. *Journal of Education and Practice*, 8(32): 58-66.

Al-Riyami, A.T. 2015. Main approaches to educational research. *International Journal of Innovation and Research in Educational Sciences,* 2(5):2349-5219.

Al-Samarraie, H. Shamsuddin, A. & Alzahrani, A.I. 2020. A flipped classroom model in higher education. A review of the evidence across disciplines*. Educational Technology Research and Development,* 68(3):1017-1051.

Alvi, M.H. 2016. *A manual for selecting sampling techniques in research*. [Munich Personal RePEc Archive]. https://mpra.ub.uni-muenchen.de/70218/.

Andersson, K., & Johansson, M. (2021). "Design Thinking in Technology Education: A Swedish Perspective." International Journal of STEM Education, 8(1), 75-89.

Anney, B. 2014. Ensuring the quality of the finds of qualitative research: Looking at the Trustworthiness criteria. *Journal of Emerging Trend in Educational Research and the Policy Studies* (JETERAPS), 5: 272-281.

Appiah, D.O., Osman, B. & Boafo, J. 2014. Land use and misuse; Human appropriation of land ecosystems services in Ghana. *International Journal of Ecosystem*, 4(1):24-33.

Aspers, P. & Corte, U. 2019. *What is qualitative in qualitative research. qualitative sociology.* 42:139-160. https://doi.org/10.1007/s11133-019-9413-7

Austria, M.M., Dasig Jr, D.D. & Valderama, A.M.C. 2015. Exploratory study on learner driven blended learning environment. *Paper presented at the Proceedings Journal of Education, Psychology and Social Science Research*: 69-76.

Ayele, S. & Mutyaba, V. 2021. Chinese-funded electricity generation in sub-Saharan Africa and implications for public debt and transition to renewable energy. In: *IDS Working Paper 557.* Institute of Development Studies, Brighton.

Ayu, M. 2017. Interactive activities for effective learning in the overcrowded classroom. *Linguists*, 4(2):1-6.

Bahtiar, R.S., Suryarini, D.Y., Farozin, M., Sujarwo. F., Haryanto, P., Popiyanto.Y. & Jarmani, H. 2021. Impact of social interaction among primary school students on learning performance. *ICLIQE '21: Proceedings of the 5th International Conference on Learning Innovation and Quality Education,* Article No: 28:1–74.

Bashan, B. & Holsblat, R. 2017. Reflective journals as a research tool: The case of student teachers' development of teamwork. Cogent Education, 4(1): 137-152.

Baskas, R.S. 2010. *Dialogue as a means of learning and teaching* (Ed513524). Eric. Walden University.

Battistella, P.E. & von Wangenheim, C. 2016. Games for teaching computing in higher education. A systematic review. *IEEE. Technology and Engineering*

Baxter, P. & Jack, S. 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4):544-559.

Baydillah, P. 2021. *Importance of communication in education.* Sepuluh Nopember Institute of Technology, Surabaya.

Berkowitz, B. & Wadud. E. 2013. Identifying community assets and resources. *The Community Toolbox.* http://ctb.ku.edu/en/tablecontents/subsectiontools 1043.aspx.

Bertram, C. & Christiansen, I. 2014. *Understanding research: An Introduction to Reading Research*. Pretoria: Van Schaik.

Bertram, C. & Christiansen, I. 2014. Understanding Research: An Introduction to Reading Research. Van Schaik, Pretoria.

Bogdan, R.C. & Biklen, S.K. 2012. *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn and Bacon.

Botha, S.M. 2022. *Primary school teachers managing learners' academic needs in overcrowded classrooms*. Master's Dissertation: University of Pretoria.

Botman, B.V. 2016. A Freirean perspective on South African teacher education policy development. *South African Journal of Higher Education,* 30(5):48–67.

Bouilheres, F., Le, L.T.V.H., McDonald, S., Nkhoma, C. & Jandug-Montera, L. 2020. Defining student learning experience through blended learning. *Education and Information Technologies*, 25(4):3049-3069.

Bozkuş, K. & Bayrak, C. 2019.The application of the dynamic teacher professional development through experimental action research. *International Electronic Journal of Elementary Education*, 11(4):335-352.

Braun, V. & Clarke, V. (2021) *Thematic analysis: A practical guide*. London: Sage Publications.

Braun, V. & Clarke, V. 2006.Using thematic analysis in psychology.*Qualitative Research in Psychology,* 3(2):77-101.

Brey, P. 2017.The strategic role of technology in a good society. *Technology in Society,* 52(DC):39-45.

British Educational Research Association (BERA). 2018. *Ethical guidelines for educational research.* London, British Educational Research Association. *Psychology,* 79:1-28.

Brown, C., & Li, X. 2023.The impact of dialogic methods on creativity and understanding in Technology education. *Educational Research Quarterly: 38(3), 234-250.

Brown, R. and Green, T. 2021. 'Overcoming challenges in dialogue-based teaching: Addressing overcrowding and time constraints', *Educational Research Review*, 23(1), pp. 102-115.

Bua, J.D. & Martin, M.D.M. 2020.Handling multi-grade teaching: It's educational implication towards teachers' competence. *Management Research Journal*. 9(2):1-12.

Byrne, D.2021. A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity,* 56:1391-1412.

Cheng, Y. & Chen, Y. 2018. Enhancing classroom management through parental involvement by using social networking apps. *South African Journal of Education*, 38(2):1-14.

Chia, L. S., & Tan, S. L. (2016). "Innovative Design and Technology Education in Singapore: A Hands-On Approach." *International Journal of Technology and Design Education*, 26(3), 337-355.

Chia, S.C. & Tan .S.C.J. 2016.Teaching Design & Technology to Develop Pupils as Persons: A Singapore Vision, *A publication for Educational Practitioners*, 2(2):99107.

Chilliba. K. 2019. *A closer look at how grade 9 technology teachers incorporate critical thinking in their teaching of the design process: A case study in KwaSanti cluster*. Masters' Dissertation: University of KwaZulu-Natal.

Chin, J.M .2018. Abbey road: the (ongoing) journey to reliable expert evidence. *Canadian Bar Review,* 96(3):422–459.

Cibane, Z.Z. 2020.*The role of District Officials in supporting under-performing schools:*

Cohen, L., Manion, L. & Morrison, L. 2018. Research methods in education, (8theed). New York, NY: Routledge.

Cohen, L., Manion, L. & Morrison, K. 2011. *Research methods in education* (7th ed.). London: Routledge.

Collingridge, D.S. & Gantt, E.E. 2019. The quality of qualitative research. *American Journal of Medical Quality,* 34(5):439-445.

Contreras León, J.J. & Chapetón Castro, C.M. 2016. Cooperative learning with a focus on the social: A pedagogical proposal for the EFL classroom. *HOW,* 23(2):125147.

Correia, C.F. & Harrison, C. 2020. Teachers' beliefs about inquiry-based learning and its impact on formative assessment practice. *Research in Science and Technological Education*, 38(3):355-376.

Crabtree, B.F. & Miller, W.L. 1999. *Doing qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J.W. & Creswell, J.D. 2018. *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage, Los Angeles.

Creswell, J.W. (2015) *A concise introduction to mixed methods research*. Los Angeles: Sage Publications.

Creswell, J.W. 2008. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Creswell, J.W. 2014. Research design: Qualitative, quantitative, and mixed method approaches. Thousand Oaks, CA: Sage.

Creswell, J.W. 2015. Research design: Qualitative, quantitative and mixed methods approaches. Thousand Oaks, CA: Sage.

Creswell. J.W. & Creswell, J.D. 2017. Research design: Qualitative, quantitative, and mixed methods approaches. (4th ed.). Sage, Newbury Park.

Curriculum Development Council. 2017. *Kindergarten education curriculum guide: Joyful learning through play balanced development all the way*. HKSAR.

Dahdal, S. 2020. Using the WhatsApp social media application for active learning. *Journal of Educational Technology Systems*, 49(2):239-249.

Dan, V. 2017. Empirical and non-empirical methods. In J. Matthes, R. Potter, C. S. Davis (Eds) *International Encyclopaedia of Communication Research Methods*: 1-3. Hoboken, NJ: Wiley.

Darling-Hammond, L. 2017. Teacher education around the world: What can we learn from international practice? *European Journal of Teacher Education,* 40(3):291309.

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. 2020. Implications for educational practice of the science of learning and development. *Applied Developmental Science,24*(2):97–140.

Davids, N. 2018. *Studies of female teachers' path to leadership positions usually focus on the barriers and challenges they may face.* https://africacheck.org/factchecks/reports/women-teach-and-men-lead-gender-inequality-south-africanschools-examined.

Davis, M., Edwards, L., & Patel, S. (2022). Addressing gaps in formative assessment: Evaluating dialogue and collaborative learning. *Educational Assessment Review*, 17(3), 112-128. https://doi.org/10.1080/10509585.2022.2044521

Dawadi, S. 2020. Thematic analysis approach: a step-by-step guide for ELT research practitioners. *Journal of NELTA*, 25(1-2):62-71

Dawit, D.A .2020. An Overview of Data Analysis and Interpretations in Research.

DBE. 2011. Curriculum and Assessment Policy Statement Grades 7–9: Technology. Pretoria: Government Printers.

De Jonckheere, M. & Vaughn, L.M. 2019. Semi structured interviewing in primary care research: *A Balance of Relationship and Rigor. Family Medicine and Community Health*, 7(2):1-8.

de Souza, N.S. & Perry, G.T. 2021. Women's participation in MOOCs in the IT area. *Computers and Education,* 173:104270.

DeFranzo, E.S. 2011. *What's the difference between qualitative and quantitative research?* Retrieved from:https://www.snapsurveys.com/blog/qualitative-vsquantitative-research/

Denzin, N.K. Lincoln, Y.S. & Giardina, M.D. 2006. Disciplining qualitative research.

Department of Basic Education (DBE). 2011 *South Africa. 2011. Curriculum and assessment policy statement (CAPS): Senior Phase Grades 7–9 Technology.* Government Printing Works.

Department of Basic Education (DBE). 2013. *Annual performance plan 2013/2014*. Department of Basic Education, Johannesburg.

Department of Basic Education (DBE). 2014. *Report on the annual national assessment of 2014*. Department of Basic Education, Pretoria.

Department of Education (DoE) (2004). *White paper on e-Education. Transforming learning and teaching.* Retrieved July 8, 2016.

Department of Education (DoE). 2008. *National curriculum statements-policy documents. Grades 10-12.* (General) Life Sciences. Pretoria: Government

Desimone, L.M. 2009. Improving impact studies of teachers' professional development: toward better conceptualizations and measures. *Educational Researcher,* 38:181-199.

Doyle, A., Seery, N., Canty, D. & Buckley, J. 2019. Agendas, influences, and capability: Perspectives on practice in design and technology education. *International Journal of Technology and Design Education*, 29(1):143–159.

Drageset, J., Haugan, M. & Eriksson, A. 2021. *Health promotion in health care: Vital theories and research.* Cham, CH: Springer. (Eds.).

Dredge, D., Airey, D. & Gross, M.J. 2014. The Routledge handbook of tourism and hospitality education. *The Routledge Handbook of Tourism and Hospitality Education*, 1–570. Abingdon, UK: Routledge.

Dreyer, A.M.F. 2017. *Applying game-based learning at the south African military academy: An experimental study.* Master In Technology: The University of Stellenbosch.

Du Toit, A. & Gaotlhobogwe, M. 2018. A neglected opportunity: Entrepreneurship education in the lower high school curricula for technology in South Africa and Botswana. *African Journal of Research in Mathematics, Science and Technology Education*, 22(1):37-47.

Dudovskiy, J. 2018. *Questionnaires.* Available at: https://researchmethodology.net/research-methods/surveymethod/questionnaires-2.

Dugger, W. & Naik, N. 2001. Clarifying misconceptions between technology education and educational technology. *The Technology Teacher*, 61(1):31- 35.

Đurišić, M. & Bunijevac, M. 2017. Parental involvement as an important factor for successful education. *Center for Educational Policy Studies Journal*, 7:137-153.

Easterby-Smith, M. Thorpe, R. & Jackson, P. 2015. *Management and business research* (5th ed.). Los Angeles, CA: Sage.

Education, 9(1):8-30.

Efron, S.E. & Ravid, R. 2013. Action research in education: A practical guide. Guilford Press.

Ehiobuche, C., Tu, H. & Justus. B. 2012. Dialogue as a tool for teaching and learning of entrepreneurship. *ASBBS Annual Conference: Las Vegas.* 19(1):300-308.

Eisner, E.W. 2017. The enlightened eye: Qualitative inquiry and the enhancement of educational practice. *Teachers College Press.*

Ekinci-Vural, D. & Doğan-Altun, Z. 2021. Parental involvement in early childhood classrooms: Turkish teachers' views and practices. *African Educational Research Journal*, 9(1):60-68.

Emmanuel, A.O. 2013. *Effect of student-teacher ratio on students' academic performance in secondary schools in the Ado-Odo/Ota Local Government area of Ogun State.* Master's dissertation: National Open University of Nigeria, Lagos.

Engeström, Y.C. 2017. Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1):133-155.

Erciyes, E. 2020. Paradigms of inquiry in the qualitative research. *European Scientific Journal, ESJ*, *16*(7):181.

Erdogan, I., & Campbell, J. (2023). "The Shift Towards Collaborative Learning: Enhancing Classroom Engagement and Knowledge Construction." Journal of Educational Innovation, 12(3), 45-63.

Eriksson, C., & Olofsson, A. D. (2022). "Iterative Design and Problem-Solving in Swedish Technology Curriculum: Enhancing Students' Technological Competencies." Journal of Educational Research and Practice, 12(4), 215-230.

Espino-Díaz, L., Fernandez-Caminero, G., Hernández-Lloret, C. M., GonzalezGonzalez, H. & Álvarez-Castillo, J. L. 2020. Analyzing the impact of COVID-19 on education professionals: Toward a paradigm shift: ICT and neuroeducation as a binomial of action. *Sustainability,* 12(14):5646–5655.

Facione, P.A. 2015. *Critical thinking: What it is and why it counts*. Measured Reasons LLC.

Fahrman, B. & Gumaelius, L. 2016. Technology teachers' views on general pedagogical knowledge. *In 32nd PATT conference, technology education for 21st century skills*. Utrecht.170-178.

Fahrman, B., Norström, P., Gumaelius, L. & Skogh, I.B. 2019. Experienced technology teachers' teaching practices. *International Journal of Technology and Design Education,* 30(5):163-186.

Fahrman, B., Norström, P., Gumaelius, L., & Skogh, I. (2019). "Understanding the Design Process in Swedish Technology Education: Insights and Implications." Journal of Technology Education Research, 30(2), 121-137.

Farooqi, M.T.K., Ahmed, S. & Ashiq, I. 2019. Relationship of perceived organizational support with secondary school teachers' performance. *Bulletin of Education and Research*. 41(3):141–152.

Farrow, R., Iniesto, F., Weller, M. & Pitt. R. 2020. The GO-GN Research Methods

Fitri, A., Hermansyah, H., Pratiwi, E. & Aswadijaya, A. 2021. Teacher's strategies in teaching speaking during Covid-19 pandemic. *Journal of English Education and Teaching*, *5*(3):349-367.

Freire, P. 2002. *Pedagogy of the oppressed.* New York: Continuum.

Ganiyu, S. A., Ebohon, J. O. & Ajayi, O. T. 2020. Understanding research paradigm in social sciences: A critique of two papers on critical success factors for BIM implementation. *Environmental Technology,* 2(1):64−70.

Garcia, M., & Smith, P. 2023. Fostering Deeper Learning Through Effective Communication Practices*. Journal of Learning Sciences, 52(4), 550-568. doi:10.1080/10508406.2023.2257224

Garcia, M., Lee, T., & Patel, R. (2023).Innovative approaches in technology integration: The role of teachers. *Technology and Education Review*, 20(1), 67-89.

García-Carrión, R., López de Aguileta, G., Padrós, M. & Ramis-Salas, M. 2020. Implications for social impact of dialogic teaching and learning. *Frontiers in Psychology*, 11- 140.

Gay, L.R., Miles, G.E. & Airasian, P. 2011. *Educational research: Competencies for analysis and applications.* (10th ed.). Boston, MA: Pearson.

Gentles, S.J., Charles, C., Ploeg, J &. McKibbon, K. 2015. Sampling in Qualitative Research: Insights from an Overview of the Methods Literature. The *Qualitative Report*. 20(11):1772-1789.

Gharbavia, A. & Iravani, H. 2014. Is teacher talk pernicious to students? A discourse analysis of teacher talk. *Procedia - Social and Behavioral Sciences,* 98: 552-561.

Gillies, R.M. & Boyle, M. 2010. Teachers' reflections on cooperative learning: issues of implementation. *Teaching and Teacher Education,* 26:933-940.

Goldkuhl, G. 2021. Pragmatism vs. interpretivism in qualitative information systems research. *European Journal of Information Systems*, 21(2):135-146.

Gorsky, P., Casper, A. & Trumper, R. 2004. Dialogue in a distance education physics course. *Opening Learning*, 19(3):265-277.

Goswami, B., Hassan Y. & Sarma, A.J.D. 2018. The effects of noise on students at school: A review. *International Journal of Latest Engineering and Management Research (IJLEMR),* 3(1):43–45.

Govender, S. & Ajani, O.A .2021. Monitoring and evaluation of teacher professional development for resourceful classroom practices. *Universal Journal of Educational Research*, 9(4):870 – 879.

Granic, I., Lobel, A. & Engels, R.C.M.E. 2014. The benefits of playing video games. *American Psychologist, 69*(1):66–78.

Green, W., Adendorff, M. & Mathebula, B. 2014. 'Minding the gap?' A national foundation phase teacher supply and demand analysis: 2012-2020. *South African Journal of Childhood Education,* 4(2):1-23.

Gröschner, A., Seidel, T., Pehmer, A.K. & Kiemer, K. 2015. Facilitating collaborative teacher learning: the role of 'mindfulness' in video-based teacher professional development programs. *Gruppendynamik und Organisationsberatung*, 45(3):273-290.

Gumbo, M.T. 2017. An indigenous perspective on Technology Education. In P. Ngulube (Ed.). *Handbook of research on Indigenous Knowledge Systems in developing countries*. 137-160. Hershey: IGI.

Gumbo, M.T. 2020. Professional development of technology teachers: Does their training meet their need? *Perspectives in Education*, 38(1): 58-71.

Gunawardhana, P.D. & Palaniappan, S. 2016. Possibility of using Multimedia Application for Learning. *GSTF Journal on Computing (JOC),* 5(1):77-83.

Gunther, F. & Chatoney, F. 2016. Technology education in France: Efficiency of tools from functional analysis in learning process for describing objects*. Pupils Attitude Towards Technology—PATT 32 Conference 23rd–26th August 2016; Hotel De Bilt—Utrecht Amsterdam, Netherlands*

Guskey, T.R. 2002. Professional development and teacher change. *Teachers and Teaching: Theory and Practice,* 8(3/4):381-391.

Gusrayani, D., Djuanda, D. & Sudin, A. 2019. Extending students ZPD with center learning and technology. *Journal of Physics: Conference Series*, 1318, 012039.1-5.

Gustafsson, Å. 2017. Assessing work order information quality in harvesting. *Silva Fennica*, 51(4):18.

Guy, J., Williams, J. & Shore, B .2019. High- and otherwise-achieving students' expectations of classroom group work: An exploratory empirical study. *Roeper Review,* 41(3):166–184.

Halloush, L., Abdelrahman, A.B. & Abu-Dalbouh, M. 2021. Effect of using dialogic teaching method on seventh-grade students' performance in speaking skill. *Jordan Journal of Educational Sciences*.17 (4):649-662.

Hammarberg, K., Kirkman, M. & De Lacey, S. 2016. Qualitative research methods

Hancock, B., Ockleford, E. & Windridge, K. 2009. An introduction to qualitative research. *National Institute for Health Research,* 1-39. Handbook. *Open Education Research Hub.* The Open University, UK. CC-BY

Hardman, J. 2019. Towards a pedagogical model of teaching with ICTs for mathematics attainment in primary school: A review of studies 2008–2018. *Heliyon*, 1-6.

Harley, K. & Wedekind, V .2004. Political change, curriculum change and social formation, 1990 to 2002. In: L Chisholm (ed.*). Changing class, education and social change in post-apartheid South Africa*. London: Zed Books.

Haskova, A., Mandulakova, S. & VAN MERODE, D. 2017. Problematic Aspects of Technology Education in Slovakia. *Communications - Scientific letters of the University of Zilina*, 19:75-80.

Hassan, F.J .2023. Defining the design process: Methodology and creation. *Journal of Design and Textiles,* 2(1):20–35.

Hébert, C. & Jenson, J. 2019. Digital game-based pedagogy: Developing teaching strategies for game-based learning. *Journal of Interactive Technology and Pedagogy,* 15.

Hendrickx, M.M., Mainhard, M. T., Boor-Klip, H. J., Cillessen, A.H. & Brekelmans, M. 2016. Social dynamics in the classroom: Teacher support and conflict and the peer ecology. *Teaching and Teacher Education*, 53:30– 40.

Heymans, J.H. 2007. The implementation of Technology Education in Secondary Schools in the urban areas of the Free State Province. *Interim: Interdisciplinary Journal*, 6(1):37-44.

Hill, N.E. & Tyson, D.F. 2009. Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, 45:740-763.

Hilton, A., Hilton, G., Dole, S. & Goos, M.2015. School Leaders as Participants in

Ho, T.M.L. & To, M.T. 2022. Delegating Critical Thinking Skills in Learners through Effective Questioning Technique in the Class. *International Journal of TESOL & Education,* 2(3):13-31.

Horikoshi, K. 2023. The positive psychology of challenge: Towards interdisciplinary studies of activities and processes involving challenges. *Frontiers in Psychology,* 13.

Howe, C. & Abedin, M. 2013. Classroom dialogue: A systematic review across four decades of research. *Cambridge Journal of Education., 43*(3):325–356.

Howe, C., Hennessy, S., Mercer, N., Vrikki, M. & Wheatley, L. 2019. Teacher–student dialogue during classroom teaching: Does it really impact on student outcomes? *Journal of the Learning Sciences*. 1-51.

Huang, G.H.C. & Mason, K.L. 2008. Motivations of parental involvement in children's learning: Voices from urban African American families of pre-schoolers. *Multicultural Education,* 15(3):20-27.

Ibrahim, K.H. 2012. *The relevance of user education to the use of university libraries by students in Niger State*. Federal University of Technology Minna, Minna.

Imtiaz, S. 2014. Exploring strategies for English language teaching of Pakistani students in public sector colleges. *Research Journal of English Language and Literature (RJELAL),* 2(2):247-253 *International Journal of Academic Research in Education and Review,* 8 (1):1-27

Jameson, P., & Miller, R. 2022. Constructing Reality: Social Constructivism in Research Methodologies. Academic Press.

Jansen, J.D. 1998. Curriculum reform in South Africa: A critical analysis of outcomesbased education. *Cambridge Journal of Education*, 28:321-331

Jensen, E., Skibsted, E.B. & Christensen, M.V. 2015. Educating teachers focusing on the development of reflective and relational competences. *Educational Research for Policy and Practice*, 14(1):201–212.

Jensen, K. & Bennett, L. 2016. Enhancing teaching and learning through dialogue: a student and staff partnership model. *International Journal for Academic Development.* 21(1):41-53.

Johnson, B. & Christensen, L. B. 2008. *Educational research: Quantitative, qualitative and mixed approaches.* Los Angeles, CA: Sage Publications.

Johnson, D., & Wang, L. 2023.Interactive and reflective teaching methods: A review of recent research. *Teaching and Learning Journal: 22(4), 345-362.

Johnson, L., & Wang, M. 2022. The Role of Justification and Explanation in Effective Learning Communication. International Journal of Educational Research, 101, 120-135. doi:10.1016/j.ijer.2022.101221

Johnson, M. & Wang, L., 2022**.** Effective facilitation of dialogue is critical for promoting deep learning, but is often undermined by classroom overcrowding and inadequate teacher preparation. *Journal of Educational Research*, 45(2), pp. 123-135.

Joiner, R.J. & Bergeman, C.S. 2020. Perceived daily health and perceived daily stress in middle-aged and older adults. *Poster accepted for presentation at Midwestern Psychological Association 2020 conference in Chicago, IL*.

Jollibekova, M. & Abdiganiyeva, N. 2021. The role of communicative efficiency in teaching speaking. *Galaxy International Interdisciplinary Research Journal*, *9*(11):115–117.

Juuti, T., Rättyä, K., Lehtonen, T. & Kopra, M. 2017. Pedagogical content knowledge in product development education. *Paper presented at the International Conference on Engineering and Product Design Education. Oslo, Norway.*

Kabir, S.M.S. 2016. Methods of data collection. In *Basic Guidelines for Research*: *An Introductory Approach for All Disciplines*. 9:201-275.

Kagan, D.M. 1992. Implications of research on teacher belief. *Educational Psychologist,* 27:65-90.

Kaliisa, R. & Picard, M. 2017. A systematic review on mobile learning in higher education: The African perspective. *Turkish Online Journal of Educational Technology,* 16(1):1–18

Kapi, A.Y., Osman, N., Ramli, R. Z. & Taib, J. M. 2018. Multimedia education tools for effective teaching and learning. *Journal of Telecommunication, Electronic and Computer Engineering*, 9(2-8):143-146.

Kapri, U.C. 2017. A study of scientific temper and scientific creativity of secondary school students. *International Journal of Advanced Research*, 5(8): 1498-1503.

Karacabey, M.F. 2020. School principal support in teacher professional development. *International Journal of Educational Leadership and Management,* 9(1):54-75.

Kasim, R.M. 2015. Small-group vs. competitive learning in computer science classrooms: A meta-analytic review. In R. Queirós (Ed.)., *Innovative teaching strategies and new learning paradigms in computer programming* :46–64.

Kenza-Tacarraoucht, A., Zano, K. & Zamorano, A. 2022. Team games-language learning model in improving students' speaking and listening skills viewed from creativity. *Journal of Language and Literature Studies*, 2(1):53–61.

Khairudin, M. & Mahendra, I.G.B. 2019. The obstacle analysis in the implementation of the ISO 9001:2008 Quality management system in vocational high schools, *Advances in Social Science, Education and Humanities Research,* 440:233-235.

Khaldi, K. 2017. Quantitative, qualitative or mixed research: Which research paradigm to use. *Journal of Educational and Social Research,* 7(2):15-23.

Khamkaew, S. & Trussat, A .2024. The Effects of Using the Zone of Proximal Development (ZPD) on the Fundamental English Classes of Thai EFL Learners. *International Journal of English Language Teaching*. 12(1):46-64.

Khan, M.S., Khan, I., Qureshi, O.A., Ismail, H.M., Rauf, H., Latif, A. & Tahir, M. 2015. The styles of leadership: A critical review. *Public Policy and Administration Research*, 5:87-92.

Khoza, S.B. 2016. Is teaching without understanding curriculum visions and goals a high risk.? *South African Journal of Higher Education*. 30(5):1–16.

Khoza, S.D. & Makgato, M.2016. Difficulties of student teachers in the engineering graphics and design course at a South African university: Snapshot on sectional drawing Eurasia*. Journal of Mathematics, Science & Technology Education*, 12(4):703-715.

Khumalo, H.B. 2004. *The implementation of technology education as a learning area.*

Kim, H. 2019. The perception of teachers and learners towards an exploratory corpus-based grammar instruction in a Korean EFL primary school context. *Primary English Education*, 25(1):123-152.

Kivuna, C. & Kuyini, A.B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5):26-41.

Kivunja, C. 2018. Distinguishing between theory, theoretical framework, and conceptual framework. *A Systematic Review of Lessons from the Field,* 7(6): 4453.

Kleyn, T. &. García, O. 2019. Translanguaging as an act of transformation: Restructuring teaching and learning for emergent bilingual students. In Luciana, C. (Ed.), The handbook of TESOL in K-12: 69-82.

Kola, M. 2021. Pre-service teachers' action research: technology education lesson planning in a South African University. *Educational Action Research*, 29(1):99117.

Kola, M., Rauscher, W. & Haupt, G. 2019. Grade 9 technology teachers' explication of critical thinking and its enactment in the classroom. *African Journal of Research in Mathematics, Science and Technology Education,* 23(2):123-134.

Kolyvas, S. & Nikiforos, S. 2023.Technology and Creativity on early adolescence: A case study during COVID-19 pandemic. *Curr Psychol,* 42(10): 8554-8561.

Korstjens, I. & Moser, A. 2017. Practical guidance to qualitative research. Part 2: Context, research questions and designs. *The European Journal of General Practice.,* 23: 274-279.

Krasniqi, R. 2022. Teacher professional development trends: Perspectives of teachers and principals in Kosovo. *Issues in Educational Research,* 32(4):1467-1485.

Krusenvik, L. 2016. Using case studies as a scientific method: Advantages and disadvantages.http://www.diva-portal.se/smash/get/diva2:1054643/ FULLTEXT01.pdf

Kubheka, T. 2016. '*Teachers "sick and tired" of overcrowded classrooms'*, Eyewitness News, viewed 28 September 2018, from https://ewn.co.za/2016/05/07/ Teachers-sick-and-tired-of-overcrowded-classrooms

Kumar, A. 2022. *Observation methods*. Department of Library & Information Science, University of Delhi, Delhi – 110007, India

La Fleur, J. & Dlamini, R. 2022. Towards learner-centric pedagogies: Technologyenhanced teaching and learning in the 21st century classroom. *Journal of Education (University of KwaZulu-Natal)*, (88):4-20.

Language teachers' experiences. Master's Dissertation: University of KwaZuluNatal, Durban.

Lawson, B. 2006. *How designers think: The design process demystified* (4th ed.). Oxford; Burlington, MA: Elsevier/ Architectural Press.

Le, H., Janssen, J. & Wubbels, T. 2018. Collaborative learning practices: Teacher and student perceived obstacles to effective student collaboration. *Cambridge Journal of Education*, 48:103-122.

Lee, H., Kim, J. and Lee, S. 2022.'The impact of collaborative learning spaces on dialogue teaching', *Journal of Classroom Dynamics*, 19(3), pp. 77-89.

Lee, M. 2014. Transformational leadership: Is it time for a recall? *International Journal of Management and Applied Research,* 1(1):17-29.

Lee, S., & Zhao, Q. (2021). *The Impact of Justification and Explanation on Learning Outcomes*. Journal of Applied Educational Psychology, 43(1), 45-60. doi:10.1080/02665433.2021.1940745

Leedy, P.D. & Ormrod, J.E. 2014. *Practical research: Planning and design* (10th ed.). Edinburgh Gate: Pearson Education.

Lehesvuori, S., Hähkiöniemi, M., Ketonen, L., Lerkkanen, M.K., Pöysä, S. & Pakarinen, E. 2021. Reflections on dialogicity: Challenges and suggestions by mathematics student teachers. *Learning, Culture and Social Interaction*, *31* (Part A), Article 100567.

Lichtman, M. 2014. Drawing meaning from the data. In *Qualitative Research for the Social Sciences*:335–340. Thousand Oaks, CA: SAGE.

Lim, C. P., & Wang, M. H. (2022). "Enhancing Problem-Solving Skills through Technology Education: Insights from Singapore's Curriculum." *Educational Review*, 74(2), 230-245.

Lincoln, Y.S & Guba, E.G. 1985. *Naturalistic inquiry*. Newbury Park, CA: Sage

Loseke, D. 2017. *Methodological Thinking: Basic principles of social research design*. Second Thousand Oaks, CA: SAGE Publications. Available at:

M.Y. & Nelson, K. 2017. Toward a more dialogic pedagogy: Changing teachers' beliefs and practices through professional development in language arts classrooms. *Language and Education, 31*(1):65–82.

Mabaso, S.M. 2014. *Impact of agricultural development projects on poverty alleviation in Amajuba district municipality (KZN).* Master's Thesis: University of Fort Hare.

Magaldi, D. & Berler, M. 2020. Semi-structured Interviews. In: Zeigler-Hill V., Shackelford T.K. (Eds.) *Encyclopedia of Personality and Individual Differences. Springer*, Cham.

Maharaj, L., Nkosi, T. & Mkhize, M. 2016. Teachers' experiences of the implementation of the Curriculum and Assessment Policy Statement (CAPS) in Three Primary Schools

in Kwa-Zulu Natal. *Africa's Public Service Delivery & Performance Review,* 4(3):371-388.

Mai, L.T. 2020. EFL lecturers' needs for professional development: A case study of an institution in the Mekong Delta. *Journal of Science,* 12(3):7-16.

Makgato, M. 2015.The *Teaching and learning of technology: Spotlight on sectional drawing among student teachers in an Eastern Cape University, South Africa.* In Proceedings of the 2015 TENZ Conference, 20(20):1-12.

Malamah-Thomas, A. 1991. *Classroom interaction*. Oxford, UK: Oxford University

Malmberg, E. & Nilsson, H. 2018. *Strategies to promote interaction*. https://mau.divaportal.org/smash/record.jsf?pid=diva2%3A1489213&dswid=-9233

Mandernach, B.J. 2015. Assessment of student engagement in higher education: A synthesis of literature and assessment tools. *International Journal of Learning, Teaching and Educational Research,* 12(2):1–14.

Manganyi, N.C. 2001. Public policy and the transformation of education in South Africa. In: Y Sayed. & J Jansen (eds). *Implementing education policy. The South African experience.* Cape Town: UCT Press.

Mann, L. C., & Walshaw, M. 2019. Mathematics anxiety in secondary school female students: Issues, influences, and implications. New Zealand Journal of Educational Studies, 54(1):101-120.

Mapotse, T.A. & Gumbo, T. 2012. Exploring the challenges of senior phase technology teachers in Limpopo province. In Proceedings of ISTE - *International Conference on Mathematics, Science and Technology Education: University of South Africa:*542-556.

Mapotse, T.A. 2012. *The teaching practice of Senior Phase Technology Education teachers in selected schools of Limpopo Province: An action research study.* Doctoral thesis: University of South Africa.

Mapotse, T.A. 2015. An emancipation framework for technology education teachers: An action research study. *International Journal of Technology and Design Education,* 25:213–225.

Mapotse, T.A. 2018. Development of a Technology Education cascading theory through community engagement site-based support. *International Journal of Technology Design Education,* 28:685–699

Marais, P. 2016. "We can't believe what we see": Overcrowded classrooms through the eyes of a student teachers. *South African Journal of Education*. 36(2):1-10.

Marasco, E., Gatti Jr, W., Kim, B., Behjat, L. & Eggermont, M. 2017. Curious conversations: Using game-based learning to develop creative culture within technical courses. *Papers on Postsecondary Learning and Teaching: Proceedings of the University of Calgary Conference on Learning and Teaching,* 2:57-63.

Maree, J. G. 2010. Critical appraisal of the system of education and prospects of meeting the manpower and developmental needs of South Africa. *Africa Insight*, 40(2):85–108.

Maree, K. (Ed). 2016. *First steps in research* (2nd ed). Braamfontein: Van Schaik

Margolis, A.A. 2020. Zone of proximal development, scaffolding and teaching practice. *Cultural-Historical Psychology*, 16(3):15–26.

Masi, G. & Singh, E. 2018. Repurposing spaces in schools to encourage social interaction amongst students. Dissertation: The Faculty of Graduate Studies Educational Administration and Leadership the University of British Columbia. Vancouver.

Matola, N., Fomunyam, K.G. & Moyo, S. 2022. Transforming the teaching and learning process in South African Higher Institutions. *Universal Journal of Educational Research*, 10(1):67-78.

Matsepe, D., Maluleka, M. & Cross, M. 2019. Re-imagining teacher's experience with overcrowded classrooms in the public secondary schools in South Africa. *Journal of Gender, Information and Development in Africa (JGIDA),* Special Issue, 91103.

Mawson, B. 2007. Designers as teachers and learners: Transferring workplace design practice into educational settings. *International Journal of Technology and Design Education,* 17:163-177

Mayer, I. 2015. Qualitative Research with a focus on qualitative data analysis. *International Journal of Sales, Retailing and Marketing,* 4:57-67.

Mbongwe, Z. 2016. *Exploring factors that influence how teachers implement the Technology curriculum in Grade 9: A Case of three secondary schools in the Umlazi District.* Master's Dissertation: University of KwaZulu-Natal.

McKenney, S. & Reeves, T. 2019. *Conducting educational design research* (2nd ed.). London: Routledge.

McLennan, A., Muller, M., Orkin, M. & Robertson, H. 2017. *District support for curriculum management change in schools.* Johannesburg: Witwatersrand University.

McLeod, K. 2014. Orientating to assembling: Qualitative inquiry for more-than-human worlds. *International Journal of Qualitative Methods,* 13(1):377–394.

McLeod, S.A. 2019. *What Is the Zone of Proximal Development?* Retrieved from https://www.simplypsychology.org /Zone-of-Proximal-Development.html

McMillan, J. & Schumacher, S. 2014. Research in education: Evidence-based Inquiry.

McMillan, J. H. & Schumacher, S. 2010. *Research in education: Evidence-based inquiry.* Upper Saddle River, NJ: Pearson Education, Inc.

McMillan, J.H. & Schumacher, S. 2014. Research in education: Evidence-based inquiry. (7th ed.). New York: Pearson.

McMillan, J.H. & Schumacher, S. 2016. Research in education. Evidence-based inquiry (6th Ed). Bostom, MA: Pearson Education.

McQueen, M. 2002. *Language and power in profit/non-profit relationships: A grounded theory of inter-sectoral collaboration.*

Mehran, N., Shahram, S. & Hossein, S .2012. Relationship between communication skills and effectiveness. *International Journal of Basic Sciences & Applied Research,* 1(4):101-106.

Meloncon, L., Trauth, E. & Molloy, C. 2019. Communicating Elective Sterilization: A Feminist Perspective. Rhetoric of Health and Medicine. 2(1)

Mercer, N., Hennessy, S. & Warwick, P. 2019. Dialogue, thinking together and digital technology in the classroom. Some educational implications of a continuing line of inquiry. *International Journal of Educational Research*. 97:187-199.

Merriam, S.B. & Tisdell, E.J. 2015. *Qualitative research: A guide to design and implementation.* San Francisco, CA: Wiley.

Michaels, S. & O'Connor, C. 2012. *Talk science primer.* TERC. Retrieved from http://inquiryproject.terc.edu/.

Mirza, H., Bellalem, F. & Mirza, C. 2023. Ethical considerations in qualitative research: Summary guidelines for novice social science researchers. *Qualitative Research,* 11(1):441-449.

Moorosi, P. & Bantwini, B. D. 2016. School district leadership styles and school improvement: Evidence from selected school principals in the Eastern Cape Province. *South African Journal of Education*, 36(4):1-9.

Motlalepula, M., Mokhampanyane, M. & Schlebusch, G.2022. The role of school management teams in the education of learners from disadvantaged socioeconomic background in South Africa. *Proceedings of ADVED 2022- 8th International Conference on Advances in Education, Istanbul, Turkey:242-247*

Mouton, N. & Malumbete, P. 2023. Exploring the challenges of curriculum advisors in schools in the Vhembe-West district, Limpopo province, South Africa. *South African Journal of Education,* 43(3):1-9.

Mpanza, L.S.P. & Govender, S. 2022. Primary school-based support teams' experiences and practices when supporting teachers. *Multicultural Education,* 8(2):272-285.

Muffoletto, R. 1994. Technology and restructuring education: Constructing a context. *Educational Technology*, *34*(2):24–28.

Munje, P.N. & Jita, T. 2020. The impact of the lack of ICT resources on teaching and learning in selected South African primary schools*. International Journal of Learning, Teaching and Educational Research*, 19(7):263–279.

Munje, P.N. & Mncube, V. 2018. The lack of parent involvement as hindrance in selected public primary schools in South Africa: The voices of educators. *Perspectives in Education,* 36(1):80–93.

Munyaradzi, J. & Manyike, T.V. 2022. Perceptions of lecturers on English as a primary medium of instruction at a selected university in South Africa. *Journal for Language Teaching, 56*(1):1-22.

Murphy, C., Smith, G., Varley, J. & Razı, O. 2015. Changing practice: an evaluation of the impact of a nature of science inquiry-based professional development programme on primary teachers. *Cogent Education,* 2(1):1077692.

Mustafa, H.M.H., Mahmoud, S.,Assaf, I.H., Al-Hamadi, A. & Abdulhamid, Z.M. 2014. Comparative analogy of overcrowded effects in classrooms versus solving

Naz, R. & Groves, E.C. 2023. Facebook in higher education: Proposed model for sustainable education in the Faculty of Business and Entrepreneurship (FoBE) at the National University of Samoa (NUS). *Journal of Samoan Studies*, 13(1):5763**.**

Neuman, W.L.2011. *Social research methods: Qualitative and quantitative approaches.* (7th ed.). Boston, MA: Pearson.

Nguyen, T., & Patel, A. 2023. Integrating dialogue assessment into formative practices: A review of current frameworks. *Journal of Educational Practice*, 23(2), 87-101. https://doi.org/10.1007/s10833-022-09455-7

Nguyen, T., & Patel, R. (2022). *The Necessity of Justification and Explanation in Educational Communication*. Review of Educational Research, 92(3), 789-805. doi:10.3102/0034654322108321

Nicholson, D.T. 2018. Enhancing student engagement through online portfolio assessment. *Practitioner Research in Higher Education Journal*, 11(1):15-31.

Nkambule, G & Amsterdam, C. 2018. The realities of educator support in a South African school district. *South African Journal of Education*. 38(1) :1-11.

Noble, H. & Heale, R. 2019. Triangulation in research, with examples. *EvidenceBased Nursing*, 22:67-68.

Noble, H. & Smith, J. 2018. Issues of validity and reliability in qualitative research. *Journal of the Medical Library Association*, 21(2):102–108.

Nowell, L.S., Norris, J.M., White, D.E. & Moules, N.J. (2017) 'Thematic analysis: Striving to meet the trustworthiness criteria', *International Journal of Qualitative Methods*, 16(1), pp. 1-13.

Ntekane, A. 2018. Parental involvement in education. [Doctoral dissertation, North-West University]

Ntombela, M. 2022. The sociolinguistic problems of English medium instruction in the Middle East and North Africa: Implications for epistemic access.Masters' dissertation: Durban University of Technology.

OECD .2011.Education at a Glance 2011: OECD Indicators, OECD Publishing. http://dx.doi.org/10.1787/eag-2011-en

Ohemeng, F.L. K. 2014. Challenges and prospects of public administration education and training in Africa: The case of Ghana. *Journal of Public Affairs Education*, *20*(4):469–486.

Ohemeng-Appiah, F. 2014. *Teaching the design process in the grade 9 technology class.* MEd Thesis: Durban: University of KwaZulu-Natal.

O'Keeffe, J., Buytaert, W., Mijic, A., Brozović, N. & Sinha, R.2016. The use of semistructured interviews for the characterisation of farmer irrigation practices, *Hydrology and Earth Systems Sciences,* 20(5):1911–1924.

Olanrewaju, G.S., Adebayo, S.B., Yetunde-Omotosho, A. & Olajide, C.F. 2021. Left behind? The effects of digital gaps on e-learning in rural secondary schools and remote communities across Nigeria during the COVID-19 pandemic.

Omar, T.K. 2023. Students' challenges in EFL speaking classrooms. *Academic Journal of Nawroz University (*AJNU),12(4):957-963.

Owoko, I.S. 2009. *The role of advocacy in enhancing equalization of opportunities for disabled people* (unpublished paper) presented in Leonard Cheshire Disability workshop in Kisumu.

Pajares, M. 1992. Teacher's beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3):307–332.

Palinscar, A.S. & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1(2), pp. 117-175.

Paraiso, J. 2022. Stakeholders' involvement in school-based programs of Gosoon Elementary School, Carmen, Agusan Del Norte. *International Journal of Novel Research in Education and Learning*, 9(3):63-72.

Parson, L. 2016. Are STEM syllabi gendered? A feminist critical discourse analysis. *The Qualitative Report*, *21*(1):102-116.

Patel, C. 2013. Use of multimedia technology in teaching and learning communication skill: An analysis. *International Journal of Advancements in Research & Technology,* 2(7):116-123.

Patton, M.Q. 2002. *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

perspectives of school principals. Masters Dissertation: University of KwaZuluNatal, Durban.

Pervin, N. & Mokhtar, M. 2022. The interpretivist research paradigm: A subjective notion of a social context. *International Journal of Academic Research in Progressive Education and Development*, 11(2):419–428.

Phillippi, J. & Lauderdale, J. 2018. A guide to field notes for qualitative research: context and conversation. *Qualitative Health Research,* 28(3):381388.

Polit, D.F. & Beck, C.T. 2014. *Essentials of nursing research: Appraising evidence for nursing practice (8th ed.).* Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.

Powell, C. K. & Kalina, J. C. 2009. Cognitive and social constructivism: Developing tools for an effective classroom. *Education,* 130:241-250.

Powell, D. & Kalina, C.J. (2009). Vygotsky's theory of the zone of proximal development and its implications for the classroom. *International Journal of Child Care and Education Policy*, 3(1), pp. 242-252.

Prawat, R.S. 2018. Instructors' belief about teaching and learning: A constructivist perspective. *American Journal of Education*, 100:354-395.

Pressley, M. & Woloshyn, V. 2017. *Cognitive strategy instruction that really improves children's academic performance*. Cambridge: Brookline Press. Printers. Proposing

the “MIRACLE” narrative framework for providing thick description in qualitative research. *International Journal of Qualitative Methods*, 22(3):1-13.

Punch, K.F. & Oancea, A. 2014. Introduction to research methods in education. Thousand Oaks, CA: Sage. Quality Systematic Reviews. *Review of Educational Research*, *90*(1):6-

Ragavan, B.J. 2022. *Assessing grade six second language learners: English Home*

Rajasekar, S., Philominathan, P. & Chinnathambi, V. 2013. Research methodology. *European Journal of Information Systems,* 21:135–146.

Ramaboea, H., Ramaligela, S. & Mtshali, T. 2022. Grade 9 Technology teachers’ ability to facilitate mini-practical assessment tasks through 9E instructional model in technology classroom. *International Journal of Mechanical Engineering,* 7(12):139–146.

Ramaligela, S.M., Ogbonnaya, U.I. & Mji, A. 2019. Comparing pre-service teachers’ PCK through 9E instructional practice: A case of mathematics and technology preservice teachers. *Africa Education Review,* 16(3):101-116.

Rambrij, R. 2018. *Technology literacy for teachers in rural schools: constructing key concepts in technology education for teachers in the Ilembe District.* MEd Thesis: University of KwaZulu-Natal.

Reznitskaya, A. & Gregory, M. 2013. Student thought and classroom language:

Rice, K. & Redcay, E. 2015. Spontaneous mentalizing captures variability in the cortical thickness of social brain regions. *Social Cognitive and Affective Neuroscience,* 10(3):327-34.

Rizvi, M. 2010. Development of a classroom observation schedule for measuring the efficacy of a teacher development programme. *Procedia Social and Behavioral Sciences*, 2:654-660.

Rodriguez, J.A., Condom-Bosch, J.L., Ruiz, L. & Oliver, E .2020. On the shoulders of giants: benefits of participating in a dialogic professional development program for in-service teachers. *Frontiers in Psychology*, 11:1–10.

Rogoff, B. (2014). *Cognition as a collaborative process*. In: R. C. Mayer, ed., *The Cambridge Handbook of Cognitive Science*. Cambridge University Press, pp. 237-255.

Rohaan, E.J., Taconis, R. & Jochems, W.M.G. 2009. Measuring teachers’ pedagogical content knowledge in primary technology education. *Research in Science and Technological Education,* 27(3):327–338.

Rutherford-Hemming, T., Lioce, L. & Durham, C.F. 2015. Implementing the standards of best practice for simulation. *Nurse Educator,* 40:96–100.

Ruys, I., Keer, H.V. & Aelterman, A. 2012. Examining pre-service teacher competence in lesson planning pertaining to collaborative learning. *Journal of Curriculum Studies,* 44(3):349–379.

Salas, R.G. 2017. Disrupting equilibrium: Working for equity and social justice in education for English learners. *International Journal of Multicultural Education,* 19(1):7-20.

Salleh, S. & Mohd. Y.N. 2016. Teachers' attitudes and beliefs towards the use of studentcentred learning in English language classes. *International Seminar on Generating Knowledge Through Research*, 327-334.

Sam, L., Agyapong, D., Tahiru, A., Sam, J.K., Kofi, A.P., Owusu, D., Boaponsem, P.

Saxena, A. 2014. Workforce diversity: A key to improve productivity. *Science Direct,* 11:76-85.

Schaffalitzky, C. 2021. Learning to facilitate dialogue: On challenges and teachers' assessments of their own performance. Advance online publication. https://doi.org/10.1080/03055698.2021.2007854.

Schoch, J. 2018. Enriching practice through teaching. Practice-Informed Learning: The Rise of the Dual Professional, Guild HE https://guildhe.ac.uk/practiceinformed-learning-the-rise-of-the-dual-professional/

Senthamarai, S. 2018. Interactive teaching strategies. *Journal of Applied and Advanced Research*, 3(SI):36.

Sephoto, S.A.K. 2018. *Exploring the effectiveness of the teaching strategies that technology teachers apply to teach the design process*. Master's Dissertation: University of Limpopo.

Shinn, Y.H. 1997. Teaching strategies, their use and effectiveness as perceived by teachers of agriculture: A national study. *Retrospective Theses and Dissertations*, 12244.

Showkat, N. & Parveen, H. 2017. *Non-probability and probability sampling.* E-PG Pathshala.

Shulman, L.S. 1986. Those who understand: Knowledge growth in teaching *Educational Researcher*, 15(2):4-14.

Shulman, L.S. 1987. Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1):1–22

Shultz, H.L., Wozencroft, A.J. & Cihak, D.F. 2017. Examining the use of therapeutic recreation in schools and the implications on students' social interaction behaviours. *Therapeutic Recreation Journal,* 51(4):239–257.

Sibanda, J. 2021. Academics' conceptions of higher education decolonisation. *South African Journal of Higher Education,* 35(3):182-99.

Siddiqui, Z., Khan, R. & Alam, S., 2020. Understanding and teaching the design process in secondary education: Enhancing creativity and problem-solving skills. Journal of Technology Education, 31(2): 15-28.

Siddiqui, Z., Khan, R., & Alam, S., 2020. Understanding the design process in secondary education: A focus on critical thinking and problem-solving. Journal of Technology Education, 31(2): 15-28.

Simweleba, N.H. & Serpell, R. 2020. Parental involvement and learners' performance in rural basic schools of Zambia. *South African Journal of Childhood Education.* 10(1):1–13.

Singha, S.K. & Sikdar, D.P. 2018. Professional development of teacher and professionalism in teacher education. *International Journal of Applied Social Science*, 5(8):1320-1332.

Singh-Pillay, A. & Naidoo, J. 2020. Context matters: Science, technology and mathematics education lecturers' reflections on online teaching and learning during the Covid-19 pandemic. *Journal of Baltic Science Education,* 9(6):1125– 1136.

Singh-Pillay, A. & Ohemeng-Appiah, F. 2016. Interconnectedness of technology teachers' perceptions of the design process to learner creativity. *Perspectives in Education*, *34*(2):70–82.

Skelton, A. 2014. Leveraging funds for school infrastructure: The South African "mud schools" case study, in *UKFIET international conference on education and development: Education and development post 2015: Reflecting, reviewing, revisioning, Oxford, 10–12 September 2013.*

Slavin, R.E. 2019. When does cooperative learning increase student achievement? *Psychological Bulletin,* 94:429-445.

Slevitch, L. 2011. Qualitative and quantitative methodologies compared: Ontological and epistemological perspectives. *Journal of Quality Assurance in Hospitality & Tourism,* 12(1):73-81.

Smagorinsky, P. 2019. Vygotsky and the social dynamics of classroom. *English Journal,* 87(2): 61-66.

Smith, A., & Jones, B.2023.Incorporating technology into classrooms: Enhancing students' problem-solving and creative skills. *Journal of Educational Technology: 15(2), 123-145.

Smith, J. and Jones, A. 2023.'Effective dialogue teaching: Exploring the role of interactive technologies and teacher training', *Journal of Educational Technology*, 15(2), pp. 45-60.

Smith, J., Johnson, A., Brown, K. & Anderson, M. 2019. Examining the relationship between job satisfaction and employee retention. *Journal of Organizational Psychology,* 25(3):123-145.

Smith, O. & Jones, S. C. 2020. 'Coming out' with autism: Identity in people with an Asperger's diagnosis after DSM-5. *Journal of Autism and Developmental Disorders, 50*(2):592–602.

Sofroniou, A. & Poutos, K. 2016. Investigating the effectiveness of group work in mathematics. *Education Sciences,* 6(3):30.

Soller, Amy. (2001). Supporting social interaction in an intelligent collaborative learning system. *International Journal of Artificial Intelligence in Education.* 12(1): 40-62.

Sosibo, L. & Nomlomo, V. 2014. Teachers' conceptions of standards in South African Basic Education and Training: A case study. *Perspectives in Education*. 32(1):77-91.

Starman, A.B. 2013. The case study as a type of qualitative research. *Journal of Contemporary Educational Studies, 1*:28-43.

Statistic South Africa (StatsSA) .2011. Census South Africa 2011. Pretoria: Statistics South Africa.

Stein, R. & Hurd, S. 2000. *Cooperative learning is an educational approach that promotes interaction among students and shared responsibility for academic achievement: Using student teams in the classroom.* Bolton MA: Anker Publishing Company, Inc.

Subramanian, N. & Jeyaraj, A. 2018. Recent security challenges in cloud computing. *Computers & Electrical Engineering*, 71:28-42.

Sugeng, B. & Suryani, A. W. 2018. Presentation-based learning and peer evaluation to enhance active learning and self-confidence in financial management classroom. *Malaysian Journal of Learning and Instruction*, 15(1): 173-201.

Sun, H.-L., Sun, T., Sha, F.Y., Gu, X.Y., Hou, X.R., Zhu, F.Y. & Fang, P.T. 2022. The influence of teacher–student interaction on the effects of online learning: Based on a serial mediating model. *Frontiers in Psychology*, 13:779217.

Sweetman, D., Badiee, M. & Creswell, J.W. 2010. Use of the transformative framework in mixed methods studies. *Qualitative Inquiry,* 16(6):441-454.

Taherdoost, H. 2021. Data collection methods and tools for research: A step-by-step guide to choose data collection technique for academic and business research Projects. *International Journal of Academic Research in Management, 10(1): 1038.*

Tan, A., Lim, W. S., & Lim, C. P. (2021). "The Impact of Experiential Learning on Technology Education: Evidence from Singapore." *Journal of Educational Technology & Society*, 24(1), 45-58.

Tan, E.T. & Goldberg, W.A. 2019. Parental school involvement in relation to children's grades and adaption to school. *Journal of Applied Developmental Psychology*, 30:442–453.

Tao, Y & Chen, G. 2022. Implementation of dialogic teaching: Exploring teachers' perceptions, attitudes, and practical challenges. *Proceedings of the 16th International Conference of the Learning Sciences*: 1657-1660.

Tarone, E. 2007. Sociolinguistic approaches to second language acquisition research. *The Modern Language Journal,* 91:837-848.

Taylor, B.M. & Pearson, P.D. 2020. Research on learning to read - At school, at home and in the community. *Elementary School Journal*., 105(2):167-181.

Taylor, C., Anderson, R., & Martinez, A. (2023). *Enhancing Critical Thinking Through Effective Communication in Learning Environments*. Educational Psychology Review, 35(2), 415-430. doi:10.1007/s10648-023-09672-x

Taylor, S. 2021. COVID stress syndrome: Clinical and nosological considerations. *Current Psychiatry Report*, 23:19. Teachers' Professional Development: *The Impact on Teachers' and School Leaders' Professional Growth. Australian Journal of Teacher Education*, 40(12).

Teherani, A., Martimianakis, T., Stenfors-Hayes, T., Wadhwa, A. & Varpio, L. 2015. Choosing a qualitative research approach. *Journal of Graduate Medical Education,* 7(3):669-670.

Teo, P. 2019. Teaching for the 21st century: A case for dialogic pedagogy. *Learning, Culture and Social Interaction,* 21:170–178.

Thanh, N.C. & Thanh, T.T.L. 2015. The interconnection between the interpretive paradigm and qualitative methods in education. *American Journal of Educational Science,* 1(2):24-27.

The Sasol Inzalo Foundaton: Ten years in STEM education in South Africa 2008 – 2018 Commemorative Book.

https://www.sasolfoundation.com/wpcontent/uploads/2021/11/SASOL_INZALO_Commemorative_Book.pdf

Thompson, R.A. & Haskins, R. 2014. Early stress gets under the skin: Promising initiatives to help Children facing chronic adversity. *Future of Children,* 24(1): 1– 8.

To, J. & Liu, Y .2018. Using peer and teacher-student exemplar dialogues to unpack assessment standards: Challenges and possibilities. *Assessment & Evaluation in Higher Education* 43(3):449–460,

Tran, N.H., Truong, T.D,. Dinh, H, T., Do, T.L., Tran, T.T. & Phan, M.T. 2020. Significance of teacher professional development in response to the current general education reforms in Vietnam: Perceptions of school principals and teachers. *Problems of Education in the 21st Century,* 78(3):449-464

Tshangana, C., Nomtshongwana, M. & Buka, N. 2023.Teaching experiences with overcrowded classrooms in primary schools in the OR Tambo Coastal District of South Africa. *E-Journal of Humanities, Arts and Social Sciences,* 4(8):936-946.

University of South Africa .2016. *Policy on research ethics*. Pretoria: UNISA Press.

Upper Saddle River, NJ: Pearson Education, Inc.

Valentová, M. & Brečka, P. 2019. Implementation of the critical thinking strategies in the school subject Technology: A preliminary study. *TEM Journal*. 8(3):998-1004.

Vally, S. 2007. People's education to neo-liberalism in South Africa. *Review of African Political Economy,* 34(11):39-56.

Van de Pol, J., Brindley, S. & Higham, S. 2017. Two secondary teachers' understanding and classroom practice of dialogic teaching: a case study. *Educational Studies*, 43(5):497-515.

Van der Veen, C., Van Kruistum, C. & Michaels, S. 2015. Productive classroom dialogue as an activity of shared thinking and communicating: A commentary on Marsal. *Mind, Culture, and Activity,* 22(4):320–325.

Van Rensburg, A., 2021. Teachers' perceptions and implementation of the design process in Technology education for Grade 9 learners. South African Journal of Education, 41(3): 345-358.

Van Rensburg, A., 2021. Teachers' perceptions and implementation of the design process in Technology education for Grade 9 learners. South African Journal of Education, 41(3): 345-358.

Vannoni, M. 2015. What are case studies good for? Nesting comparative case study research into the Lakatosian Research Program. *Cross-Cultural Research,* 49(4):331-357.

Vincent-Lancrin,S.2019.Measuring Innovation in Education,What changed in the classroom, Educational Research and Innovation,OECD Publishing,Paris.

Vrikki, M., Wheatley, L., Howe, C., Hennessy, S. & Mercer, N. 2019. Dialogic practices in primary school classrooms. *Language and Education,* 33(1):85-100.

Vygotsky, L.S. 1978. *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Wahyuningsih, S. 2018. Men and women differences in using language: A case study of students at Stain Kudus. edulite: *Journal of English Education, Literature and Culture,* 3(1):79.

Webb, N.M. 2017. The role in promoting collaborative dialogue in the classroom.

Wells, G. 2020. Language and the inquiry-oriented curriculum. *Curriculum Inquiry*, (25): 233-269.

Welman, J. C., Kruger, F., Mitchell, B. & Huysamen, G. K. 2010. *Research methodology* (3rd ed.). Oxford University Press.

West University]. http://doi.org/10.13140/RG.2.2.36330.21440

West, J. & Meier, C. 2020. Overcrowded classrooms–The Achilles heel of South African education. *South African Journal of Childhood Education,* 10(1): 617.

West, J. 2019. *Data collection.* https://www.researchconnections.org/childcare /datamethods/survey.jsp.

When to use them and how to judge them. *Human Reproduction,* 31:498-501.

Wikberg-Nilsson, Å. Ericson, Å. & Törlind, P. 2021. *Design: Process och metod* (2 ed.). Studentlitteratur AB

Wilkinson, I.A.G., Reznitskaya, A., Bourdage, K., Oyler, J., Glina, M., Drewry, R., Kim,

Winner, L. 2018. *Autonomous technology.* Cambridge: MIT Press.

Wood, D., Bruner, J.S. & Ross, G. (1976). The role of tutoring in problem-solving. *Journal of Child Psychology and Psychiatry*, 17(2), pp. 89-100.

Yılmaz, M., Yılmaz, U. & Demir-Yılmaz, E.N. 2019. The relation between social learning and visual culture*. International Electronic Journal of Elementary Education,* 11(4):421-427.

Yin, R. 2009. Case study research: Design and methods. (4th ed.). Thousand Oaks, CA: Sage.

Yin, R. 2014. Case study research: Design and methods (5th ed.). Thousand Oaks, CA: Sage.

Zahid, A., Qinghe, Z. & Sohail, A. 2021. Communication barriers and process of feedback in social interactions. *Mediterranean Journal of Social & Behavioral Research,* 5(1):3-12.

Zhang J. & Price A. 2020. Developing the enterprise educators' mindset to change the teaching methodology: the case of Creating Entrepreneurial Outcomes (CEO) Programme. *Entrepreneurial Education*, 3(3):339–61.

Zheng, T.T. 2017. A literature review on knowledge sharing. *Open Journal of Social Sciences*. 5:51-58.

APPENDICES

Appendix A: Proof of Registration

UNISA university of south africa

1728

SWEATLSE M E ME
843 KLOOVAAL STREET
NEWE ESTATE
0182

STUDENT NUMBER : 64176843

ENQUIRIES TEL : 0800 000 870

eMAIL : mesm4@unisa.ac.za

2024-08-20

Dear Student

I hereby confirm that you have been registered for the current academic year as follows:

Programme Qualification: MED (CURRICULUM STUDIES) (98494)

CODE	PAPER	S	NAME OF STUDY UNIT	NQF credits	LANG.	PROVISIONAL EXAMINATION EXAM.DATE	CENTRE(PLACE)
Study units registered without formal exams:							
DEDC893			MEd - Didactics	**	E		

You are referred to the "MyRegistration" brochure regarding fees that are forfeited on cancellation of any study units.

* Your attention is drawn to University rules and regulations (www.unisa.ac.za/registers).
Please note the new requirements for re-registration and the number of credits per year which state that students registered for the first time from 2013, must complete 36 NQF credits in the first year of study, and thereafter must complete 48 NQF credits per year.
Students registered for the MBA, MBL and DBL degrees must visit the SBL's ESOnline for study material and other important information.
Readmission rules for Honours: Note that in terms of the Unisa Admission Policy academic activity must be demonstrated to the satisfaction of the University during each year of study. If you fail to meet this requirement in the first year of study, you will be admitted to another year of study. After a second year of not demonstrating academic activity to the satisfaction of the University, you will not be re-admitted, except with the express approval of the Executive Dean of the College in which you are registered. Note too, that this study programme must be completed within three years. Non-compliance will result in your academic exclusion, and you will therefore not be allowed to re-register for a qualification at the same level on the National Qualifications Framework in the same College for a period of five years after such exclusion, after which you will have to re-apply for admission to any such qualification.
Readmission rules for MSc: Note that in terms of the Unisa Admission Policy, a candidate must complete a Masters's qualification within three years. Under exceptional circumstances and on recommendation of the Executive Dean, a candidate may be allowed an extra (fourth) year to complete the qualification. For a Doctoral degree, a candidate must complete the study programme within six years. Under exceptional circumstances, and on recommendation by the Executive Dean, a candidate may be allowed an extra (seventh) year to complete the qualification.

BALANCE ON STUDY ACCOUNT: 17949.00

Payable on or before:

Immediately: 3930.00	2024/03/31: 0.00	2024/08/15: 4017.00	2024/08/15: 4018.00	
	2024/11/15: 0.00	2024/03/15: 0.00		

Yours faithfully,

Prof MM Sepeng
Acting Registrar

INDEX D 02

UNIVERSITEIT VAN SUID AFRIKA PRETORIA UNIVERSITY OF SOUTH AFRICA

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 B: Ethical Clearance Certificate

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2022/02/09

Ref: **2022/02/09/44174543/26/AM**
Name Ms ME Swaratlhe
Student No.:44174543

Dear Ms ME Swaratlhe

Decision: Ethics Approval from 2022/02/09 to 2025/02/09

Researcher(s): Name: Ms ME Swaratlhe
E-mail address: swaratlheme@yahoo.com
Telephone: 0736275578

Supervisor(s): Name: Dr M. M Maja
E-mail address: majam@unisa.ac.za
Telephone: 012 429 6201

Title of research:

THE USE OF DIALOGUE IN TEACHING TECHNOLOGY SUBJECT IN GRADE 9 TO ENHANCE LEARNERS' COMMUNICATION SKILLS

Qualification: MEd Curriculum Studies

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 2022/02/09 to 2025/02/09.

*The **medium risk** application was reviewed by the Ethics Review Committee on 2022/02/09 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 will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.

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 C: Request Permission from the GDE

Amandasig
2835 Loius Street
Pretoria North 0183 23

January 2022

The District Manager
Gauteng Department of Education
Gauteng

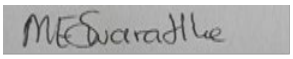
Request for permission to conduct research at following Secondary schools:

Sir/Madam

I, Swaratlhe M.E am doing research under supervision of Prof MM Maja, in the Department of Curriculum and Instructional Studies towards a Master's Degree at the University of South Africa. Asking for a permission to conduct research in above mentioned public secondary schools situated in Atteridgeville, west of Tshwane, under the title *"Grade 9 Technology Teachers' Use of Dialogue o Enhance Learners' Communication Competence in Tshwane South District".* The researcher will give teachers, an opportunity to learn issues concerning the research topic. Participants' names will not be disclosed otherwise will be given codes. The data collection procedure will take place at school, during school hours. The duration of the interviews will be 1 hour. Methods to collect data will be observation and semi-structured interview.

The benefits of this study for the participants is that they will have an opportunity to voice their opinion and learn more about the study. After the data collection procedure participants will have access to the research findings. Potential risk may be considered minimum due to anonymity and confidentiality. There will be no reimbursement or any incentives for participation in the research. Feedback procedure will entail sending emails and in case of participants not having emails, the researcher will deliver hardcopies personally.

Your approval for permission to conduct research will be appreciated. Yours sincerely



Motshidisi Swaratlhe

Appendix D: Response Letter from the GDE

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

6/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	22 April 2022
Validity of Research Approval:	08 February 2022– 30 September 2022 2022/145
Name of Researcher:	Swaratlhe M.E
Address of Researcher:	2835 Lolus Street
	Amandasig
	Pretoria North
Telephone Number:	073 6275578
Email address:	44174543@mylife.unisa.ac.za
Research Topic:	The use of dialogue in teaching technology subject in grade 9 enhance learners communication skills
Type of qualification	Med Curriculum and Instructional Studies
Number and type of schools:	3 Secondary Schools
District/s/HO	Tshwane South

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.

23/04/2022.

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

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 E: Request Permission Letter to Schools

2835 Louis Street
Amandasig
Pretori North
0183
23 January 2022

The Principal

Dear Sir/Madam

I, Motshidisi Ellen Swaratlhe am doing research under supervision of Prof M. M Maja, a senior lecturer in the Department of Curriculum and Instructional Studies towards a MEd at the University of South Africa. I am inviting your teachers to participate in a study entitled

GRADE 9 TECHNOLOGY TEACHERS' USE OF DIALOGUE TO ENHANCE LEARNERS' COMMUNICATION COMPETENCE IN TSHWANE SOUTH DISTRICT

The aim of the study is to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process.

Your school has been selected because technology is one of the subjects that are taught at your school.

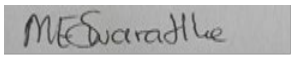
The study will entail the research giving teachers, an opportunity to learn issues concerning the research topic. Participants' names will not be disclosed otherwise will be given codes. The data collection procedure will be taking place at schools, during school hours as lessons will be observed. The duration will be 2 hours. Methods to collect data will be observation and semi-structured interview.

The benefits of this study are to allow learners to be involved in a lesson and for teachers to be able to identify learners who are too shy to participate in class, learning will be a collaborative exercise to help learners enhance their communication skills while learning technology as a subject.

Potential risks are not involved as this will take place in a safe environment.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail a written report of the findings of the study. Yours sincerely



Motshidisi Ellen Swaratlhe

Researcher

Appendix F: Request Permission Letter to Grade 9 Technology Teachers

2835 Louis Street
Amandasig
Pretoria North
0183

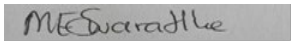
23January 2022

Dear prospective participant

Request permission to be participant in the study

My name is Motshidisi Ellen Swaratlhe I am doing research under the supervision of Prof M.M Maja, a senior lecturer in the Department of Curriculum and Instructional Studies towards a MEd at the University of South Africa. I am inviting you to participate in a study entitled: "*Grade 9 Technology Teachers' Use of Dialogue to Enhance Learners' Communication Competence in Tshwane South District.* This study is expected to collect important information that could explore the use of dialogue in teaching Technology subject in Grade 9 classrooms to enhance learners' communication skills. investigate how Grade 9 teachers provide dialogue opportunities in teaching Technology. Participants are invited because they possess the necessary knowledge regarding the topic of the study. The chosen participants are the best participant to contribute appropriate information. I obtained your contact details from the school principal. The role of participants will be to teach while the researcher is observing the lesson as the study entails observation and the use of face-to-face semi-structured interviews with open ended questions that will be asked with in a period of forty-five (45) minutes to one hour. I kindly request for your permission to audio tape the dialogue to capture data in a timely manner. I also request to allow probing and clarifications during interviews. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason. Thank you for taking time to read this information sheet and for participating in this study.

Thank you.



Motshidisi Ellen Swaratlhe

Appendix G: Consent for Grade 9 Technology Teachers

CONSENT TO PARTICIPATE IN THIS STUDY (Return slip)

I, _____ (participant name), 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 interviews _____

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

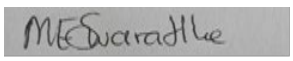
Participant Name & Surname (please print) _____

_____ _____

Participant Signature Date

Researcher's Name & Surname (please print)

_____



26 January 2022

Researcher's signature Date

Appendix H: Observation Schedule

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APPENDIX H: observation schedule

What to observe	Reflective notes	Recommendations
Activities for designing process		
Methodology	Teacher centred Learner ☐ centred/Dialogue method ☐	
Classroom environment		
Technology project		
Tools to use		
Seating arrangement		
Interaction between teacher to learner		
Interaction between teacher to group		
Interaction between learner to learner (pair work)		
Interaction between learner to learner(group work)		
challenges		
Teaching strategies		

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Appendix I: Interview Schedule

Title: Grade 9 Technology Teachers' Use of Dialogue to Enhance Learners' Communication Competence In Tshwane South District

AIM: The aim of the study is to explore Grade 9 Technology teachers' use of dialogue to enhance learners' communication competence in the teaching and learning design process.

SECTION A: INTERVIEWS QUESTIONS FOR GRADE 9 TECHNOLOGY TEACHERS

1. Tell me about yourself- qualification, years of teaching Technology
2. Dialogue is a strategy or teaching method that allows learners not to be passive during teaching and learning. Tell me, how you use this strategy in your lessons?
3. How do you encourage learners to understand technological design process?
4. What do you do during the investigation skill?
5. When do you give learners to report their findings?
6. How do you conduct the design process?
7. How do you involve learners in the making process?
8. How do you encourage them to choose the relevant tools for their product?
9. How do learners evaluate their products?
10. Explain how you encourage your learners to communicate their final product?
11. What are the challenges of using dialogic method?
12. How do you mitigate these challenges?
13. What are the strategies you use when teaching Technology?
14. What are the outcomes of using these strategies?

Appendix J: Responses to Interview Questions

INTERVIEWS QUESTIONS FOR TECHNOLOGY TEACHERS

Main research question: *How do Grade 9 Technology teachers use dialogue to enhance learners' communication competence in the teaching and learning design process?*

T1:I Introduce general related questions to the recent topic that learners are familiar with 1 so that they can engage. I create a setting where the learners feel comfortable having discussions. 2. I question the learners and receive their responses.3. Learners feel some ownership of the topic they are discussing by being given the opportunity to speak.3. The learning process is made more meaningful when learners are actively participating in the conversation. Learners actively participate in expanding their knowledge. I bring out a certain idea or piece of knowledge to the class. If there is some relevant information that has already been read out by me, learners can talk about it as they go along. T1:Technology is very practical subject, sometimes I bring artifacts to demonstrate how are other things work like hydraulics these syringes to demonstrate how hydraulics work.

T2:After introducing the topic to the learners I ask questions and learners individually are given an opportunity to answer questions. They (learners) are not allowed to speak all at once otherwise we will have a problem of hearing what the other has to say. It is important that I promote speaking, listening, and thinking. I stimulate learning by posing sincere questions and encouraging my learners to do the same. The conversation flows in a coordinated manner, with ideas building on one another to paint a more complete picture than any one student could have imagined on their own. Points are raised, looked at, and contested. Ideas may be speculative and preliminary, or they may require considerable revision. I can reach the thoughts of the learners because of this. T2:Most of Technology work is practical. Theory work is done in class and when time allows, we can do a few of the practical work. Also, when teaching we demonstrate practically e.g when working with different types of forces, we bring objects to class and see how they react to forces.

T3:I allow learners to defend their answers, question their classmates, and explain their reasoning through dialogue. They are less scared and develop confidence in their thinking process and capacity to obtain, retain, and apply information after hearing from another learner. What I usually do is have the learners do some pre-reading before coming to class to learn about the new topic. I may have a worksheet, prompt, or question ready for them when they arrive in class. Secondly, students react to whatever I've given them. Finally, the students discuss their preferred answers/responses and make any required changes to their original work. The answer is finally disclosed and debated. I offer important vocabulary. I ask groups to discuss the last lesson or their experiences in a group setting. Each group is asked to provide one sentence summarising what they have learnt or understood. I then ask another group to speak, and so on, until all the groups feel that the summary of prior work is complete. The learner who is speaking may at any point request input or commentary from others. The person who just spoke during the class discussion is being asked to recommend the person who should speak next. To speed things up, I may occasionally clarify certain answers or link related ideas. The recommendation method, in which learners bid for turns by raising their hands,

allows me to break free from my limitations of questions and short responses. T3:I test their prior knowledge, then once I have established what they know and what they don't know, I get an idea of how to start my lesson.

T4:I use it to introduce a new topic to test pre-knowledge of learners. Learners will be able to freely express their views based on their own experience and thoughts and allows the educator to clarify any misunderstandings. Dialogue during the lesson is a way of testing learners' understanding of the topic as well as new terminology and concepts. Given that there are no absolute right or incorrect answers in dialogues, I place a strong focus on being a co-learner and developing relationships with learners. I provide learners the chance to voice their thoughts in a secure setting without worrying about judgment or criticism. They should also pay attention to other people's ideas, assess them as possibilities, and comprehend why some people accept certain ideas while others do not. T4:I allow learners to actively participate in the learning process with class discussions and exercises that support the initiative.

T5:I usually use dialogue strategy when we are discussing our PAT (Practical Assessment Task), when we discuss how they go about it carry it out, this is where I give them an opportunity to ask questions and to give me their ideas so that I can therefore correct them and help them build me information on what to investigate and how to go about in completing their Pat. I watch out that I don't dominate the class, but rather help learners learn and include them in active learning. I engage learners in dialogic discourse in which they are given open-ended questions, questions that allowed them to examine different points of view, and questions that did not have to have a predetermined solution. I observed that this approach provides them chances to employ more strong vocabulary and improves communication competence. T5:I usually use the direct teaching method, so that is where I'm most communicable when we need to do the animations and drawing part of things, I also use the learnercentered method when it is calculation time because I certainly need them to do the calculations by themselves where I have to motivate them with the use of calculators to make sure that they understand what it is that they are doing in class.

T6:I use dialogue through asking thought-provoking questions to learners and then when they respond there's dialogue, some of them do not respond so I choose them if they don't volunteer and asked them to respond freely. I encourage learners to expand on and refine others' ideas. I also give them the self-assurance and chance to ask questions. To keep the classroom in order, I encourage a balance between learners so that they can give each other a chance to speak. Our classes are overcrowded so maintaining order is very important to avoid a disruptive classroom. T6:I use a lot of strategies, I use the instruction method, I also use an interactive method where they interact as learners and I'm also there to monitor the direction, I also use the project and experimental method where I bring a practical object to the workshop for them to experience whatever concept we are doing.

What are the benefits of using dialogic method/strategies?

T1:Learners understand easier when demonstrations are done.

T2:Learners understand more easier than when it is just theory because they will be looking at the objects and seeing the results.

T3:It gives learners confidence that they are also part of the topic, meaning they have an idea of what is discussed as they also engage

T4: No two learners are exactly alike. Active participation learning allows learners to learn without stigma and gets learners involved in what they're learning.

T5:It helps me to strengthen the skills of individual learning with these learners, I also see that when I use direct strategy most of these learners can grasp the information that is given to them because there are no disruptions, I speak, I explain, and they ask questions which helps them to gain more knowledge.

T6:the varied strategies are proofing to be working in some instances but sometimes have challenges due to the high volume of learners in a class.

Sub-questions

1. What do teachers understand and teach the technological design process using the dialogical method?

1.1 What do you understand and teach the technological design process?

T1:Any design artefact needs to be sketched before it can be made, so the drawing process is very important when one needs to design a product.

T2:Well with technological steps we treat each step individually. eg during the design process we teach learners how to draw free hand, a drawing with measurements the drawing must be an isometric drawing thereafter they will have to choose their final decision. So, for learners to understand we must teach them drawing skills e g different types of lines and how to use the drawing instruments

T3:I alter my teaching strategy to make the lesson learner-centred in order to promote learner participation, provoke thinking and allow for learner creativity, learners get excited when involved in a lesson and it ignites their creativity and enhances their communication skills.

T4: It is very important for learners to understand the process as it is applied to solve technological problems. For learners to understand the process, I use real life situations (case study) that they are familiar with, indicating that problems must be investigated. This is a step-by-step process that involves investigating, designing, making, evaluating, and communicating ideas. when the problem is identified and investigated, the design brief and specifications on how the problem will be solved are stated. Simple 2D,3D sketches are drawn showing dimensions and scale, Orthographical projections also included. The product is made according to specifications and evaluation is ongoing. Group members communicate.

T5:Theoretically or on paper it is not as easy as it is written, so it is usually better for me to show them or teach them about what this technological process entails, then give them a small activity for them to go on about explaining to me what they think they will need to do for the evaluation for instance and for them to look into other things that they would understand when

they look into the technological process, steps they'd need to follow to be able to complete certain parts of their assessment.

T6: By letting it into their day-to-day lives, that's how I encourage them.

1.2 **What do you understand and teach the investigation skill**?

T1:Learners need to go out and do research on the product they want to make, by asking questions to people and sometimes use the internet .

T2: Investigation skills:learners need to go out and investigate how their product look like, what material did they use, how long can it take to make the project, the cost of the material. They can visit the site where real life projects are built.

T3:I let learners Investigate the situation so that an appropriate machine can be designed to solve the problem, need or want given in the scenario. Investigate the possible mechanisms and controls to be used together to make the machine, with the internet being easily accessible I allow learners to explore and have an opportunity to be independent .

T4:I let learners Investigate the situation so that an appropriate machine can be designed to solve the problem, need, or want to be given in the scenario. Investigate the possible mechanisms and controls to be used together to make the machine, with the internet being easily accessible I allow learners to explore and have an opportunity to be independent.

T5:I tell the learners or I give them direction on what to look for when they are doing their research, I give them direction on the pictures to look out for and I give them hints and cue cards or clue words on what to look for exactly and during their investigation, they get an opportunity to bring whatever information they have to class so that I can say yes, no, increase or decrease and so forth.

T6: Not a very open and talkative teacher. He stated that:I guide learners by giving them relevant information directly to their design problem.

1.3 **How do you provide learners opportunities to report their findings**?

T1: It depends on the product they are going to make +- 3 weeks

T2: The project can take up to two weeks depending on how big it is

T3:A key role of the teacher is in assessing learner learning. This does not mean just giving tests; it includes helping learners to reflect on their learning and the learning process and to productively share their ideas with each other in various formats. So I normally give learners two weeks to report their findings.

T4: During investigation learners must find out more about the problem identified to bring the solution. It involves questionings or researching. an old object, for example, a school bag can be disassembled to see the different parts it is made of.

T5:They usually report their findings in class when they are done with their investigation skill when I have evaluated their investigations and made sure that they have the correct information to give as a report back.

T6:They report their findings during normal teaching periods, sometimes due to the numbers that we have in the class you might find that to be a lengthy exercise so I ask them to come during their extra time after school, to my workshop.

1.4 **What do you understand and teach the design process**?

T1:learners must draw three possible answers and select one from the 3.

T2: Three working drawings must be drawn in the work book of the learners

T3:To be able to make the design process explicit and to have a common base for communication, few elements must be distinguished to explain the design process in relation to all kinds of design situations at hand, and to guide and train learners in the development of design skills

T4:Investigating the identified problems allows learners to find the best solution. The design brief is written down to state what is going to be done based on the learners' findings

T5: Due to time constraints , the design process we usually just focus on the materials they will use and I encourage the learners to work individually after school or during break where they are able to design as they wish and during that design process they come and give me an update , I go to class and check how the model is going and how far they are, have they used the material they said they gonna use, and is it effective.

T6:I give learners a problem situation, then I explain to them what is expected of them, then they go home and do research on existing problems that design process , they take pictures of possible solutions that are already on the market and develop ideas from them after evaluating them , then they now develop them to improve them to suite this particular problem that is there.

What do you understand and teach learners in the making process

T1: Learners in groups are encouraged to work together by providing materials their going to use and bring them to school and given a chance to make their products during technology period, and if possible, teachers can assist with ideas.

T2: Learners are given an opportunity to make their projects at home as we do not have enough time at school.

T3:One way to "light the spark" of motivation in a classroom and get learners involved is by giving them a prominent voice in learning activities. I'm of the view that my understanding of the making process enables me to encourage learner independence and problem-solving. I normally don't give Learners an opportunity to make their projects at home because it will limit their dependency, parents might help them which will disadvantage them, so I take them to the computer centre to explore of materials they can use and have an idea of what project to make.

T4: Learners are divided into groups of 4 to 6 to work together. having understood the case study presented, they will bring relevant materials needed for the making process. learners get to apply the theory learned, such as in strengthening structures.

T5: They make the models themselves, I do not make the models and I monitor them, even if its not during school time I'll monitor them to ensure that it's their own work.

T6: Learners are the ones that design and make on their own, I only give them some tips on how to make the project.

What do you understand and teach learners to choose the relevant tools for

their product?

T1: Ergonomics, states that it is well right tool for a right job for perfect results. Safety first.

T2: Before deciding on the tools they must know all the safety measures first. Then they will choose the tools we use in class most of the time. E. G scissors, glue gun, cudboard, wood etc

T3:Every tool for its job. They first have to understand their product first, then they will know which tool to use and how.

T4: When choosing tools for making, simple basic tools and equipments are preferred. Learners' choice is based on properties and suitability of materials and availability. Materials must be easy to work with like cutting, bending, or rolling according to the product to be made. Safety of using the type of material must also be considered

T5: They fist decide or brainstorm about the tools they will use then in that design process they will bring the material to class and before they start making the models , we check if it is really what they need whether they need to use dangerous or heavy tools. I will encourage them to use something lighter or advise them to use the workshop where I will monitor if they are using correct tools.

T6:I encourage them by asking them to research through the internet or through their peers in other classes.

What do you understand and teach learners to evaluate their products?

T1:They have to check if their product is stable enough to pass the test.

T2:They will check the stability of the products, can it withstand all kinds of forces They must draw a table for checklist of all the evaluation processes.

T3: Evaluation sits at the center of the instructional design model. It provides feedback to all other stages of the design process to continually inform and improve instructional designs. With every instructional product, evaluating results is the most significant task by a learner, and is done to determine how closely one has been able to achieve success in the implementation of the product. learners conducts an evaluation in order to test the effectiveness of the instruction to create the desired learning outcome.

T4: They must draw a table for checklist of all the evaluation processes. This will help them identify what they have missed so that they can go back and rectify before they can present their product to the class.

T5:Using a table which I draw up with questions, they answer the questions based on different products that could have done, but then now they usually check which product is best fitting for their project.

T6:They look at the strength and weakness of their product according to the problem situation that has been given and then they also comment on materials.

What do you understand and teach learners to communicate their final product.

T1: We let them test their products as a group while others are observing, and it must pass all steps.

T2:Learners stand in front of the class and operate their product. It must pass all the steps e.g if it is a roller coaster it must be able to turn and no break.

T3:The final product made will be evaluated as per the design specifications stated. This will include materials used, strengthening techniques and whether the product will meet the requirements of the users it is made for.

T4:The final product made will be evaluated as per design specifications stated. This will include materials used, strengthening technique and whether the product will meet requirements of users it is made for.

T5: They usually work in groups, to communicate. I ask them to choose a speaker, and what we do normally, I ask all of them to tell their names, and a basic introduction, and from that, I ask them to use this specific speaker so that the speaker can explain what's going on with the project if the speaker is audible enough is easier for them to communicate their project.

T6:Through drawings and through a model of that product, the group leader represents all group members as it is teamwork.

What are the challenges of using the dialogic method to enhance l

earners' communication skills?

T1:Dialogue challenges are that all learners want to speak all at once.

T2:Learners end up not giving each other an opportunity to speak. They speak all at once and they can be disruptive.

T3: The challenge comes when classes are overcrowded. For example, the ratio in the technology classroom should be 1:30, but we have 40 learners in the class making it difficult to manage all of them during dialogue interaction. They all want to speak at once making it impossible for teaching and learning to take place.

T4:Learners' academic performance is significantly impacted by overcrowding in the classroom, which is the main cause of the learners' low performance in schools. Using dialogue will be difficult to control the overall classroom.

T5: Because of overcrowding, the language English which is the medium of instruction is also a problem, it becomes chaotic as they all want to talk at the same time in their vernacular language.

T6:Its time consuming and learners are not good at expressing themselves, and language barrier.

To what extent are teachers supported in using the dialogue method to enhance learners' communication skills?

What support do you get from the district to use dialogue when teaching Technology?

District support

T1:We don't really receive much support from the district, I personally must go on the internet to get annual teaching plans, past question papers and simulations or projects rather. We have a WhatsApp group of technology teachers where we share materials and ideas as to how we can engage learners in peer learning or collaborative learning, just to make them involved in the lesson.

T2:The district provides the written work on what's needed to be done. We as teachers try to manipulate it to fit with dialogue learning so that we can engage learners. Learners get bored easily when not participating.

T3: My facilitator often comes to my school to help me engage learners in my teaching and learning. I previously struggled to get their attention as they are too many in the class. So, when they see a visitor, they all want to impress and be involved in the topic.
.

T4:After understanding the complexity of the subject, learners should be able to use their reasoning abilities to search for a solution. Technology teachers should be educated about the design process and should support their learners well if they want to help them build their communication skills. This is where the district comes in. our facilitator makes sure that we meet in what we call road shows, where we learn about the whole curriculum e.g what design process is and what should happen in design process.

T5:The district is not putting much effort in technology as a subject, the school chips in from their own school budget and help us buy required material.

T6:Our facilitator visits our school at the beginning of each term to bring us material needed for that specific term. Although the district does not give us enough budget for our projects, our school sometimes raises funds through learners wearing home clothes of Fridays and pays R5, which goes to our technology depart to buy necessary components.

What support do you get from the school to use dialogue when teaching Technology?

School support

T1:My Head of Department (HOD) assists where learners are too many in the classroom to engage in dialogue learning. To avoid disruptions, we divide the learners in halve, she takes the first halve and monitor them while I engage the remaining half in dialogue learning, when I'm done, we exchange. she engages with the halve that I was busy with to make sure that

dialogue learning was a success or not, depending on how they answer, will determine if the lesson was a success, while I'm busy with the last halve.

T2: The school can provide materials if available so learners can start working on them. There are two teachers teaching technology in my school, we asked for our periods to be at the same time, in that way we get more time to group the learners in a debate form so that they can engage in a dialogue using the topic that is provided for them.

T3: My HOD and I stay behind after school to prepare for the next day's lesson. I create the scenario in which the purpose or problem that needs to be answered is determined before learners begin the design process. For instance, I discuss the situation in which an electronic circuit may be applied to fulfil a requirement, resolve an issue, or open potential prospects when I teach about electrical systems and control. This gives learners the chance to ask questions to get clarification, engage in dialogue, and then come to their own conclusions about the issue at hand. Most importantly, learners may integrate their ideas to find the best technological solution.

T4:our school is under resourced, we struggle to get textbooks, so most of the time we communicate in our WhatsApp groups as technology teachers to discuss challenges and advantages of collaborative or dialogue learning as you put it, and how we can integrate it to our lessons.

T5:The school provides material from their own budget based in line with what is required for a project. The products that technology learners make are developed in line with the design process and input from both the teacher and classmates as a form of dialogue, it is crucial that they embrace themselves, boosting their self-confidence and promoting good communication skills. The school is really on our side, and it makes teaching and learning easier.

T6: Our school goes out of their way to help the technology department at schools. Occasionally we organise trips for learners to go to industrial companies and see all the machines that are taught in class, they make notes and comes back to class and have a class discussion of what they saw and how it works. Parents helps us with donations and pay for the trips without complaining so this makes teaching and learning easy.

What support do you get from the parents to use dialogue when teaching Technology?

Parental support

T1:Parents are failing us. Sometimes in technology learners learn well via practical method. When we arrange an excursion for learners to go and experience the real world of technology, parents don't pay or attend meetings. When we give out an investigation, we expect parents to take part and engage with learners, practice dialogue culture at home to perfect it in class, parents don't want to be involved. Parental involvement is a huge problem.

T2: The parents can step in where the school is failing to provide all materials, they are very helpful. When we give them a list of materials to buy, they buy without questioning. I normally give them a topic for the next day to go home and practice with their parents so that the next day they can have valid points and an idea of what they are discussion in their groups. This has helped me save a lot of time.

T3: Parents here don’t want to take part in their children’s schoolwork. When I give learners a topic to discuss at home and practice peer interaction, only less than a half in a classroom comes back ready for the lesson. It’s not productive because most of the learners are not ready, so now I must step in and start the lesson from the beginning, which is time consuming.

T4: When coming to schoolwork, parents are failing us. There is a lot of lack of communication which makes it difficult for us as teachers to engage in dialogue with learners in a classroom environment because learners don’t practice it at home, it becomes difficult for us to start from scratch with them and it becomes time consuming due to large numbers of learners in the classroom.

T5: This subject entices learners' curiosity, sparks their imaginations, and connects their personal experiences to those of others in society and to daily life. with parents actively involved, they help prepare learners for the classroom environment, I send learners home with the next lesson topic to rehearse at home with their parents, I’m grateful that these parents are on board and are doing the most. this promotes the idea of "learning by doing," which is a crucial component that entices learners' cognitive and communication skills. As a result, teachers and peers provide feedback to technology learners as they work to overcome technological issues via dialogue.

T6:Parents at this school are our number one cheerleader. The level of participation overwhelms us. Even when we call learners to come in on weekends, parents help us by making sure that learners attend Saturday classes, as sometimes time is not enough during the week due to overcrowdings of classes and little time we are given.

Appendix K: Proof of Editing

Cilla Dowse Editing

Dr Cilla Dowse
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(on WhatsApp)

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and
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This letter serves to confirm that editing and proofreading was done for:

MOTSHIDISI ELLEN SWARATLHE

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Curriculum and Instructional Studies

University of South Africa

GRADE 9 TECHNOLOGY TEACHERS' USE OF DIALOGUE TO ENHANCE LEARNERS' COMMUNICATION COMPETENCE IN TSHWANE SOUTH DISTRICT

Cilla Dowse
28 May 2024

Cilla Dowse
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Programme on Editing Principles and Practices: University of Pretoria 2009
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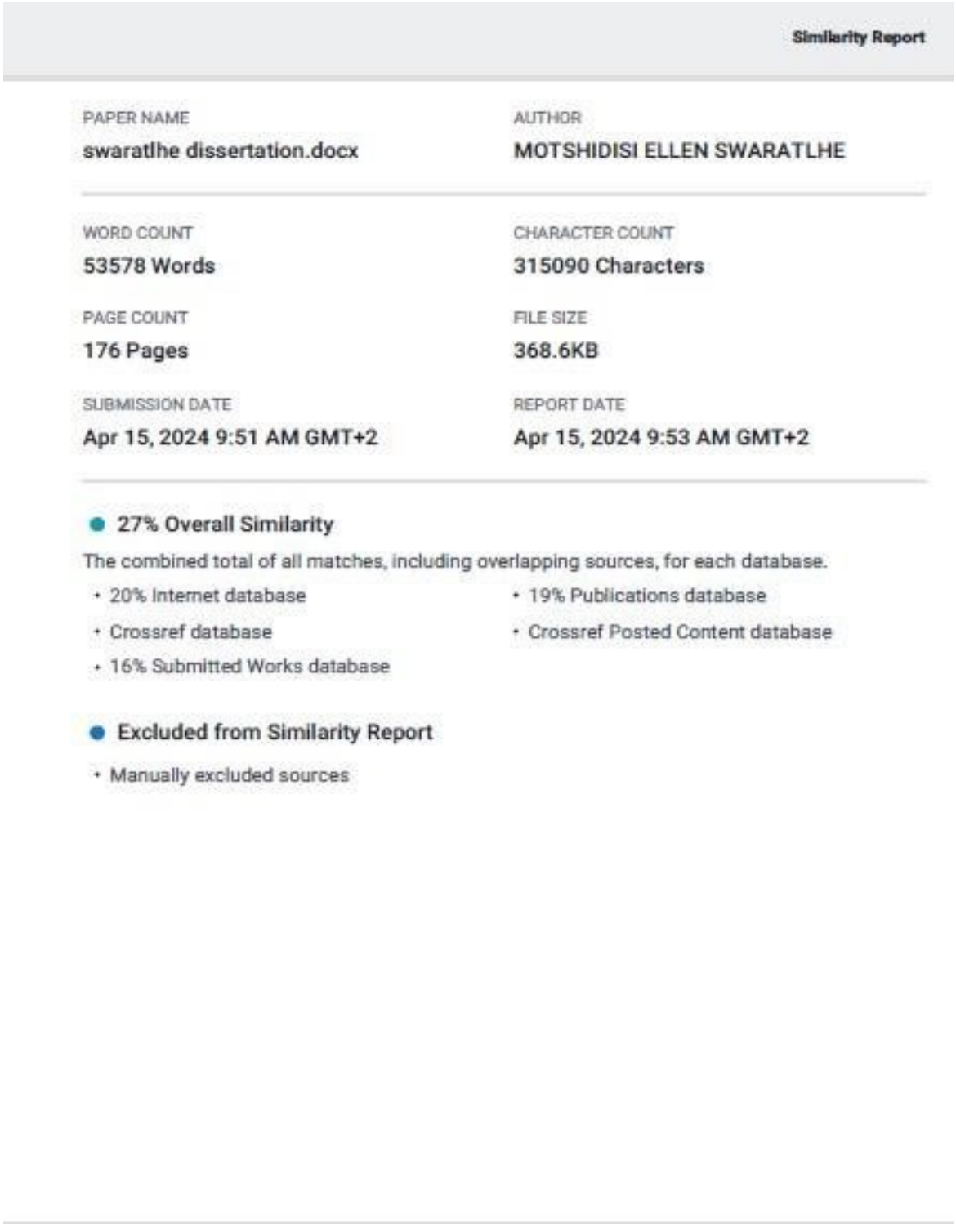
Appendix L: Turnitin Report



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