

**INTEGRATION OF EDUCATIONAL TECHNOLOGY RESOURCES IN LIFE
SKILLS EDUCATION IN RURAL SOUTH AFRICAN PRIMARY**

by

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Declaration

I, Simphiwe Ennocent Zulu, hereby declare that:

- a) The research presented in this dissertation, except where otherwise acknowledged, is my own original work.
- b) This dissertation has not been submitted, either in whole or in part, for any degree or examination at any other university or higher education institution.
- c) This dissertation does not contain the data, images, graphs, tables, or any other material belonging to other individuals unless such sources have been appropriately acknowledged.
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As the candidate's supervisor, I hereby approve the submission of this dissertation for examination.

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Date: _____ 12 October 2026

Dedication

First and foremost, I dedicate this work to Almighty God, whose grace, strength, wisdom, and unfailing guidance sustained me throughout this academic journey. Without His blessings, this achievement would not have been possible. I also dedicate this dissertation to my family, whose unwavering love, encouragement, patience, and sacrifices inspired me to persevere. Their constant support has been a source of strength throughout this journey.

This work is further dedicated to all those who believed in me and contributed to my academic growth, including my colleagues, research participants, and Mzukulu kaMathoko. Your encouragement and support have been invaluable. Finally, I dedicate this dissertation to my supervisor, Prof C.B. Mpungose, whose high expectations, constructive guidance, and commitment to academic excellence continually challenged me to become a better researcher and scholar. Your mentorship has significantly shaped both this study and my professional development.

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Abstract

The integration of educational technology (EdTech) into Life Skills education offers important opportunities to improve teaching and learning in rural South African primary schools, despite persistent contextual challenges. This study explored how EdTech resources are integrated into Life Skills teaching across ten rural primary schools. Lensed by the interpretivist paradigm, the study adopted a qualitative case study design to gain an in-depth understanding of teachers' experiences. Data were generated through semi-structured interviews, classroom observations, and reflective activities, and analysed using inductive and deductive thematic analysis. The Technological Pedagogical and Content Knowledge (TPACK) framework informed the interpretation of the findings, while credibility, dependability, transferability, and confirmability ensured trustworthiness.

The study comprises six chapters covering the study background, literature review, theoretical framework, methodology, findings, and conclusions. The findings identified three levels of technology integration: structured, unstructured, and non-structured. Teachers' technology use was often inconsistent because of inadequate infrastructure, limited professional development, and insufficient institutional support. The study recommends that the Department of Basic Education and curriculum developers provide clear curriculum guidelines and a structured framework for EdTech integration. Such guidance would strengthen teachers' technological pedagogical knowledge and promote meaningful, consistent technology integration in resource-constrained rural schools.

Keywords

Integration, Educational Technology Resources, Rural Primary School, EdTech, deep-rural areas, TPACK, Technological implications, digitised, school community, digital divide, curriculum-aligned digital

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List of Abbreviations

BEd: Bachelor of Education

C2005: Curriculum 2005

CAPS: Curriculum and Assessment Policy Statement

CK: Content Knowledge

TCK: Technological Content Knowledge

TIE: Technology in Education

TK: Technological Knowledge

TOE: Technology of Education

TPK: Technological Pedagogical Knowledge

TPACK: Technological Pedagogical and Content Knowledge

DBE: Department of Basic Education

DOE: Department of Education

EdTech: Educational Technology

GET: General Education Training

HW: Hardware

SW: Software

IW: Ideological-Ware

LMS: Learner Management System

NCS: National Curriculum Statement

OBE: Outcome-Based Education

PCK: Pedagogical Content Knowledge

PGCE: Postgraduate Certificate in Education

PK: Pedagogical Knowledge

RNSC: Revised National Curriculum Statement

SA: South Africa

SW Software

UNISA: University of South Africa

US: United States

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 Introduction

In South Africa, particularly within rural contexts, educators face significant challenges in effectively integrating technology into their teaching practices (Faloye & Ajayi, 2022; Venkatesh et al., 2024). Despite these challenges, rural primary schools have demonstrated the capacity to achieve commendable academic outcomes. This study explored the integration of educational technology (EdTech) within Life Skills education in a rural setting, aiming to enhance educational experiences through the strategic use of technological resources. This introductory chapter encompasses aspects of the study, including relevant concepts, the rationale, context, background, theoretical frameworks, literature review, problem statement, research questions, aims, objectives, methodology, data collection and analysis, trustworthiness, ethical considerations, scope, and limitations.

1.2 Context and Background to the Study

This research positions the integration of EdTech resources as a vital process that empowers primary school teachers to enhance their pedagogical knowledge. Access to quality education is a fundamental socio-economic right that opens doors to opportunities in an increasingly technology-driven educational landscape. Consequently, Life Skills educators must adapt to a rapidly changing environment where technology serves as a crucial facilitator of effective educational practices (A'mar & Eleyan, 2022; Khan & Jalal, 2023). Digital technologies have the potential to make learning more accessible, particularly for teachers who may not have previously engaged with innovative digital resources (Teixeira & Oliveira, 2024), thereby promoting inclusive and equitable access to education (Olivier et al., 2022). The advancement of knowledge in technology necessitates resources and information that support development, ultimately enhancing human well-being across the continent.

Research by Khan and Jalal (2023) indicated that the incorporation of digitised devices fosters collaboration between learners and teachers, thereby enhancing student engagement and participation, which facilitates effective teaching. Balasubramanian

(2024) emphasises that this integration of knowledge systems requires a "holistic knowledge framework for societal development". In Zambia the addition of technology resources to Mathematics instruction has been deemed essential for improving educational outcomes, particularly in rural areas (Akram et al., 2022; Kaziya, 2025; Leong et al., 2024). This trend aligns with the global growth of EdTech resources, which has resulted in fragmented outcomes within the South African educational context. According to Banoğlu and Gümüş (2022) technological resources offer unparalleled platforms for delivering digital education anytime, anywhere, facilitating Life Skills education that cultivates critical thinking, decision-making, and interpersonal skills among learners.

However, Ogungbe et al. (2024) highlighted that some African governments struggle to adopt new technological methods and strategies, in contrast to their counterparts in Norway and the United States of America (USA), who have embraced the shift towards integrating EdTech into teaching and learning, drawing on their personal and professional experiences. In Taiwan the Department of Education actively promotes the use of digital technologies in teachers' curricula and engages in technology-enhanced learning to foster information literacy and enhance global competitiveness (Walker et al., 2025). This study aims to investigate the types of technological resources integrated into Life Skills education in rural South African primary schools. Sarfo et al. (2024) explored strategies for integrating EdTech into Life Skills education in deeply rural primary schools in Central New York, considering resource limitations, teacher training, technological development, and socio-economic factors.

1.3 Problem Statement

Despite the growing emphasis on technology integration in education, little is understood about how teachers in rural primary schools experience and make sense of technology use in Life Skills teaching. Present debates often focus on the availability of technological resources, if not teachers' general digital skills, with less attention given to how teachers' content knowledge influences their ability to integrate technology meaningfully into classroom practice. This is particularly problematic in rural contexts, where limited infrastructure, inadequate training and contextual constraints may shape how teachers use available technologies. This was evident in a study by Kong et al. (2021), which found that EdTech integration in Southern African

schools has progressed slowly due to insufficient infrastructure, the absence of comprehensive technological curriculum policies for disadvantaged rural primary schools, limited financial resources, and shortages of qualified teachers. This shows that the broad and practical nature of Life Skills creates particular opportunities and considerations for technology integration, which is why it was chosen for discussion in this study.

Furthermore, the digital divide between urban and rural schools exacerbates educational inequality (Mustafa et al., 2024). Furthermore, the lack of context-specific understanding makes it difficult to determine what teachers need to strengthen their content knowledge and integrate educational technology resources effectively within Life Skills education. This suggests that these schools predominantly rely on conventional teaching methodologies. Yusup and Kurniawan (2024) confirm that rural schools primarily employ traditional teaching methods and exhibit minimal teacher-learner interaction. This study therefore addresses this gap by examining rural teachers' experiences and interpretations of the factors influencing their technology integration through the TPACK framework. Consequently, the study aims to deepen understanding of how strengthening content knowledge can support more meaningful technology integration in rural primary schools.

1.4 Main Research Purpose

To explore the integration of EdTech resources in Life Skills education in rural South African primary schools. This exploration explored teachers' knowledge of EdTech resources for teaching in rural, disadvantaged primary schools within the education district.

1.5 Location of the Study

This case study explored 10 teachers from nine primary schools within the Nongoma Circuit Management Centre in the Zululand district, South Africa.

1.6 Rationale

My interest in EdTech, combined with my role as an educator and Professional Learning Community (PLC) coordinator across 21 rural primary schools, has

motivated this investigation. With eight years of experience as a Grade 7 Mathematics teacher and three years as a Life Orientation instructor, I have observed that many educators lack awareness of the various levels of EdTech integration. This study aimed to address informal (unstructured), non-formal (personal), and formal (structured) levels of technology integration. While clusters support personal technology use, teacher motivation varies significantly. Often educators engage in unstructured activities, such as socialising or watching videos, frequently without systematic guidance. Therefore, formal integration supported by policy frameworks and resource allocation is essential for employing effective pedagogical tools. The primary objective of this study is to develop an intervention that enhances the utilisation of technology in Life Skills education.

Integration typically involves coordinating and combining various elements to function seamlessly as a unified system (Durkheim, 1956; Srole, 1956). These processes may encompass structured, curriculum-based levels, often within educational institutions, including deeply rural, disadvantaged primary schools. According to Khoza (2023) the Department of Basic Education is working to overcome teachers' resistance to integrating technology into the curriculum, particularly in rural, disadvantaged primary schools. In this context, technology is viewed as a universal solution to South Africa's educational challenges (Padayachee & Wordofa, 2025). While many studies focus on other subjects and overlook Life Skills education and technology use in rural schools, this study examines the integration of EdTech into Life Skills education in rural South African primary schools.

1.7 Significance of the Study

This study aims to assist teachers, principals, and stakeholders in rural South African primary schools in understanding how to integrate EdTech into the Life Skills programme. It also identifies root challenges prior to the intervention and promotes positive changes in the use of EdTech for teaching personal well-being. Furthermore, the study provides insights into how Life Skills teachers integrate EdTech, particularly in personal well-being education, and how this integration supports interventions that empower teachers to adopt them.

1.8 Preliminary Review of the Literature

A literature review synthesises information from journals, articles, books, and other reputable sources that provide data from past and current studies on the research topic (Creswell & Plano Clark, 2023b; Rapee et al., 2023). Mabakeng et al. (2022) assert that researchers must understand their topic and review the literature to develop a comprehensive problem and research questions. This preliminary literature review summarises studies and scholarly work on the phenomenon.

1.8.1 Phenomenon (Integration) and Levels

A study by Crevacore et al. (2023) suggests that comprehensive integration must include formal (structured), informal (unstructured/societal), and semi-structured (personal) integration levels, which help achieve the CAPS curriculum vision. Khoza and Mpungose (2022) agree that comprehensive integration is a key characteristic of technological resources. According to Tai et al. (2024), effective comprehensive formal (structured) integration occurs when the various levels of access, implementation, adaptation, and development are properly followed.

Studies by Taole (2024), Koehler et al. (2014), and Cussó-Calabuig et al. (2018) view personal (semi-structured) integration as self-taught self-identity, with teachers relying on personal choices to implement the curriculum. This can lead to intentional (structured) or unintentional (semi-structured) outcomes, driven by teachers' beliefs and feelings. The application of social media platforms such as WhatsApp, Facebook, and Instagram by teachers (non-structured integration) exemplifies active engagement in curriculum implementation to prevent disruptions (Mpungose, 2020b). Life Skills teachers must possess scientific and technological knowledge to utilise these platforms effectively.

A qualitative study conducted by Moya et al. (2011) and Mpu and Adu (2021) explored management attitudes towards information and communication technology integration in Ugandan higher education, highlighting how structured policies support educators. It discussed three levels of integration – unstructured, semi-structured, and structured – emphasising the importance for teachers to understand these levels for effective technological inclusion. Additionally, it identified the need to integrate EdTech into

South African rural primary schools to enhance Life Skills, underscoring the importance of understanding the levels of integration for successful implementation.

1.8.2 Curriculum Issues

The South African curriculum has undergone a philosophical and logical transformation within the schooling system. A study on teachers' views of the curriculum review process by Taole (2020) 2013) noted that the new syllabus, registered as Curriculum 2005 (C2005) for the General Education and Training (GET) band, was introduced in the Foundation Phase in 1997. Teacher concerns prompted a review in 1999 (Taole, 2013). This review formed the basis for the Revised National Curriculum Statement (RNCS) for GET (Grades R–9) and the National Curriculum Statement (NCS) for Grades 10–12 (Hoadley, 2011; Muller & Hoadley, 2019, 2021). Challenges in implementing a structured curriculum led to a 2009 review and the creation of the NCS (Hoadley, 2024; Khoza & Mpungose, 2018; (Hoadley, 2024; Khoza & Mpungose, 2018; Pinar, 2013). Khoza and Mpungose (2022) noted that these amendments first took effect in the Foundation Phase in January 2012 and later spread to other phases. As a result, an integrated document, the NCS Grades R–12, was developed.

Studies conducted by Pinar (2019), Ndlovu and Khoza (2021), and Van den Akker (2013) agree that the Latin verb '*currere*' means 'curriculum'. These scholars, including Pinar (2010), Schoots-Snijder et al. (2025), and Hoadley (2024) also concurred that curriculum refers to a programme, plan, and vehicle for learning, as well as a course to be implemented by its teachers. In short, the teaching strategy must be integrated into a designed programme. CAPS was South Africa's official teaching plan, introduced in 2012 during the democratic government. Studies by Mpungose and Khoza (2022), Khoza (2023, 2024), and Van den Akker (2013) reviewed the curriculum as a comprehensive educational plan that supports its implementation. It was maintained that the curriculum was not just a plan for teaching and learning; rather, it was defined by what designers intended to achieve through the enacted, implemented, and attained curriculum (Khoza, 2021).

Curriculum can be categorised into teachers' perspectives (implemented – structured) or learners' performance (attained – semi-structured). It was also categorised into the

following levels: supra (international), macro (national), meso (school), micro (teacher-designed), and nano (learner perception) (Khoza, 2015; Thijs & Van Den Akker, 2009; Van den Akker, 2013). Structured integration can be achieved by implementing the CAPS curriculum through policy documents. Research provided practical suggestions for enhancing digital equity and overall improvement (Kaziya, 2025), advancing understanding of technology integration in under-resourced contexts, enabling teachers to integrate technology across curriculum levels to address socio-economic imbalances.

Tadle et al. (2021) and Taole (2022) argued that the implemented curriculum, called structured integration, describes how curriculum implementers (teachers) and consumers (learners) interact in any teaching space. At this stage teachers developed and implemented various instructional strategies, socio-well-being initiatives, and psychosocial support, all guided by the CAPS principles. A study by Bopardikar et al. (2021) describes the curriculum as carried out through structured integration, meaning how it was practically integrated with learners and what this entails. Hoadley (2024) agrees with Holmes et al. (2022) that the education process influences the curriculum that is implemented, with teachers and learners playing roles. In the digital age incorporating EdTech can enhance this process.

Additionally, concurred with Eyitayo (2022) and Kucerova et al. (2011) view that teachers see the curriculum as achievement-oriented and focused on learners' learning outcomes, with classroom activities that incorporate resources aligned with the achieved curriculum (Faloye & Ajayi, 2022). Khoza (2018) realised that curriculum through semi-structured integration emphasised unstructured, dynamic approaches that respond to contextual issues affecting teaching and learning. Teachers need creativity (personal integration) to meet curriculum (structured) goals. This study explored how technology resources influence Life Skills education in rural South African primary schools.

1.8.3 Research Focus (Educational Technology Resources)

Technology enhances the efficiency and reliability of next-generation wireless networks, thereby fostering the adoption of emerging technologies (Leong et al., 2024). Padayachee (2017) revealed that EdTech resources and features are driven

by advances in educational information technology. Schools are undergoing a digital revolution, changing the education system by bringing new opportunities for creativity, efficiency, and competitive advantage (Balasubramanian, 2024). The three categories of EdTech resources, that is, hardware, software, and ideological-ware (Khoza & Mpungose, 2018), are discussed in detail in the next chapter. The technological resources are the focus of this research. According to Makumane et al. (2024), EdTech was a representation of knowledge designed to achieve curriculum goals. It monitors teacher-learner behaviour and promotes positive conduct in schools (Buglass et al., 2021). Task and exam administration require integrated technology to foster positive behaviour and enhance efficiency and reliability.

Successfully integrating technology into the curriculum requires teachers to have the knowledge, skills, values, and attitudes that learners gain through teaching and learning (Fullan, 2023). The features of 4G, 5G, and 6G are evolving to improve wireless communication for future applications (Leong et al., 2024). Without advances in EdTech, the careful selection of appropriate digital tools, and reliable wireless connectivity, the effective teaching of Life Skills, particularly in rural schools, may be constrained.

Moreover, Balasubramanian (2024) raised concerns that security and compliance are urgent as schools adopt digital technologies, prompting a comprehensive approach to analysing risks, focusing on vulnerabilities and noncompliance. The digital divide is the void between those with and those without access to technology and the skills to use it (Faloye & Ajayi, 2022). Faloye and Ajayi (2022) found that learners raised with computer-based skills and knowledge are often advantaged by these technological skills, highlighting technology's role in education. Security and compliance issues reveal a digital divide, contributing to ruralisation. African government agencies are pursuing the benefits of digitalisation (Faloye & Ajayi, 2022). Factors such as budget cuts and inequality widen the digital divide. Ruralisation can hinder teachers' use of technology and curriculum delivery. The theoretical framework is summarised below.

1.9 Theoretical Framework

A theoretical framework comprises existing theories and concepts that provide the structure for a research study (Creswell & Creswell, 2017; Ydesen & Buchardt, 2020).

The study by Mishra and Koehler (2006) titled 'What is Technological Pedagogical Content Knowledge?' introduced TPCK, a teacher knowledge framework for technology integration, which is now known as TPACK (technology, pedagogy, and content knowledge). According to Mishra and Koehler (2006), three knowledge components that teachers must cautiously integrate with technology into the curriculum are Technological Knowledge, Pedagogical Content Knowledge (PK) and Content Knowledge (CK).

Khoza (2023), Makumane et al. (2024), and Schoots-Snijder et al. (2025) noted that **Technological knowledge (TK)** encompasses resources ranging from traditional to digital, such as networks, simulations, whiteboards, broadcasting, hardware, and software. A study by Khoza (2021) on integrating diverse technologies to enhance online teaching and innovation at the University of KwaZulu-Natal found that each teacher should adopt cross-curricular technology strategies to promote cooperative learning. Informal, trend-driven methods support TK skills. Therefore, the intervention aimed to integrate technology and Life Skills in rural South African primary schools to address technological gaps in the curriculum. According to Mishra et al. (2023), maintaining subject focus during teaching practice is emphasised.

Pedagogical content knowledge (PK) encompasses teachers' objectives, values, and aims, which affect teaching strategies (Mishra et al., 2009; Mishra et al., 2023; Neves et al., 2022). Ali et al. (2023) stated that PK offers a comprehensive view of teaching methods. This suggests that teachers must understand pedagogical content in the subject guidelines (CAPS) to effectively integrate technology into social and environmental contexts. Mdhlalose (2023) emphasised training in technological theories to bridge the digital divide, with monitoring for skill development. This suggests that research on integrating technological resources into Life Skills in South African rural schools showed that limited understanding stems from underinvestment, staffing shortages, poor infrastructure, and systemic neglect.

The **content knowledge (CK)** component assists teachers in comprehending the content necessary to teach a specific subject (Khoza, 2023; Wang et al., 2018). These components require teachers to understand the subject matter through application (Arek-Bawa & Reddy, 2025). In this regard, this Life Skills component integrates CK's suggestions for integrating EdTech into Life Skills education in rural South African

primary schools. A study conducted by Ramrathan (2021) on South Africa's set of educational developments in the era of dangerous epidemics with a focus on content and technology found that teachers had limited guidance. Subsequently, studies support integrating EdTech into Life Skills, aligning with rural teachers' experiences and influencing learner performance. As a result, I explored interventions to integrate technology into Life Skills education in rural schools.

1.10 Study Objectives

This study had the following three objectives:

1. To explore how teachers integrate educational technology resources in Life Skills education in rural South African primary schools.
2. To identify the factors that inform the integration of educational technology resources in Life Skills education in rural South African primary schools.
3. To comprehend the challenges and opportunities associated with the integration of educational technology resources in Life Skills education in rural South African primary schools.

1.11 Study Questions

The research questions of the study were as follows:

Main research question:

How is educational technology integrated into Life Skills education in rural South African primary schools?

Sub-research questions:

1. What educational technology resources are being used by teachers?
2. How are these technologies integrated into Life Skills teaching and learning?
3. What factors facilitate or constrain technology integration?

1.12 Research Methodology

1.12.1 Research Approach

According to Christiansen and Bertram (2019) research methodologies in various contexts have defined qualitative methodologies as approaches that more effectively elucidate and explore. I observed the integration of EdTech into Life Skills education in disadvantaged rural primary schools, aligning with Wilson et al. (2024), who noted that digital literacy skills enhance teaching outcomes and that educators integrate digital resources like virtual reality and mobile applications. Qualitative research therefore provided me with insights into teachers' challenges and their use of digital technology to foster skills and improve pedagogy. However, qualitative methods lack appropriate statistical procedures for quantification (Cohen et al., 2025; CohenMiller et al., 2022). Hence, I analysed words and concepts to identify EdTech resources that could bridge the rural-urban digital divide.

1.12.2 Research Paradigm: Interpretivism

This study adopted an interpretive paradigm because it sought to understand how rural teachers experienced and made sense of technology integration in their particular school contexts. An interpretive paradigm focuses on understanding social phenomena through the meanings individuals attach to their experiences (Pillai, 2024). This orientation was appropriate for the present study because these perspectives suggest that an interpretive paradigm is less concerned with establishing a single objective reality and more with understanding how people construct meaning from their experiences. This study employed the interpretive paradigm, a mixed-methods approach discussed by Christiansen et al. (2020) and Cohen et al. (2019), to understand participants, their environment, behaviours, and experiences.

While Kivunja and Kuyini (2017) and Kizhakkethalackal and Deepa (2024) noted that data were generated and analysed following grounded theory, an interpretivist approach, as shown by Domingue et al. (2025), and Pervin and Mokhtar (2022), emphasises strong communication to gain knowledge. Creswell (2024) highlighted its versatility in revealing hidden social experiences, although Pervin and Mokhtar (2022) noted that it requires more time and resources. The interpretivist research paradigm

promoted open interaction and flexible data generation from individuals teaching Life Skills in rural primary schools.

1.12.3 Research Design: Case Study

This qualitative case study explored real-life phenomena, providing rich data and understanding (Lim, 2025; Priya, 2021). Similarly, Tisdell et al. (2025) and Yi et al. (2022) used detailed case studies for descriptive insights into practices, procedures, and data analysis for theory development. While its limited context affects generalisability and makes it time-consuming (Khoza & Mpungose, 2025; Nxumalo et al., 2023), this study of 10 teachers identified effective strategies for managing time. Rural schools often lack technology compared to urban ones. Hence, to ensure impartiality in data generation on technology in Life Skills education, I collaborated with participants to ensure consistency across resource-limited rural schools in South Africa. Peer review helped reduce bias.

1.12.4 Sampling: Purposive and Convenience

The study used purposive sampling because I wanted to engage teachers who had direct experience of the issue under discussion. Khoza and Biyela (2020) noted various sampling methodologies but emphasised that sampling bias is a main research limitation. Purposive sampling, also called criterion sampling, targets specific groups based on predefined criteria, making it more dynamic in a given research context (Khoza & Mpungose, 2025; Morgan, 2022). Accordingly, the selection focused on teachers whose experiences could shed light on the realities of using technology in their teaching context, including the opportunities, challenges, and how they developed and used their technological and content knowledge in rural primary schools within the Nongoma Circuit Management Centre in the Zululand District. Their experiences were particularly important because the study sought to understand the integration of educational technology resources within the realities of rural schooling, rather than from a general or decontextualised perspective.

Likewise, purposive sampling enabled the researcher to engage with participants who could provide information-rich accounts of the issue under investigation. The purpose was not to claim that their experiences represented all rural teachers, but to gain a

deeper understanding of the experiences and meanings attached to technology integration within the selected context. Rauteda (2025) stated that convenience sampling is faster and more cost-effective. Qualitative research conducted by Rapee et al. (2023) and Urcia (2021) recommended starting with convenience sampling, while Andrade (2021) highlighted its strength in terms of internal validity. For this study, 10 teachers were purposively and conveniently selected for accessibility and relevance, although this limits external validity. Studying specific populations does not imply that the results apply to everyone.

1.13 Data-generation Plan

Data were generated through one-on-one semi-structured interviews, reflective activities (open-ended questions), and observations to generate detailed information on the integration of EdTech resources into Life Skills education over a one-month period.

1.13.1 Semi-Structured Interviews

This data-generation phase used one-on-one semi-structured interviews to study the integration of EdTech resources into Life Skills education. Saiyed et al. (2024) described data collection as the gathering of environmental data, while Khoza (2023) viewed interviews as conversations in qualitative research. Furthermore, in Nene's (2019, p. 17) study on decolonising technological pedagogical content knowledge with first-year Mathematics learners, the interviews were researcher-participant dialogues. This suggests that 40-minute interviews with teachers generated data on technological, pedagogical, and content knowledge, yielding detailed, reflective responses. Accordingly, I adopted this arrangement since it capped each interview at 40 minutes to ensure fairness, objectivity, and consistency.

1.13.2 Reflective Activity

Reflective practice, as defined by Khoza and Mpungose (2022) and Braun and Clarke (2021), allows participants to reflect on their work without observation. The current methods encourage expression and reflection on perception (Wang, 2025). Open-ended questions prompted reflection on EdTech, while semi-structured interviews

explored the 'why' behind the research (CohenMiller et al., 2022). In this regard, data were generated through reflective practice approaches. In this study rural South African primary school Life Skills teachers reflected on technology-related interventions, sharing experiences and solutions to improve EdTech use.

1.13.3 Observation

This data-generation approach allowed me to act as either a participant or a non-participant observer, based on sensory perception (Lindlöf et al., 2025). I participated without interfering in teaching and learning (Phillips & Johnson, 2022). While this maintains data credibility, it can be time-consuming (Khoza & Biyela, 2020; Mpungose, 2024). Subsequently, observing the teacher as they taught helped me see whether they were integrating any technological, pedagogical, and content knowledge during Life Skills lessons. In this manner, I used an observation activity to assess whether teachers were integrating EdTech resources.

1.14 Data Analysis: Thematic Analysis

Qualitative studies by Cohen et al. (2017b), Squires (2023), and Braun and Clarke (2006, 2024) defined thematic analysis as identifying, organising, and selecting themes from data to reveal patterns. In addition, the method explores experiences in EdTech (Creswell, 2024; Squires, 2023). This study used deductive reasoning to align with the research questions. Chin et al. (2025), Christiansen and Bertram (2019), Creswell (2021), and Gray (2021) categorised data into descriptive categories. In this case, I employed six phases: familiarisation, coding, searching, reviewing, defining, and reporting, which are guided by TPACK, with findings related to the questions. Trustworthiness is discussed below.

1.15 Trustworthiness

A qualitative research approach by Guba and Lincoln (1994) emphasises trustworthiness as a process that validates credibility, transferability, dependability, and confirmability of the study.

1.15.1 Credibility

Qualitative and interpretive research by Grant and Lincoln (2021) and Lincoln and Guba (1990) regard credibility in qualitative research as essential for external verification, achieved by submitting credentials (documents) to non-participating researchers. This can be done by asking participants to evaluate the data analysis (Kekeya, 2021; Miles, 1994). This study highlighted results and trust, emphasising participants' right to share their experiences with digital resources. Subsequently, supervisors reviewed the explanations of EdTech and data challenges to interpret the findings and explore data further. Thus participants reviewed and commented on the informed analysis and findings of the study, which ensured credibility.

1.15.2 Transferability

Alonzo and Teng (2023) and Galesic et al. (2023) define transferability as the extent to which results are exported and generalised to other contexts. Important information is provided in order for external researchers to determine if the research is transferable (Collective et al., 2023; Mpungose, 2024). This research study, which is grounded in the TPACK framework, employed an interpretive paradigm. As a result, findings are not generalised but may be relevant to similar contexts. Moreover, the methods of data generation and analysis are detailed to aid interpretation and transferability.

1.15.3 Dependability

In interpretive case studies Khoza and Mpungose (2024), Heine et al. (2023), and Clark et al. (2022) highlighted dependability as the stability and consistency of the research method. Several qualitative researchers, including Lincoln and Guba (1990), Mlambo et al. (2023), and Moon and Lee (2022), used the terms dependability, consistency, and reliability interchangeably to construct meaning in their studies. Dependability affects control of research (Abbasi et al., 2026; Coker, 2022). Understanding the dependability principle, I therefore clearly outlined the research questions, methodology, data generation, and analysis to ensure dependability without taking sides, but depending on the research methodology approach adopted by the study. An audit trail of data and transcripts was maintained, and participants' credentials were verified to ensure credibility (Cohen et al., 2017c; Golafshani, 2003).

Accordingly, this highlighted the importance of consistency for generalisation and for reducing uncertainties and discrepancies.

1.15.4 Confirmability

Research by Lincoln et al. (2011), Creswell and Plano Clark (2023b), Creswell and Poth (2016), Hirose and Creswell (2023), and Cohen et al. (2017a) affirmed that confirmability relied on participants' results. This research was objective, error-minimised, and aimed at minimising misconceptions to produce informed findings on the integration of EdTech resources into Life Skills education in rural primary schools. In this qualitative study data verification methods and procedures were explicitly described, aligning with Schwandt (2014), Nowell et al. (2017), and Dhollande et al. (2021), who shared the sentiment that confirmability involves ensuring that the researchers' findings and interpretations are clearly derived from the data generated from participants. This study aimed to ensure transparency by detailing the research design, methodology, data, and analysis, including verbatim quotations from participants. Data were securely stored.

1.16 Ethical Issues

A study by Bertram and Christiansen (2014) found that ethical considerations include rules and behavioural expectations for proper conduct towards participants in research studies. To conduct the study ethically, I addressed relevant issues. Pseudonyms ensure participant confidentiality (Creswell & Clark, 2017; Neumann, 2022). To address ethical issues I prioritised confidentiality, privacy, harm prevention, and trust by using pseudonyms for participants and schools. I pursued approval from the University of South Africa and permission from the DBE. Consent forms were signed by teachers and sent to managers and principals. Participants were informed that participation is voluntary and could be withdrawn at any time. Research questions were provided beforehand, allowing participants to choose to continue or withdraw. They were briefed on the research site and audio recording process. Data analysis was encrypted and clearly explained. The university's ethical guidelines will guide reporting. Limitations are discussed below.

1.17 Limitations of the Study

Findings from Simon (2011) revealed assumptions, limitations, and delimitations that indicate constraints beyond researchers' control, such as a focus on South African rural primary schools and Life Skills teachers. Participants may have research experience or may have never participated before, which may affect availability. I informed the participants about procedures, privacy, and confidentiality. Being a school principal and PLC coordinator entails close contact with education officials, which may affect the stability of projects. To address this, I organised sessions on volunteerism, confidentiality, and pseudonyms. The rural setting, with poor connectivity and infrastructure, may also pose challenges. To mitigate this, participants were informed two weeks in advance of the data-generation methods and instruments to be used, and alternative interview options were provided.

1.18 Chapter Summary

This chapter presented the contextual background to the study and explained the rationale underpinning the investigation. It also outlined the problem statement, the primary and subsidiary research questions, as well as the study's aim, objectives, and significance. In addition, a brief overview of the literature and theoretical framework was provided, followed by a discussion of the research design, ethical considerations, and limitations of the study. The next chapter offers a comprehensive review of the literature on the integration of EdTech resources and scrutinises its key dimensions in greater detail.

CHAPTER 2: LITERATURE REVIEW: INTEGRATION OF EDUCATIONAL TECHNOLOGY RESOURCES

2.1 Introduction

Chapter 1 detailed the study's context and background, including its rationale. The chapter also focused on the problem statement, research questions (main questions and sub-questions), aims, objectives, and the significance of the study. The current chapter outlines the phenomenon (integration), including structured, unstructured/societal, and semi-structured integration.

Discussions and debates about the impact of technological resources in education have led to an understanding of the characteristics of the technological revolution. In recent years the 21st-century migration to technological innovation has emerged, been experienced, and significantly impacted many lives. Emerging technologies globally include ChatGPT, artificial intelligence (AI) tools, coding and robotics, non-technology, and 5G.

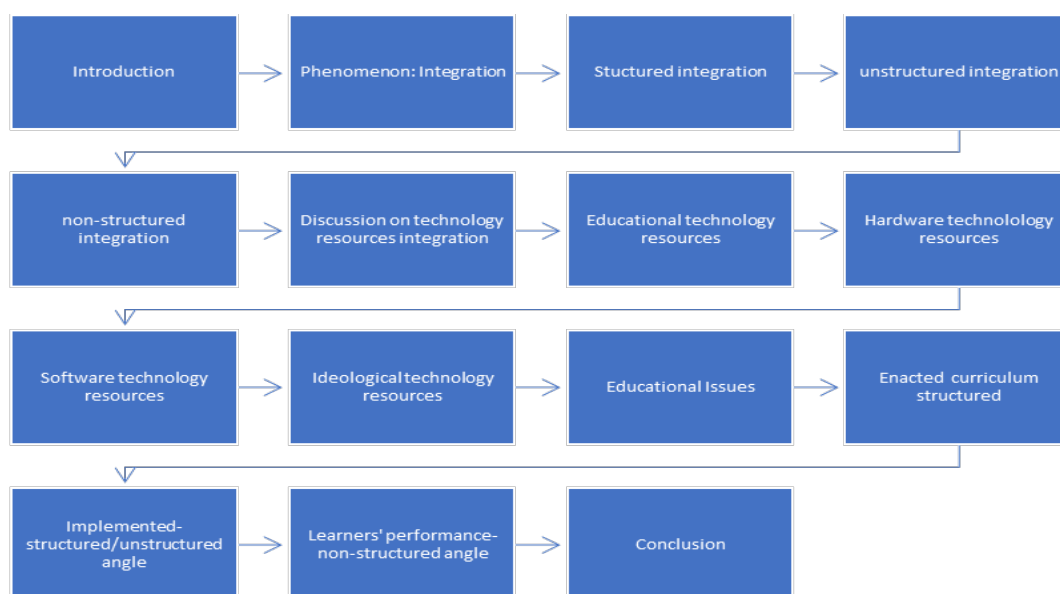


Figure 1: Chapter 2 flow chart

Therefore, the importance, influence, practice, and tradition of integrating technological resources into the curriculum are highlighted. The literature plays a

vital role in the study, enlightening readers further about the phenomenon and the study's focus, as well as identifying gaps to be filled.

The literature reviewed by Marshall and Gibson (1996) in the sixth edition of *Qualitative research* is analysed as a collection of relevant, interconnected information and resources that assist researchers in understanding the context and stance of the phenomenon. Henceforth, the chapter aims to delve into the situation to uncover specific problems related to the integration of technology resources in the Life Skills programme in rural primary schools. This helps the researcher to connect with the three legs of integration levels: structured (formal), unstructured (societal), and semi-structured (personal) integration, which will support in answering the question: What possible interventions can be used to empower teachers to integrate EdTech resources and Life Skills education in rural South African primary schools?

2.2 Integration of technology

Teachers are serving the technological world, particularly in the field of education (Khoza et al., 2024). According to Akram et al. (2022) and Mpungose (2025), the integration of EdTech into the curriculum and, by extension, into daily life, appears to be inescapable. Consequently, integration brings different components together into action. In this instance, by being aware of these phenomena teachers can navigate educational (structured) and social (unstructured) situations, manage their time effectively, and directly improve teaching and learning activities and outcomes. Integration has become a prevalent phenomenon in the educational landscape, facilitating the combination of elements to condense them into relatively simple and permanent forms (Hornby et al., 1974). It is viewed as an action of fitting together different groups of fundamentals (Amadi, 2023). According to Akram et al. (2022) the term 'integration' stems from the Latin term *integratus*, which is defined as a process of combining two or more things effectively.

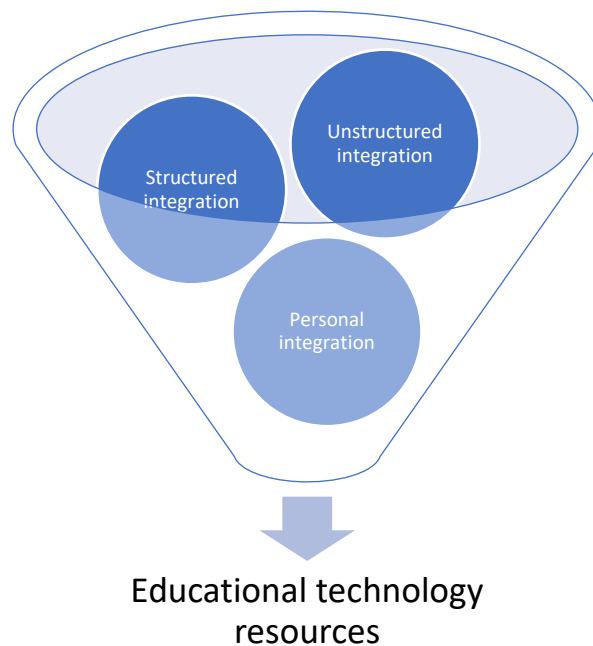


Figure 2: Integration levels

Ackerman (2023) and Topal (2023) further argued that integration denotes blending things to form a complete whole. Its root, *tangere*, means to handle, which is formed from the integer, which also means to integrate. In this manner, modern education encourages teachers to transition from traditional teaching methods. Ackermann et al. (2025) posit that integration is rooted in the term *integra*, which comes from the Latin word *integer*, meaning whole, integrating different parts (Akram et al., 2022; Akram et al., 2021; Bartels et al., 2022; Cassidy & Davidson, 2024; van Zyl, 2023; Zhong et al., 2024). The prefix *int-* denotes existence flanked by dual extremes, otherwise central to a variability (Al-Balushi & Durugbo; Hao et al., 2024). In short, the teacher must bring all essential technological elements together to complete the implemented curriculum activities: structured integration, unstructured integration, and non-structured integration.

According to Shih et al. (2023), integration is the unification of elements that were previously segregated. Mayembe et al. (2023) concurred with the study by Morrison-Saunders and Arts (2024) on strengthening impact assessment, proposing a call for integration as a range of established, methodical, and well-ordered phases that define the type and degree of connectedness between programmes and services. In other words, integration is a continuous function with an infinite interval $[a, b]$ that has no limit of boundaries (Ackerman, 2012; Ackerman, 2023). This suggests that teachers

can continuously integrate technological resources in the teaching of Life Skills without grappling with subject content. Essentially, integration lies between concepts, elements, and abilities (pedagogical and individual skills). However, Turnbull (2020), in a qualitative case study on social media and higher education, argued that integration is a challenging initiative and complex to comprehend, especially when influenced by unpredictable environments, network connectivity, human behaviour based on practices, and perceptions. With this understanding, this study aims to explore how teachers integrate EdTech resources in Life Skills education, particularly in rural primary schools. In simple terms, integration is a contemporary perspective for sustaining teachers' pedagogy. Comparing the findings of these studies, Ghavifekr and Wong (2022), Faloye and Ajayi (2022), Okatta et al. (2024), Turnbull (2020), and Kelly and Sennott (2025) specified that not every school is equipped with EdTech. Challenges lead to reluctance in integrating these resources into teaching and learning, which hinders the transformation of quality education. In this study the integration of technology resources is discussed in terms of structured integration, unstructured integration, and non-structured integration.

2.2.1 Structured Integration

The integration of technological resources is hindered by various factors, specifically teachers' perceptions, attitudes, and lack of support in understanding traditional and online teaching (Mwalongo, 2018; Ng, 2020). According to Muller and Hoadley (2019) and Hoadley (2017), CAPS is the enacted curriculum policy that a discipline and perspective teach through a strong framing of the selection, sequence, and pacing of school knowledge, as illustrated in a qualitative case study conducted by Wang (2002) on integrating technology into learning. The study revealed that a prescribed curriculum drives structured integration. It also finds that education is guided by diverse qualifications, which assist with hardware resources such as keyboards, graphics tablets, optical mouse, webcams, and smartboards. This means that qualifications, workshops, and in-service training play a significant role in primary school education by effectively combining and implementing different EdTech resources to promote quality professional development in technological knowledge and skills.

According to Khoza and Mpungose (2022), structured integration is determined by professional activities throughout the teaching and learning process, resulting in the shared interaction of knowledge driven by applicable policies and regulations. In simple terms, structured integration is the key to mitigating these influences and enhancing the integration of technological skills to suit different schooling environments. A study by Cranston et al. (2016) found that professional development is essential for managing current educational demands. Therefore, the curriculum is continually improved, either formally or informally (Harding et al., 2018). In other words, formal integration requires teachers to master and adhere to the Annual Teaching Plans (ATPs). This suggests that understanding structured integration could help teachers conveniently source information and services for their practice; thus, a flexible method for resolving uncertainties tends to recur.

However, not only is the integration of technology in teaching and learning significant, but also the extent to which it transforms the teaching experience, curriculum, and learning activities (Fütterer et al., 2024; Ohei et al., 2023). Therefore, the objective of this study is to explore ways of integrating EdTech into Life Skills education in rural South African primary schools. Nonetheless, Nuryahman et al. (2024) argued that integrating corresponding elements in formal and non-formal education enhances teachers' competence. The study acknowledges that these levels of integration differ, but it affixes a curriculum implementation method that develops strategies for creating a conducive teaching and learning environment. Therefore, South African rural primary schools can shape an inclusive and sustainable environment for the future, regardless of their vicinity.

2.2.2 Unstructured Integration

McKnight (2021) and Nani and Safitri (2021) defined unstructured integration as social experiences instilled by people outside formal education. Khoza (2023) perceives unstructured integration as a social perspective driven by societal influences, at the expense of effective teaching and learning. Similarly, Ngaka et al. (2012) explored an interpretive paradigm for unstructured education practices in Uganda's integrated and diversified learning contexts. The study explored possibilities for integrating unstructured education in Uganda, centring on the abilities approach and the social practices theory of literacy, with qualitative analysis guiding the process. According to

the study, unstructured integration maintains productive skills as a long-term source of information. The study further found that teachers are proficient at blending various forms of education integration, although they occasionally struggle to differentiate between levels of integration. This suggests that driven by unstructured integration, most Life Skills teachers fail to differentiate between the forms of integration, which can be structured and/or unstructured. Cavus (2021) maintained that few organisations have enforced policies on unstructured integration for teaching and learning. Unstructured integration is perceived as a systematic incorporation of teaching activities that include the acquisition of skills, attitudes, values, and behaviours from social technological platforms, such as WhatsApp, TikTok, YouTube, Facebook, Instagram, blogs, and other social media, for implementation of the enacted curriculum (Al-Qaysi et al., 2023; Al-Sharafi et al., 2023; Hamadi et al., 2021; Mpungose, 2025).

Fomunyam (2021) agrees with Van Deursen and Van Dijk (2014) that informal platforms (Wikipedia, Facebook, WeChat, WhatsApp, blogs, YouTube, and others) accommodate different teaching styles of teachers in South Africa, regardless of the digital divide. According to Javaid and Siddiquah (2021), unstructured integration suggests that external influences on teaching and learning practices are not jeopardised but are easily accessible to teachers, providing a sophisticated way of imparting knowledge during curriculum delivery (Hamadi & El-Den, 2024). In simple terms, integrating various EdTech resources strengthens cluster discussions for teaching and learning, thereby developing an understanding of key concepts within the context of the subjects.

A qualitative interpretive study by Mpungose (2024) on digital skills at a South African university in the post-COVID-19 era revealed that most teachers were inspired by informal skills for social needs, and personal digital skills for individual needs, at the expense of formal digital skills for discipline needs. This suggests that teachers are most driven by the informal integration of social media platforms for curriculum delivery. This has proven to be more transactional, data-friendly, and easier to browse globally (Räsänen, 2021). This makes education more diverse, potentially aligning with the envisioned concept of education. Teachers must therefore be mindful that the Ministry of Education intends to deliver a curriculum that enriches learners with distinguished skills and knowledge which is meaningful to their well-being.

2.2.3 Personal (Non-Structured/Non-Formal) Integration

Integration at this level is arbitrary and self-educated; it is based on the teacher's discretion rather than being prescriptive and objective. Integration occurs through the teacher's hard work and familiarity, even without formal instruction. According to Mishra et al. (2009), Taole (2022) and Mpungose (2020b), personal integration equates to self-centred and self-understanding (choices, favouritisms, self-identity). Formal and non-formal integration are derived from personal integration (Khoza & Biyela, 2020). A qualitative case study by Taole (2024) explores primary school teachers' experiences with integrating technological resources in a multigrade context. They used the TPACK framework. Semi-structured interviews were conducted with 12 participants, and the data were analysed through thematic analysis. The study revealed that the accessibility of devices and other technological resources is central for teachers and learners. However, it also found that generally teachers experience difficulties in integrating technology resources into their teaching because of a myriad of factors, such as qualifications, the classroom context, rural location, lack of basic technology infrastructure, limited training on integrating technology into teaching, time, the teaching context, and support from principals.

According to Malureanu et al. (2021), non-formal integration leads to the synthesis of formal and informal integration by teachers in their pursuit of digital tools, which depends on the teaching and learning context at any given time. Non-structured integration provides teachers with flexibility in choosing any devices based on individual competency (Sokhulu, 2025). In other words, personal integration is the inevitable pulse of an effective curriculum. As a result, personal integration may affect teachers' mentality either positively or negatively in adapting to technology integration, thus aligning with constructive learner-centred learning.

Regardless of the intensification in research on integration of EdTech resources into Life Skills education (formal, nonformal, and informal), Kyndt et al. (2016), and Mpungose (2025) emphasise that further research is essential in understanding the nature of these teaching activities and their impact on education and learner schooling in different rural contexts. The researcher aims to explore how general technology integration, encompassing formal (professional instruction), informal, and personal approaches, is implemented in rural primary schools. This exploration will facilitate the

introduction of Life Skills teaching by integrating technologies as a source of information. As a result, this study aims to address the gap in the context of rural primary schools in the Zululand district of South Africa. Consequently, integration of technology resources in this study is categorised into three levels: hardware technological resources, software technological resources, and ideological technological resources.

2.3 Educational Technological Resources in Life Skills Education

The status quo suggests that EdTech resources are habitual and uncontainable. According to Khoza and Fomunyam (2021) and Khoza (2023), the use of technological resources is becoming an unequivocally integral part of education internationally. The literature by Selwyn (2021) and Selwyn et al. (2020) posits that the term ‘technology’ refers to the Greek word *technologia*, which is interpreted as ‘*techne*’, meaning skills, art, or craft. The term ‘*technologia*’ also signifies the systematic application of methods and processes to critical skills, integrating resources (Hunt, 1992; Valcour & Hunter, 2004). Hence, it reflects the Indo-European prefix ‘*teks*’, which represents the procedure of intertwining and engineering various technological resources to work collaboratively with elements, while the suffix (*logia*) of *technologia* is a Greek term interpreted as an understanding of something, or as a subdivision of knowledge and insights. The term ‘*techne*’ also refers to the knowledge of how to accomplish tasks (Carroll, 2017; Govender & Mpungose, 2022). According to Bain (1937, p. 860), “technology is all tools, machines, utensils, weapons, instruments, housing, clothing, communication, transportation devices, and skills by which we produce, and use them”. In addition to the above, Selby (1993) finds that technology is an engineering process (machines), gadgetry, and equipment, confirming that the integration of technological resources in education is a continuous process driven by machines and tools.

Technology encompasses numerous concepts widely used in education; nevertheless, they are congruent. EdTech is “a system, a process or an application of scientific knowledge, to improve the efficiency of the process of learning and instruction” (Kumar, 1996, p. 5). EdTech is about understanding how technological resources are integrated (Mpungose, 2023), including tools, processes, procedures, and strategies that communicate the curriculum and enhance learning experiences

during the teaching and learning process. For instance, in the Republic of South Africa, classroom technology is best known for its role in education (Govender & Khoza, 2024; Walker et al., 2020). In the United Kingdom and European countries, it is well identified as Technology-Enhanced Learning (TEL). In the USA it is known as Information Technology (IT).

Technology in education encompasses many dynamic concepts, particularly in integrating resources, which has led to the development of EdTech over the years (Govender & Govender, 2009; Huang, 2019). Consequently, the concept of EdTech is used in this study. Given that we are living in an EdTech era, it helps teachers appropriately address the digital divide that rural primary schools may face. According to studies by Frans and Pather (2022) and Kaziya (2025), EdTech can be categorised into two classes: Technology of Education (TOE) and Technology in Education (TIE). The TOE presents EdTech resources that are invisible, such as PowerPoint presentations and Zoom and Teams meetings. The TIE, which comprises tangible components such as computers, tablets, and smartphones, is essential to the TOE. Studies by Olalere and Makwela (2024) and Frans and Pather (2022) concur that EdTech resources are categorised into three main groups. Similarly, Faloye and Ajayi (2022) and Ghavifekr and Wong (2022) categorise these as hardware devices used in teaching and learning and software that transmits data to yield tangible learning outcomes, while ideological ware refers to values, beliefs, ideas, theories, and systems, as defined by various sources.

In short, technology is flexible and polyhedral (with multiple facets) in the curriculum to enhance technology-enhanced teaching and learning in Life Skills education. This suggests that teachers should recognise the importance of ongoing training, professional development, and the integration of EdTech resources to effectively implement a comprehensive curriculum. Therefore, the issue of flexibility and access to resources, encompassing hardware, software, and ideological resources, has numerous facets that enable teachers to some degree, thereby overcoming barriers to teaching and learning and allowing them to plan diversity in their practice (Cullen, 2021; Mpungose, 2024). This means that when teachers are driven by structured integration, it becomes easier for them to utilise various EdTech resources to address the digital divide through technology enhancement.

2.3.1 Hardware Educational Technology Resources

According to Pereira et al. (2021) hardware resources are technological tools used in the teaching and learning process. Studies (Cakir, 2012; Hennessy et al., 2022) suggest that hardware resources contribute to learners' knowledge, and integrating these resources into the curriculum represents a progressive approach to teaching and learning in EdTech. Hardware resources can be categorised into two central sets (Tondeur et al., 2017; Zhou et al., 2020) external hardware consists of apparatus linked to the main computer, such as speakers, mouse, keyboard, monitor, and printers, while the internal hardware comprises items like a hard drive and a motherboard. These components are essential to drive the computer to function (Cakir, 2012; Kulaksız & Karaca, 2023).

Moreover, these hardware resources are categorised as TIE (Khoza & Biyela, 2020; Mpungose, 2023), which means that technological resources such as hardware can be structurally integrated into any schooling context, whether traditional or online, depending on the nature of the learning activity (Zuma et al., 2022). Certainly they anchor and communicate the curriculum processes to direct its progress toward achieving structured integration and framed curriculum coverage. In this instance, teachers must understand that hardware resources are categorised by those that are visible and those contained within the device tool. This suggests that Life Skills teachers must constructively or semi-structurally integrate and demonstrate substantial improvement in the use of EdTech devices.

Consequently, hardware resources are operational tools used in curriculum implementation, namely smartphones, tablets, computers, overhead projectors, notepads, and televisions (Heine et al., 2023). Khoza and Mpungose (2022), in their study on the digitalised curriculum to the rescue of higher education institutions, found that the curriculum is driven by different technological hardware resources (e-textbooks, laptops, and some physical devices). Clearly these resources are designated as essential for meeting the needs of teaching and learning progression. This application suggests that teachers should be equipped with sufficient devices, including smartphones, laptops, serviced computers, routers, and data bundles, to enhance learners' academic and mental performance. Therefore, understanding hardware resources as a mechanism to assist in harmonisation between teaching and

learning helps teachers to explain why technology integration may be required in a Life Skills curriculum, despite the disturbances that ruralism brings. Sometimes these disruptions make integration of technology resources less necessary.

Mpungose (2020a) argued that hardware resources are driven by constructive integration rather than unstructured integration, which addresses curriculum needs because technological resources such as hardware and software also provide a sustainable space and pace where teachers' actions may transform the intended curriculum in practice (Hennessy et al., 2022; Yurtseven Avci & Osman, 2021). Notwithstanding, EdTech resources must be integrated objectively. As a result, these resources are structurally integrated into the Life Skills curriculum, with physical resources guided by manuals on how to incorporate the vertical curriculum in various forms of teaching, learning, and assessment within the school (Mpungose, 2020a). This proves the vital position of EdTech resources in the curriculum, socio-economics, and digital transformation in different spheres of life.

However, in this regard hardware serves as a platform, enabling the software to connect with teachers to perform specific tasks and provide access to educational content. A mixed-methods study by Makumane and Mpungose (2022) informed by pragmatism was conducted to explore learners' experiences of integrating EdTech during the digital divide in Lesotho and South Africa. The study randomly selected 35 learners to participate in the questionnaire. Subsequently participants in Zoom semi-structured interviews and e-reflective journals were purposively and conveniently sampled for data generation. The study revealed a deficiency in the integration of EdTech by schools, attributed to inaccessibility to internet connections and a lack of technological skills and proficiency in its use.

In terms of internet speed and bandwidth, Lai and Widmar (2021) note that these are crucial factors in discussing the digital divide, as they determine the quality and level of access individuals and communities have to the internet and its resources. Accordingly, Van Dijk (2017, p. 7) further notes that "in the early 2000s, the term 'digital divide' shifted from focusing solely on access to technology also to encompass disparities in internet speed, computer hardware, time, teaching and learning activities and digital literacy skills". As a result of the digital divide, deep rural primary school learners are deprived of understanding the rationale, aims, and objectives of

accessing essential technology benefits. Contextual factors, such as network connectivity, contribute to the inaccessibility of these benefits, including EdTech resources. Sometimes it is not that these schools are not prepared to adopt EdTech, but rather that the devices of underprivileged teachers are essentially unproductive on their own, requiring software technology (Khoza & Fomunyam, 2021) to function effectively, as well as professional development, which is infused with structured integration. It appears that the digital gap negatively impacts the drive to integrate EdTech, which is exacerbated by socio-economic inequalities, particularly when such technology is forcefully imposed on individuals lacking material access, skills, and integration (Makumane & Mpungose, 2022).

Essentially, teachers need to be aware of various hardware resources to ensure that teaching remains meaningful in terms of content coverage. In other words, hardware resources are the refined teaching and learning support materials that promote constructive integration of technologies in the curriculum through software resources. The integration of traditional hardware technology, as described by Hoadley (2015), Rudolph et al. (2020), and Mpungose (2020a), involves a face-to-face environment that facilitates teaching and learning activities through ordinary teaching and learning support materials. Nevertheless, lacking appropriate software applications, hardware resources often go underutilised in most rural primary schools, resulting in a lack of structured integration of EdTech.

2.3.2 Software Educational Technology Resources

Software resources for a qualitative, interpretive comparative case study conducted by Heyberi (2013) on integrating technology into the curriculum for enhanced learning are described as materials designed to display and communicate teaching and learning activities integrating hardware. Equally, software is informed by the ideas and beliefs of other individuals, software resources, and offline transparency for the overhead projector, and online PowerPoint slides (Bayaga & Khoza, 2024). Software resources, according to Segun-Falade et al. (2024), include integrated software design, practical decomposition, structured software development, and other structured analysis methods. Software applications are technologies that display and process information within hardware technology (Microsoft Word, Google Chrome, and management systems), and are branded as software (Ching & Roberts, 2020;

Wang et al., 2022). Physical hardware technology, such as a computer without software technologies, is limited in its capabilities (Mangal et al., 2019). However, a study by Zheng et al. (2024) found that the lack of programming and efficient implementation of applications in systems is a problem. In simple terms, system and application software are written using various machine and symbolic languages to understand them (Khan et al., 2024).

A study by Ugwueze and Chukwunweike (2024) demonstrated that milestones in software development techniques include the integration of program subroutines, modular programming, functional decomposition, structured programming, and structured analysis. The study emphasises the significance of these techniques in modern-day software development. In this instance, teachers resort to personal integration due to a lack of experience and technological knowledge of various software, which may jeopardise the implementation, transfer, and improvement of educational programmes across different levels of Life Skills education. In other words, hardware technology is conditional on software technology to function. This suggests that software inclusion requires significant human involvement or that tangible technology is essential for integrating software resources with structured curriculum implementation.

Davis and Phillips (2020) conducted a study employing a qualitative survey with questions written in an interview-style format which included open-ended questions to explore how COVID-19 affected individual teaching and how teachers navigated this period. The study identified some common concerns with other teachers, namely a rapid increase in the integration of different technologies and online tools, as well as an extensive increase in workload. Furthermore, Chitamba et al. (2025) maintained that teachers require professional training in digital devices, software, and modern, innovative technologies as teaching tools. This enables them to integrate modern software technologies to address technological knowledge gaps, with an unstructured integration process guiding the school society. Therefore, a deficiency in professional development must be addressed; teachers need to better integrate EdTech into the curriculum in line with CAPS requirements.

Furthermore, this suggests that education is in an era distracted by digital platforms, compelling teachers to adapt by customising their approach with unstructured

software. Essentially, globalisation has compelled most organisations, including rural schools, to adopt online platforms and integrate software technologies. Soman et al. (2025), in line with Govender and Mpungose (2022), maintained that the availability and accessibility of both hardware and software technologies are primarily interdependent. Still, without their adaptability to online platforms, it is impossible. In simple terms, digital teaching and learning require the integration of software of the age to access the educational resources on various digital platforms (Zoom and Teams); these platforms need teachers to have access to Teams, Google Chrome applications, online technologies (software resources), and physical technology (hardware resources).

A study by Zhou et al. (2021) revealed that despite positive advances in the use of digital devices, implementing a high-performance on-device teaching and learning system still faces some severe challenges, including insufficient user-training data, backwards propagation blocking, and limited peak-processing speed. According to Faloye and Faniran (2023) there is insufficient evidence to support the integration of modern software technologies into classroom activities. However, systematic planning and implementation of lessons that require teachers to think critically, work collaboratively, and integrate technology to support teaching are essential for enhancing the quality of technology education. This suggests that as teachers struggle to integrate hardware and software across various online platforms, they often rely on their personal integration skills to support digital teaching and learning, thereby avoiding being overwhelmed by the demands of the digital age.

In contrast, WhatsApp is a valuable software technology in supporting teachers and learners during and outside school hours (Sunzuma et al., 2022). According to Mhlanga et al. (2022) the provincial department, such as the Gauteng Department of Education, has partnered with Olico Maths Education and other partners to support the asynchronous method of online teaching and learning. Not all provincial departments of education have adopted this online teaching platform program, which may further deepen the educational and digital divide among schools in South Africa. This means that ruralism compels education to be decided through unstructured practices to facilitate the integration of EdTech and bridge the digital divide in South African primary schools. As a result, the unavailability of technology policy, insufficient technology equipment, a lack of teachers qualified in technology integration, and

maintenance and technical problems are significant challenges affecting the effective integration of technology at the school level (Faloye & Faniran, 2023). In this regard, teachers are also self-reliant on WhatsApp and other easily accessible software technologies to modernise and balance the curriculum inequalities bestowed on South Africans by the apartheid regime as well. Therefore, Life Skills teachers can be captivated by unstructured and semi-structured approaches to address societal challenges in online teaching and learning, with or without the integration of software technologies, which may require ideological ware technologies.

2.3.3 Ideological Ware Educational Technology Resources

According to Mbhele et al. (2023), ideological ware, along with hardware and software, serves as a resource that facilitates educational lessons. Therefore, teaching and learning encompass not only technology but also attitudes, beliefs, ideas, values, and perspectives. A study by Khoza and Bwalya (2021) and Govender and Khoza (2024) categorised ideological ware as any skills, knowledge, values, experiences, techniques, methods, theories, and EdTech that influence the enacted curriculum to yield desired outcomes. In a nutshell, ideological ware is regarded as TOE, which includes approaches and methodologies for imparting content knowledge in teaching and learning Life Skills education (Kumar & Zubair, 1996). In line with Kumar and Zubair (1996), Mbhele et al. (2023) defined ideological ware as a TOE because it comprises various theories that support critical pedagogy or social constructivism for a specific subject. Life Skills teachers should therefore design theories and approaches that develop advanced ideological ware and methods for the subject, as the full potential of EdTech resources has not been achieved. Hence, the application of ideological ware suits personal integration. As a result, personal integration drives teachers' behaviours, attitudes, and theories on how to integrate ideological software into the CAPS curriculum (Joseph et al., 2023).

Furthermore, by implementing ideological ware, they will be better equipped to integrate various hardware and software technologies, thereby disseminating relevant subject content to learners throughout classroom engagement. This is the embracement of an ideological approach, combined with other EdTech resources, that ought to play a significant role in giving technology didactic meaning when it is structured and integrated in the curriculum delivery (Joseph et al., 2023). This

interface, revolving around online EdTech demand, includes in-service workshops on teaching theories and pedagogical techniques. In a nutshell, rural primary schools did not rely on WhatsApp as their sole means of social communication to impart and disseminate information, whether educational or societal. However, the online education ideology must receive enduring backing from Life Skills teachers, while the Department of Education should properly reinforce structured training (Chirinda, 2021). In brief, EdTech is a vehicle to transform education technologically, socially, economically, and educationally across South African schools. This interconnectedness suggests that integrating EdTech as hardware or software without teachers' understanding of ideological ware widens the challenges to the structured integration of technological resources into Life Skills education. In other words, the Department of Education must be influenced by ruralism to promote technology development in rural schools, thereby bridging the widening digital divide.

Hathaway et al. (2024), in line with Loiko (2023), stated that teachers do not receive guidance or workshops on EdTech integration. As a result, they may encounter challenges and ideological barriers based on the education districts. A learning environment, according to Khoza (2022), is any teaching and learning platform, namely traditional, online, and blended environments. A study by Govender and Mpungose (2022) and Ukobizaba et al. (2022) defined traditional technologies as traditional ideological ware which are teacher-centred. In this environment learners experience the simultaneous structured integration of conventional education and longstanding technologies, resulting in prompt feedback from their teachers (Graham & Longchamps, 2022). This suggests that physical contact time in a classroom setting is driven by professional development, which requires teachers to engage in structured integration.

Likewise, three elements of ideological ware identified by Katrak and Devos (2021), Capone et al. (2022), Chirinda (2021), and Vidergor (2023) were asynchronous, synchronous, and hybrid online education. A study by Coulanges (2025) on the experiences of rural middle school teachers with arts integration employed a qualitative case study using semi-structured interviews. Ten participants were selected and purposively sampled for this study. Two focus groups, each with five participants, and classroom observations were led within a small rural middle school in southeastern USA. The theoretical framework for the study was metacognition

theory. The study presented that planning and communicating with teachers, setting goals and precise objectives, and focusing on learners' interests facilitated the integration of the arts into teaching through various ideological methods. This shows that ideological ware is driven by personal integration, as it promotes the education systems, and the elimination of redundancy in processes that integrate EdTech resources.

However, observations revealed a lack of institutional support and limited availability of teaching materials on the arts (Coulanges, 2025; Vidergor, 2023). In this regard, a lack of support from educational upper structures drives teachers to adopt unstructured ways of achieving the desired learning outcomes. Studies by Mantula et al. (2024) and Kraft et al. (2021) found that ideological ware was confrontational to teachers, who are accustomed to direct teaching approaches. This can harm teaching because they lack experience with online EdTech integration, such as ideological ware. In other words, teachers are enticed to resort to unstructured and semi-structured integration to understand online platforms (hardware, software, and ideological ware) as the CAPS policy document is silent on the usage of EdTech resources in the enacted, implemented, and achieved curriculum, addressing issues of curriculum development in South Africa.

2.4 Recent Debate on Curriculum Development In South Africa

Technological developments in education and the global landscape consistently demand new technological knowledge and skills for effective curriculum implementation and ongoing development. So how do the processes of curriculum reform change with the integration of EdTech technologies in CAPS? What constitutes a curriculum within the context of this study? Thijs and Van Den Akker (2009) discuss the Dutch term '*leerplan*,' which translates into 'education plan' (Germans refer to it as '*lehrplan*', and the Swedish system is known as '*laroplan*'). These describe the curriculum as a plan executed by its implementers.

Similarly, in the context of this study a curriculum is defined as a carefully designed plan that structures the content of teaching (Pinar (2013) Stojanowska et al. (2023) Thijs and Van Den Akker (2009) Zulu (2018). Learning in the school involves the way values and beliefs are represented in the school's methods for undertaking its tasks,

as well as how well teaching and learning are executed, managed, and facilitated. Therefore, a curriculum is a plan that can be a strategy or content that teachers impart to learners. The approach of teachers in conveying the content should integrate technology resources with the curriculum, and that should be strictly adhered to.

Studies by Pinar (2019), Shahjahan et al. (2022), Pinar (1978), Ndlovu and Khoza (2021), and Van den Akker (2013) indicate that the Latin verb '*currere*' means 'curriculum'. The latter scholars, including Pinar (2019) and Schoots-Snijder et al. (2025), concur that curriculum refers to a programme, plan, and vehicle for learning, as well as a course to be implemented by teachers, thus reconceptualising teaching with the support of technology. However, while South Africa's curriculum has undergone various reform processes since 1994, EdTech has largely been overlooked in its curriculum agendas (Chisholm, 2005; Hoadley, 2017; Jansen, 2012). This means that curriculum designers mistakenly overlooked the curriculum reform agenda, which aims to address the aspirations of the AI era through structured integration, supported by policies and legislation governing education.

In line with the above, Maodzwa–Taruvunga and Cross (2012, p. 145), in their review of Jonathan Jansen's *Curriculum Debate in South Africa: An Essay Review of Jansen's Writings Between 1999 and 2009*, concluded that Outcome-Based Education (OBE), Curriculum 2005 (C2005) was anachronistic in South African classrooms and context. As a result of the recommendations of a review committee (Gamede et al., 2022), the State officially recognised the failure of the 2005 OBE and NCS, leading to a radical change in position as OBE was unresponsive (Bertram et al., 2021; Bettman, 2025a; Lekitlane, 2023; Mogashoa, 2021; Muller & Hoadley, 2021). This led to inclusion of the NCS Review Report in the C2005 Review Committee report of 2000 (Jansen & Walters, 2022). In short, CAPS can be unresponsive if no amicable measures are taken to meet the demands of emerging technologies, which require the structured integration of modern EdTech resources. This suggests a shift towards a creativity and AI-driven curriculum that emphasises structural integration with teacher and learner needs, centred on the technological knowledge of subject disciplines. Consequently, advanced and envisioned EdTech resources are introduced in the curriculum.

These various curriculum reforms, comprising C2005, NCS, the Revised NCS, and CAPS, were introduced by the South African Government (Chisholm, 2005; Maimela & Mbonde, 2025; Mustafa & Lleshi, 2024; Ngobeni et al., 2023) to inform teachers about what to teach in class, when to teach it, and how to assess and provide feedback to learners. Hoadley (2023), Taole (2024), and Faloye and Ajayi (2022) note that South Africa's outcomes-based curriculum, branded C2005, was introduced around 1997, and reinforced by the OBE philosophy, without taking EdTech into account for all South African schools. Similarly, Jansen and Walters (2022), Landa et al. (2021) and Chisom et al. (2025) believe that the shift was evident in another curriculum initiative, CAPS, which emphasises implementation and teacher needs by focusing on the centrality of knowledge of subject disciplines. Moreover, a study by Mpu and Adu (2021) reiterates that when curriculum and assessment descriptors are vague, ambiguous, hard to measure, and low in academic content, objectives become unclear. Consequently, as textbooks are being reintroduced, the field of power and its deterministic tendencies remain unchanged. In this regard, CAPS is rigid and textbook-oriented rather than technology-friendly.

Additionally, the devastation caused by the OBE reform advanced and strengthened subsequent reforms, including the NCS and CAPS (Akindolani, 2023; Bertram, 2022; Hoadley, 2024; Ngobeni et al., 2023). Seemingly, these curriculum reforms have achieved much less in terms of resources for hardware, software, and ideological ware, despite the changes aimed at bridging technological gaps between urban and rural schools through digital integration. This further deepens the digital divide in rural school education, which can be regarded as a form of ruralism in terms of technology sustainability and implementation. This further suggests that there are very few, strict measures that establish teachers' roles and educational policies, effectively integrate science, technology, and EdTech resources, and demonstrate a responsibility towards rural schools. In other words, some government policies place our education system and teachers' roles in a precarious position amid technological transformation in inaccessible rural primary schools, and possibly in all rural school settings. Some studies, such as those by Pelzel-McCluskey et al. (2021), Jansen et al. (2022), Maodzwa–Taruvunga and Cross (2012), Jansen (2024), Hoadley (2017), and Soudien and Chisholm (2021), regarded educational policies as an obsolete millstone, fraught

with contradictions that may lead to their downfall, since there is limited consensus on what constitutes valuable knowledge for achieving these goals.

A study by Soudien and Chisholm (2021, p. 1) on key curriculum debates and directions in South Africa posits that “the reform process ensuing policy was rooted in labour movement debates, and informed by the outcomes-based education (OBE) rather than technological and technical skills”. Moreover, Bertram (2022), in line with Thijs and Van Den Akker (2009), notes that there are many different curriculum issues, ranging from a substantive perspective that emphasises the traditional curriculum question of what knowledge is worth teaching and learning, a technical professional perspective that refers to how to address curriculum development tasks, and a socio-political perspective that refers to curriculum decision-making processes. The C2005 was also practised in Australia and New Zealand (Coetzee & Van Niekerk, 2012). In simple terms, these initiatives, including C2005, NCS, RNCS, and CAPS, have not significantly improved or maintained the expected quality of education, as they are affected by prevailing socio-economic and educational inequalities. Rural primary schools continue to struggle with limited tangible technological resources. This suggests that these schools lag other South African or African schools in terms of social justice, curriculum justification, and administration. This widens the technological gap and exacerbates educational inequalities in South Africa's rural primary school system.

In this discussion the South African education system can be described as a “global curriculum reform phenomenon with adaptations, and local responses in the country, whose origins and evolution can be traced to competency-based debates in Australia, New Zealand, Scotland, Canada, and limited circles in the United States” (Cross et al., 2002, p. 176). In this regard, South Africa's education system has not fully addressed the challenges of providing technological materials and resources to primary schools in rural areas. Since it is based on political philosophies that, to some extent, hinder socio-economic and educational progress in schools, it hinders the development of Life Skills education (Bertram et al., 2021). This suggests that restructurings have a significant technological impact on these schools, which face multiple socio-economic and political challenges.

Being in an emerging country means that the type of education does not encourage the element of natural creativity through technological modernisation to support teachers' technology integration. Some adopted curricula were therefore compromises that reflected elements of constructivism, progressivism, and traditional essentialism, which were deemed extremely detrimental to rural primary schools (Hoadley, 2017; Jansen, 2012). As a result, in recent years it has become increasingly clear that without proper professional development in technology policies and their implementation, teachers may learning and struggle to integrate technological educational resources and learning and teaching support materials across all subjects. Therefore, the South African educational system needs to be revitalised and revised with more technological approaches to address imbalances and enhance technological content knowledge in Life Skills education. It is crucial to ensure that these multiple curriculum reforms do not reproduce inequalities similar to those of the apartheid era.

Studies by Soudien and Chisholm (2021), Jansen (2012), Hoadley (2017), Khoza and Mpungose (2024), and Galane and Khoza (2023) have identified poor infrastructure and sanitation, indiscipline and violence, neoliberalism, minimalism, and skewed resource allocation policies as key factors contributing to the collapse of curriculum reforms in South Africa. However, Soudien and Chisholm (2021) argued that there is a poor theoretical mix for achieving equality and quality in education, especially in socio-economically challenged societies. In this regard, these reforms (NCS, RNCS, and CAPS) are unproductive and unresponsive in addressing this theoretical mix for accomplishing equality and quality in education. This is especially true because South African schools, particularly rural schools, are characterised by a lack of technological hardware and software, as well as a dearth of teacher development in integrating technology-enhanced resources (Hoadley, 2024; Ngoben et al., 2023). This implies that teachers are agents of change for transforming technology-enhanced educational programmes (Fisher, 2006; Kavanagh & Fisher-Ari, 2020). They are expected to implement different levels of curriculum, supported by the effective integration of these elements, which in turn supports student-centred learning (Steck & Perry, 2016). Consequently, this research aims to identify the EdTech resources integrated into Life Skills education in rural South African primary schools, as understanding the specific

barriers that delay effective integration of EdTech in Life Skills education in rural South African primary schools is essential.

2.4.1 Curriculum Levels

According to van Ooijen-van der Linden et al. (2022) teachers must be familiar with the various ways the curriculum can be applied across different aspects, often referred to as the curricular spider web. In doing so, they understand the rationale for 'why' they are integrating various technologies in their teaching activities. Therefore, according to Matola et al. (2022) and Mpungose (2021), rationale serves as a central link connecting all other interconnected curriculum components, providing consistency and coherence. This enables teachers to understand which goals their curriculum aligns with (Bertram et al., 2021). Curriculum can be categorised into teachers' perspectives (implemented-structured angle) or learners' performance (attained-semi-structured angle).

The structured integration of the curriculum is also categorised into supra (internationally designed curriculum), macro (nationally designed curriculum), meso (curriculum at the school level), micro (curriculum designed by the teacher), and nano (based on how learners perceive the teaching and learning process) (Kuiper et al., 2013; Van den Akker, 2013). Ndlovu and Khoza (2021) and Van den Akker (2013) note that the enacted curriculum is intertwined with the governmental (macro) and international (supra) levels. In fact, this curriculum level is influenced and guided by the Common European Framework, as well as policies from UNESCO and other governmental stakeholders. This suggests that a strong, sound, and structured integration of technologies is essential to provide a background for the effective use of technology resources in education. This ensures teachers have the support and resources needed to integrate technology effectively in schools.

Similarly, departmental and national systems could further complicate the description of this level through core aims, objectives, attainment levels, entry requirements, and assessment programmes (Schoots-Snijder et al., 2025; Vreuls et al., 2025), as well as the assessment of attainment realisation levels within the curriculum. Hence, teachers in rural schools cannot assess learners' technological content knowledge and skills compared with other schools (well-resourced schools); in these instances, the

teaching and learning process is skewed. Put it concisely, the enacted level serves as the umbrella. This suggests that structured integration can be achieved by implementing the CAPS curriculum as intended (structured integration level) through prescribed educational policy documents, and across the spectrum. In simple terms, advances in technological resources enable teachers to integrate technology at various curriculum levels, address imbalances regardless of socio-economic background, and provide deeper insights in the process.

2.4.1.1 Curriculum Representation

Brown (2022) and Bridges et al. (2023) argue that the curriculum as implemented (structured integration) is what teachers and learners practise in the classroom. The implemented levels relate to the meso level. At this integration level (unstructured integration), teachers develop and implement a range of teaching, socio-emotional well-being and psychosocial provisions across the curriculum in the classroom. Hence, it is guided and influenced by the CAPS as enacted, which is a structured integration (Hoadley, 2015; Jansen, 2012; Khoza, 2018; Mpungose, 2024; Soudien & Chisholm, 2021). In other words, the school implements its programme in accordance with department guidelines, without considering the school's specific context. This systematic approach to developing learners technologically creates challenges due to inadequate educational planning. For this reason the location of an educational institution is a less neutral factor; however, the learning content takes precedence (Van den Akker et al., 2006). Consequently, this level can be shaped by the unstructured integration of teachers' perspectives.

A study by Bopardikar (2021) delineates curriculum as implemented (structured integration) as the actual integration of a curriculum to learners, or what it consists of in practice. Hoadley (2023) agrees with Hoover and Washington (2024) that the process of teaching and learning drives curriculum as implemented (structured integration) and is driven by both teachers and learners. In the digital era the curriculum as implemented (structured integration) can be better driven by integrating EdTech resources into classroom practice. At this phase, at the micro and nano levels, the curriculum is driven by numerous contextual factors that can have both positive and negative impacts on educational outcomes, including the grouping of teaching materials and resources. This suggests that it is essential to recognise that curriculum

levels, including the micro and nano levels, can exhibit significant differences in both scope and scale (Thijs & Van Den Akker, 2009).

Furthermore, Thijs and Van Den Akker (2009) state that these resources may range from generic instructional materials and textbooks, such as publisher-developed guidelines, to those modified by individual teachers for their own instructional practice, which can be driven by personal integration, including a teaching plan guided by structured integration. Bertram (2019) concurred with Eyitayo (2022) that curriculum as achievement (semi-structured integration) is perceived by teachers as measured through their learning outcomes. The outcomes of classroom activities (integrating resources, teaching, and learning outcomes) are considered the attained curriculum (semi-structured integration) (Joseph et al., 2011). This raises the interesting question: What is to be done if the South African curriculum reform agenda is to consider the aspirations of most of its people while addressing the need for one nation, not two? (Vahabli et al., 2022). Therefore, teachers must demonstrate substantial subject content knowledge to understand the content knowledge for teaching a particular subject with EdTech in classrooms.

Individual planning for knowledge and courses is central to teaching and learning; it is a personally integration-driven approach. As Khoza (2018) opined, curriculum as achieved (semi-structured integration) emphasises producing unstructured integration based on the contextual issues affecting teaching and learning, and it is dynamic. In other words, to deliver content in a particular context teachers must provide creativity (personal integration) to achieve the desired curriculum (structured) objectives. This means that when a strong curriculum is built on curriculum-focused EdTech, this structured integration has the potential to transform teaching and learning. This is particularly true in rural areas with limited technological knowledge and in primary schools that focus on reading, writing, and thinking as the primary means of success.

2.5 Curriculum Development Approaches

Kuiper et al. (2007) describe curriculum development as a process involving several steps, often starting with an analysis of the existing circumstances and the formulation of intentions for proposed change or innovation. In other words, curriculum development encompasses a variety of models that cover the core activities and approaches of curriculum (Kuiper et al., 2007; Kuiper et al., 2006). Additionally, a study

by de Beaufort et al. (2023) agrees with Thijs and Van Den Akker (2009) that curriculum development encompasses five core activities: analysis, design, development, implementation, and evaluation.

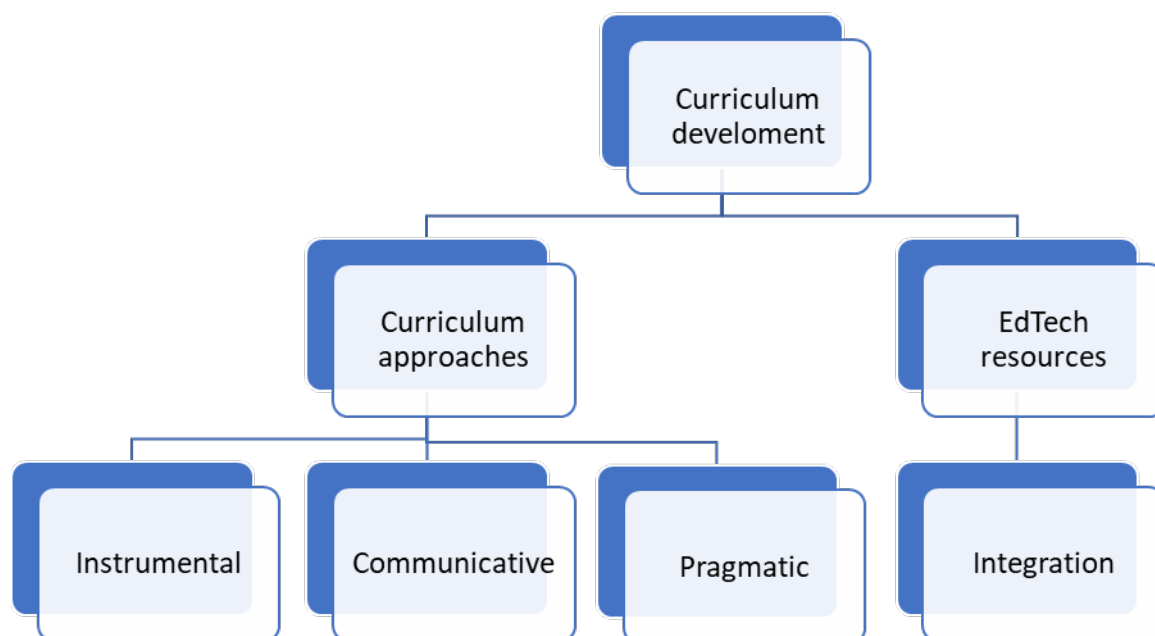


Figure 3: Flow of steps of curriculum development approaches

Further, van den Akker and Kuiper (1994), in the literature on curriculum development models, concurred with Kuiper et al. (2007) that curriculum development often begins with a phase involving problem analysis, context analysis, and needs analysis. These activities are organised as follows: first, by integrating EdTech resources, an initial design is developed to meet the needs of curriculum implementation (Nieveen & Kuiper, 2021; Vreuls et al., 2022). Consequently, Nieveen and Kuiper (2021) argue that the design requirements of a curriculum that structurally integrates digital resources are carefully developed, tested, and refined into a relevant and usable NCS-CAPS, resulting in a final product. This indicates that the curriculum process follows a cyclic design, implementation, and evaluation cycle aimed at achieving concrete results in integrating the proposed curriculum change with EdTech resources. These core activities help address disconnects in the attained curriculum through personal and unstructured integration, providing opportunities for improvement. To effectively integrate these core activities with the implemented curriculum it is necessary to conduct a thorough analysis of the curriculum's setting and problem formulation.

Consequently, the context of this study is the integration of EdTech resources, which seeks to understand the current level of EdTech integration in Life Skills education in rural South African primary schools, and to evaluate what barriers teachers face in integrating EdTech into their Life Skills education practices.

Similarly, based on this understanding, the researcher generates data to help develop guidelines that mitigate barriers and improve the implemented curriculum by constructively integrating EdTech. Evaluation plays a crucial role in this process (Kuiper et al., 2007). This suggests that typically every programme developed undergoes re-evaluation. Ballejos et al. (2019) and Thomas and Kern (2022) defined evaluation as the process of identifying, clarifying, and applying criteria to determine the merit of what is being evaluated. In this case, the integration of EdTech resources in teaching Life Skills in rural primary schools in South Africa is being evaluated. Therefore, an evaluation of a programme in this context aims to identify specific challenges that hinder effective technology integration, such as a lack of training, insufficient resources, or inadequate school support.

However, this study focuses on four curriculum approaches to curriculum development, rather than examining these five core activities in detail. A study by Visscher-Voerman and Gustafson (2004) categorised curriculum development approaches into the following: instrumental, communicative, and pragmatic approaches, as depicted above (see Figure 3). For these reasons curriculum development is regarded as a structured course offered by schools, emanating from the classical Latin term 'curriculum', which originally means 'running' or a 'race course' to achieve desired teaching and learning activities and outcomes (Andersson et al., 2025; Kuiper et al., 2013; Kuiper et al., 2007). This suggests that developing a digitised curriculum to bridge the digital divide in every educational institution is a daunting process that South African education has undergone through its curriculum reforms.

Similarly, Guiterman et al. (2022) described the development curriculum as the 'what' of the educational experience, referring to the document that systematically describes intended learning outcomes. A study by Pepe et al. (2025) on utilising disc assessment in surgical residency leadership training to address communication skill acquisition posits that curriculum is a planned educational experience that encompasses a breadth of educational experiences, from one or more sessions on a specific subject

to face-to-face or online, to a complete training programme. These approaches are now discussed sequentially, starting with the instrumental approach.

2.5.1 The Instrumental Approach

According to Ndlovu and Khoza (2021) and Vinnberg (2022) the instrumental approach highlights the importance of a systematic design process, thorough analysis, and clear, measurable objectives for curriculum development. Further to this, Babbar and Ineson (2023) argued that an instrumental approach in education views learning and knowledge as a means to achieve practical, external goals, such as gaining skills for employment, acquiring credentials, or fulfilling societal needs, rather than as valuable in their own right. This perspective, also known as instrumentalism, focuses on 'how to do' rather than 'why', emphasising rule-based learning for quick answers, and success in tests or job tasks. Studies by Tyler (1949), Pinar and Irwin (2004), and Le Grange (2013) suggested a framework for curriculum developers, guided by the following questions: Which objectives should education aim for (objectives)? Which learning experiences are most suitable to attain these objectives? How could these learning experiences be organised effectively (organisation)? How can teachers determine whether the objectives have been achieved (evaluation)?

In the EdTech context, 'instrumental' refers to the integration of technological resources, such as smartphones and digital software, which teachers and learners use to perform specific tasks in Life Skills education (Herheim, 2023; Zager, 2023). Instrumental understanding can be described by rephrasing (Henne, 2023; Maulana et al., 2025; O'Reilly et al., 2022) as 'learning by doing without reflection'. These negative characteristics tend to come to the fore when the instrumental approach is dominant. The instrumental approach is still regarded as a form of understanding with strengths such as immediate, more apparent rewards (e.g., correct answers). It is usually easier to understand and provides answers more quickly than relational mathematics (Babbar & Ineson, 2023; Sayed et al., 2021).

Furthermore, studies by Sayed et al. (2021), Thomas et al. (2022), and Skarbez et al. (2017) posit that this approach ought to be influential in identifying gaps in current curriculum reforms that align with the evolving technological landscape using the SMART framework (Specific, Measurable, Achievable, Relevant, Time-bound) for

objectives. In simple terms, curriculum development is a comprehensive and inclusive concept that encompasses various objectives and learning experiences, with the institution determining whether these experiences are productive. This means that it also involves designing technological content knowledge and evaluation to support the outcomes defined by the Department of Basic Education. In this regard, teachers collaboratively integrate structured goals and objectives for curriculum development, shaping the South African curriculum with passion and purpose by applying the SMART framework. The government must therefore have sufficient influence over curriculum designers and implementers to alert them about the evolving technological landscape of education.

Vinnberg (2022), in an instrumental approach to learners' work with digital items in Mathematics, posits that this approach helps to scrutinise the interrelations between phenomena and focus on the study. The purpose of the study is to examine students' instrumented techniques and action schemes during digital genesis and assessment, specifically the Swedish national tests in Mathematics for Grade 9. Moreover, technical problems frame the research, and learners describe their opportunities and constraints, explaining how these relate to their conceptual understanding. The study by Vinnberg (2022) identified concerns associated with the instrumental techniques learners use, or do not use, when solving items with a spreadsheet component. In this regard the aim is to determine which tests should focus on the intended EdTech resources in Life Skills education rather than in Mathematics. Consequently, Sayed et al. (2021) and Thomas et al. (2022) explore teachers' contributory practices and approaches in the process of digital integration and assessment, explicitly focusing on Life Skills in South African rural primary schools. Understanding technological integration in Life Skills requires a broad, structured approach; therefore, it is crucial that tests assess life competencies and avoid introducing construct-irrelevant variance (Thomas et al., 2022; Vinnberg, 2022).

Nevertheless, Tyler and Sofrin (1962), Tyler (1962), and Kebabsa et al. (2024) highlighted some drawbacks with the instrumental approach. The main weakness of this approach is its strong emphasis on attaining predetermined objectives, which consequently neglects the flexibility to adjust to the ever-changing needs of teachers and the growing insights of designers. Firstly, it hinted at a technical approach focused on factual, data-driven, and trial-and-error findings. Kebabsa et al. (2024) pointed out

that education focuses more on individual views and opinions than on the reality of the situation, which is often muddled by social and political aspects that play a prominent role in many curricular issues. In other words, to bridge the technology divide in education, one needs to understand the problems to be solved and the specific goals and objectives for assessing EdTech integration. As a result, they regularly incorporate feedback, reflect on the integration of technology resources, and revise their curriculum development process to ensure it meets the needs of both students and stakeholders. Therefore, teachers setting goals and objectives for curriculum development are driven by the integration of structured, unstructured, and personal elements when integrating EdTech resources and developing educational strategies for teaching Life Skills.

2.5.2 Communicative Approach

According to Kuiper et al. (2007) the importance of an interactive strategies perspective is emphasised, involving intensive deliberation during a part of the process. Consequently, the communicative approach emphasises building relationships with the parties involved, which is crucial for highlighting the importance of integrating EdTech resources and curriculum implementation more broadly (Babbar & Ineson, 2023; Kuiper et al., 2007). Furthermore, the definition of communicative strategies refers to the means by which a curriculum's objectives are achieved, suggesting that they are at the heart of the curriculum (Kern, 2004; Kern, 2016; Skemp, 1976; Tzuriel et al., 2023). In simple terms, communication is crucial for improving and implementing the integration of EdTech resources in CAPS. This suggests that when teachers are driven by structured integration, which strikes a balance between instrumental and communicative approaches, it maintains and values the input of educational stakeholders, curriculum developers, and other relevant parties (Kuiper et al., 2007). Therefore, Thomas et al. (2022) and Edgoose et al. (2021) posit that addressing racism in education through an interactive process can be achieved by structurally integrating technologies into the curriculum, promoting cohesion while allowing for variability between implementation stages. As a result, EdTech materials and resources can be utilised to meet the educational goals and objectives of each learning activity, thereby strengthening communicative strategies, improving accessibility for the target group, and providing individualised assessment. According

to studies by Kwakye et al. (2024) and Kassaye (2025) the communicative approach in curriculum development is the deliberative model, which comprises three phases: first, a platform of ideas that involves views and opinions about the problem; secondly, deliberation focuses on generating possible solutions and brainstorming alternatives to address the identified problem; then, the platform of ideas on transforming the deliberation results in a product. This means the approach is policy-driven (structured integration), guided by various structured approaches, equivalent to the level of curriculum development preferred by users. As a result, an objective analysis of the problem situation forms the starting point for an instrumental approach; the communicative approach commences with the more subjective perspectives and understandings of the designers, the targeted group, which consists of rural primary schools, and other stakeholders (Kuiper et al., 2007; Thomas et al., 2022). In this instance, when the communicative approach is unstructured and personal integration drives various methods, it involves multiple approaches to generate possible solutions for the identified problem, potentially jeopardising the quality of education. Therefore, the curriculum is cyclical, necessitating a redesign to accommodate the new technological era, one dominated by AI, that serves all public schools.

Walker (1971) and Tyler and Bard (1949) agree with Jong (2022) on research on Taba's curriculum development theory. They note that the main strengths of the deliberative model are the broad social support for the intended product and the ample opportunity given to every curriculum implementer and other parties involved to contribute. However, studies by Wang and Maa (2021) and Kuiper et al. (2007) using this approach show that it often has a narrow scope, as products are focused on a specific context of use and are based on the designer's particular vision. In simple terms, as teachers are especially attuned to consider the role of a team player in enhancing integration pedagogy and technology, as well as technology content knowledge, they also recognise the importance of individuality in implementing curriculum, which may negatively impact new teaching methods and content through technologies (Rasyidi & Al Idrus, 2024; Schneiderhan et al., 2019; White-Davis et al., 2018). In other words, a communicative approach may sometimes delay the redesign of a curriculum integrating EdTech resources in CAPS subjects, due to the lengthy processes involved. This further suggests that teachers are more willing: integrating the curriculum with innovative educational technologies when there is congruence

among their pedagogical knowledge, affective dispositions, and instructional practices (Andersson et al., 2025; Wilk, 2025), while indicating that they are motivated/driven by the unstructured and personal integration of educational strategies in uplifting rural communities with the little they possess to integrate technological resources to inform a practical approach of desired curriculum. The pragmatic approach is unpacked next.

2.5.3 Pragmatic Approach

Studies by Kern (2016) and Kuiper et al. (2007) suggest that the pragmatic approach, which focuses on the practical usability of curricular products, lacks objective criteria or fixed procedures. Instead, it is more important for designers to creatively anticipate the target group's unique characteristics from their own vision. According to Phillips et al. (2004), Durañona and Challinor (2025), and Kern (2004) implementing curriculum development involves both the educational intervention and its evaluation. Additionally, the pragmatic method comprises several key components: securing political support, identifying and procuring resources, addressing implementation barriers, introducing the curriculum, administering it, and refining it over successive cycles. In short, curriculum development is crucial for any educational reform aimed at transforming and integrating EdTech resources, thereby enhancing the practicality (structured integration) and usability of learning outcomes (unstructured integration).

Sequentially, digital education, comprising EdTech resources in the implemented curriculum, can be implemented when educational content or methods utilise digital (electronic) technologies, allowing learners to access offline or online resources simultaneously (i.e. synchronously) or at different times (i.e. asynchronously) (Hashmi et al., 2020; Kwok & Jacob, 2024; Singh et al., 2021). Consequently, for rural primary schools this implies that the enacted curriculum requires financial support and political backing to secure technological resources and attract professionals to implement and administer it. In this case, if the government fails, Life Skills education faces challenges related to infrastructure, policy, teacher training, and resource availability, all of which affect the use of technology in the classroom. Therefore, the integration of technology in schools largely depends on the government to address barriers hindering the effective use of EdTech.

Moreover, Mrwebi (2025), along with Rathando (2022), reported that the President of South Africa, Mr Cyril Ramaphosa, proclaimed in his State of the Nation Address for 2019 that one of the government's five fundamental goals for the next decade is for all learners to be able to read for meaning by the age of 10 years. This suggests that curriculum development occurs in close collaboration with local practice and users, and formative evaluation is a core activity (Kuiper et al., 2013; Kuiper et al., 2007; Padayachee, 2025; van den Akker & Kuiper, 1994). For this reason, the curriculum requires that evaluation activities span both technological and academic aspects to ensure interactivity. Furthermore, this suggests that when the curriculum is driven by personal integration, it can be challenging to combine approaches and insights that enhance teaching and learning performance. Moreover, the educational intervention itself and its success in delivering the new curriculum are primarily contingent on the selection of appropriate educational strategies (Kim et al., 2025; Sulena et al., 2025). This illustrates the importance and influence of integrating personal curriculum reform and development through EdTech resources, highlighting the need for a pragmatic approach in the structured implementation of the curriculum.

2.6 Chapter Summary

This section reviewed and unpacked the phenomenon of integrating EdTech resources, categorised into three types (structured integration, unstructured integration, and personal integration), with a focus on EdTech. The acronym EdTech is commonly used in this section because it is consistent. Procedure certainly bounds for scientific knowledge to improve the efficiency of the process of learning and instruction (Kumar, 1996; Midha & Kumar, 2022), classified as hardware technological resources, which are tangible, software (intangible ware), which transmits data, and ideological ware, which is logically philosophically bound. These resources were unpacked in the context of integrating EdTech resources in rural primary schools for Life Skills education.

Moreover, this chapter concluded with a discussion of recent issues in curriculum development in South Africa, including core curriculum activities and approaches. Consequently, to understand the integration of EdTech resources within Life Skills in rural primary education, the succeeding chapter delves into the study's framework and its components. However, the literature studied shows a lack of research on

integrating EdTech into Life Skills education in rural South African primary schools. Most of the literature is on integrating technology into other CAPS subjects, such as Mathematics. This suggests a significant gap in the literature, underscoring the need to conduct this research to address it. Consequently, this study intends to explore the integration of EdTech in Life Skills education in rural South African primary school

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Introduction

Chapter 2 reviewed the literature on the phenomenon, covering its integration levels, EdTech categories, and curriculum core activities and approaches. Chapter 3 unpacks the theoretical framework and its components. The framework employed in this study is TPACK. The inclusion of the TPACK approach in this study fosters creativity beyond technocentric strategies and is known to help teachers develop and apply integrated, interdependent approaches using EdTech resources (Celik, 2023; König et al., 2020; Mishra et al., 2023; Tan et al., 2025). The chapter therefore explores how EdTech resources are integrated into Life Skills education in rural South African primary schools, using a framework comprising three levels: technological, pedagogical, and content knowledge. The chapter is organised as follows: the origins of TPACK; its principles, covering the effectiveness of content knowledge, pedagogical knowledge, and technological knowledge; and its applications. The chapter also details the affordances and constraints of TPACK in the context of technology integration studies. It concludes with a brief overview of the history of Life Skills worldwide, with particular focus on the South African context.

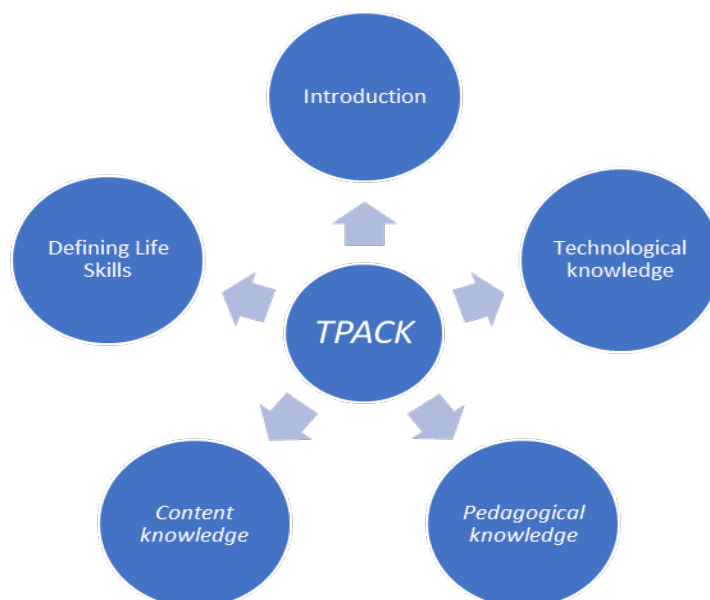


Figure 4: Chapter 3 flow chart

3.2 The origin of TPACK

A study by Mishra and Koehler (2006), posits TPCK as an original framework for teacher technology knowledge that integrates technological, pedagogical, and content knowledge. This is now registered as TPACK, which stems from the combination of technology, pedagogy, and content knowledge. Each component plays a central role in influencing the theoretical perspectives that describe the broader social group (Nadal et al., 2022; Nadal & Scharrón-del Río, 2021; Wang & Maa, 2021; Williams, 2023). The theoretical frameworks and teachers' perspectives facilitate the high-quality integration of technological information and the professional instruction and holistic development of learners through various methods. Studies by Wang et al. (2024), Yang et al. (2021), and Chukwuere (2021) recommend that a comprehensive theoretical framework facilitates the development of a cohesive, integrative body of research on EdTech resources.

Likewise, the TPACK theoretical framework was initially developed by Shulman (1986) and comprises two features of knowledge pedagogy and content that together construct pedagogical content knowledge (PCK). Cherner and Smith (2017), and Brianza et al. (2022), maintained that Shulman advocated for effective instruction by integrating teachers' deep content knowledge with practical strategies and assessment approaches (pedagogical knowledge), thereby providing learners with meaningful and compelling learning experiences. To put it differently, Shulman's theory essentially teaches teachers to structure, unstructure, and integrate personal knowledge to address content and pedagogical knowledge in Life Skills education. In simple terms, TPACK is a multi-pronged body of knowledge about curriculum, which is why it was selected for the study.

However, it is worth noting that this framework was developed at a time when technology primarily focused on industrial work rather than the educational sector (Andoh et al., 2022; Mishra et al., 2023). The demand for integrating EdTech resources in education suggested revising the theory to infuse technological knowledge into the pedagogy of the curriculum (content) (Andoh et al., 2022; Rahayu et al., 2025; Roozafzai, 2025). In short, TPACK encompasses the structured, unstructured, and personal integration of teachers' profound technological content

knowledge, along with practical strategies and assessment approaches (pedagogical knowledge), to provide learners with meaningful and compelling learning experiences.

According to Shulman (1986) teachers' knowledge for effective practice necessitates transforming information into pedagogical forms. This led to the concept of pedagogical content knowledge (PCK), later strengthened into the technological pedagogical content knowledge (TPCK/TPACK) framework, first published in 2005. Singh and Malik (2022) discuss Mishra and Koehler's (2005) technological pedagogical content knowledge (TPACK) framework, which is considered the most significant advancement in technology integration over the past 25 years. In this aspect, in Shulman's era the crucial roles that technology could play in education were overlooked in the digital age, as teachers relied on pedagogy, content (materials), and their own experience (knowledge) to impart knowledge in the classroom.

According to Gee et al. (2025) and Teague (2017), the TPACK framework builds on Lee Shulman's construct of PCK by including technology knowledge. The TPACK framework is critical for teachers' effective use of technology in teaching (Koehler et al., 2015; Mishra et al., 2022). Similarly, Koehler and Mishra (2009, p. 66) defined TPACK as an "emergent form of knowledge that goes beyond all three fundamental components, the interactions among content, pedagogy, and technological knowledge". In simple terms, TPACK was initially created for practice in post-secondary education, and both Shulman's PCK and Mishra and Koehler's TPACK explore the interconnected components that enhance effective teaching (Thompson, 2024; Zhang et al., 2025). This indicates that TPACK is crucial for the future and evolving circular education system. Hence, it is used in primary education in this context, serving as the foundation phase for post-secondary education and helping to eliminate constraints.

Furthermore, studies by Koehler et al. (2013) and Petko et al. (2025) found that TPACK arises from integrating technology, primarily through three knowledge components: pedagogy, content, and technology. This aligns with the study by Gudmundsdottir and Shulman (1987) on 'Knowledge and Teaching: Foundations of the New Reform', which found that TPACK is a theoretical framework comprising two knowledge areas (pedagogy and content). Briefly, PCK varies across curriculum areas because technology learning activities are based on the characteristics of tools rather

than the tools themselves (Al-Adwan et al., 2025; Gudmundsdottir & Shulman, 1987; Hava & Babayiğit, 2025; Mishra & Koehler, 2006). This implies that the TPACK framework for integrating EdTech resources is not autonomous, but rather technology-based teaching and learning activities.

However, in EdTech Mishra and Koehler (2006) have frequently criticised TPACK for lacking theoretical grounding. Consequently, this proposes a theoretical framework for EdTech by focusing on Shulman's formulation of PCK and extending it to the phenomenon of teachers integrating technology into their pedagogy (Al-Adwan et al., 2025; Mishra & Koehler, 2006). Handayani et al. (2023) and Rakes et al. (2022) concurred with Mishra and Koehler (2006) on differentiating TPACK development using learning activity types with in-service and pre-service teachers. Integration of technology in the classroom teaching and learning environment proved multifaceted, which resulted in the introduction of the TPACK framework. The study uses TPACK to understand the current context of integrating EdTech resources in rural primary schools, identifying barriers to effective integration, and proposing targeted interventions to enhance teaching and learning outcomes.

Additionally, Mishra and Koehler (2008) further revealed and explained this complexity by synthesising their knowledge of curriculum content, teaching strategies, and the affordances and constraints of technological tools and resources. Mishra and Koehler (2006) and Ning et al. (2024) further argued that technological knowledge is integrated into the teaching and learning content, forming the TPACK theoretical framework. Similarly, Mishra and Koehler (2006) state that the complex, multifaceted nature of integrating technology into education requires developing a situated form of knowledge known as technological pedagogical content knowledge (TPCK). Likewise, the interplay among the three main components of learning environments, content, pedagogy, and technology, is essential for teacher knowledge and is a prerequisite for effective technology integration in teaching. The TPACK theoretical framework, therefore, serves as a lens for this research study. The following section aims to understand TPACK's principles, examine the affordances in detail, and assess TPACK's limitations across unstructured, non-structured, and structured integration.

3.3 TPACK's Principles

The essence of this section focuses on the principles of the TPACK framework, which encompasses pedagogy, content, and technology (Chukwuemeka, 2025; Mishra & Koehler, 2008; Mishra, Oster, et al., 2024). Furthermore, it requires teachers to go beyond knowledge of disciplines, technologies, and pedagogical techniques in isolation (Mishra & Koehler, 2006; Mishra, Oster, et al., 2024; Mishra et al., 2023). According to Celik (2023) and Koehler et al. (2011) this type of knowledge is contingent and flexible, lying at the intersection of all three knowledge bases. It requires teachers to develop deep, complex, fluid, and adaptable knowledge of all three components of the framework. In short, these principles are dictated by the boundaries of content knowledge (CK) (what they teach), ranging from rigid disciplinary boundaries to cross-disciplinary and interdisciplinary thinking (Driskell et al., 2025; Thines et al., 2023). This proposes that TPACK enhances and reinforces a digitalised curriculum in real schooling. Thus, it enables teachers to reflect on three components: CK, PK, and TK.

Consequently, teachers' creativity in applying and disseminating pedagogical knowledge (PK) (i.e., how they teach) helps them adapt to the evolving demands of teaching and learning by integrating EdTech resources and higher-order rational skills (Choi & Young, 2021). Studies by Mishra (2019), Mishra and Koehler (2008), and Mishra et al. (2023) emphasise that teachers' adaptability is vital, especially in reprocessing and repurposing new technology for use in rural primary school classrooms – technology knowledge (TK). Koehler and Mishra (2009, p. 66) definition of TPACK as an “emergent form of knowledge that goes beyond all three ‘core’ components (to) the interactions among content, pedagogy and technological knowledge” was used. In a nutshell, TPACK guides teachers step-by-step in integrating technology into curriculum implementation. This results from its comprehensiveness and completeness, providing teachers with adaptable, flexible knowledge for developing deep technology integration across pedagogy, content, and technology. The first component of TPACK's principles to be discussed is content knowledge (CK).

3.3.1 Content Knowledge

Sinnema et al. (2020) study on curriculum in development posits that at the macro level what matters most is the 'what' concerning objectives and content knowledge, which usually receive more attention than the 'how' questions concerning pedagogy, educational materials, and the learning environment. Furthermore, Thijs and Van Den Akker (2009) and McKenney and Reeves (2018) discuss the aims and content knowledge required to equip teachers and learners for their roles in tomorrow's world. In other words, content knowledge (CK) refers to teachers' professional knowledge about the subject matter (what to impart and teach) to be taught and learned (Andoh et al., 2022; Brianza et al., 2022; Mishra & Koehler, 2008). This means that when teachers draw on their TPACK knowledge, the teaching content is integrated through a structured process.

In line with Andoh et al. (2022), Cherner and Smith (2017), Koehler and Mishra (2009) and Nguyen (2022) viewed content knowledge as any teacher's professional knowledge of the subject obtained in accredited tertiary qualifications. Therefore, teachers must upgrade and familiarise themselves with specialised modern-day technological resources, skills, and knowledge to gain expertise in structured technological integration in Life Skills education or any subject. Fomunyam and Khoza (2020) and Mpungose (2020c) opined that professional teachers impart content knowledge impartially to fulfil professional needs in a particular discipline. However, a professional qualification without content knowledge in a discipline in this ever-evolving digital age is incomplete. As a result, the integration of technology in rural primary schools remains a significant challenge in South Africa. Limited access to EdTech resources constrains teachers' ability to implement technology-enhanced teaching, restricts learners' opportunities to develop digital competencies, and widens existing educational inequalities between rural and urban schools.

Consequently, professional teacher development is imperative to equip teachers with the content knowledge and skills needed to articulate the precise content intended by curriculum officials for learners' benefit (Elliott, 2025; Mpungose, 2020a). For instance, Life Skills, such as physical education, personal well-being, performance, and creative arts, need to be constructively integrated with EdTech resources to create a productive curriculum for today's evolving technological world. This suggests that what is learned

or attained is determined by the era in which teachers serve (in the digital age). Hence, when it is unstructured and personally driven, it should not be well integrated with the desired EdTech resources in instructional practice, as it is likely to yield inconsistent results, especially in contexts where resources are often limited.

According to Khoza (2023) and Fu et al. (2025), the content knowledge component enables teachers to understand the content knowledge required to teach a particular subject. In concise terms, the components of technology content knowledge require teachers to distinguish and understand the subject matter being taught by applying subject-specific disciplines (Adedoyin et al., 2023; Arek-Bawa & Reddy, 2025; Carvajal et al., 2025). This further demonstrates that when educational stakeholders are guided and share the same sentiment about the curriculum, structured integration leads to curriculum development that is aligned with the aims, objectives, and content. Therefore, this research focuses on potential interventions for integrating EdTech resources into Life Skills education in rural South African primary schools.

Koehler and Mishra (2009) argue that the TPACK framework, which encompasses technology, pedagogy, content, and context, is essential for effective technology integration in teaching. They further emphasise that these elements are interdependent and crucial for educators to deliver content-based curricula effectively using educational technologies. This means that TPACK-based teaching and learning activity types help teachers successfully integrate technology into their practice. On this note, the TPACK framework establishes connections among different levels of integration (structured, unstructured, and non-structured) through technologies, curriculum content, and specific pedagogical approaches. It demonstrates how teachers' understandings of technology, pedagogy, and content can interact to produce effective discipline-based teaching with educational technologies.

Additionally, a study by Mlaba (2020) on qualitative action research at a university in KwaZulu-Natal on four lecturers' teaching of Business Studies modules using the Moodle learning management system used a critical methodological paradigm. The primary purpose of this study was to conduct a reconnaissance of lecturers' reflections on teaching Business Studies modules, using reflective activities, artefacts, and one-on-one semi-structured interviews to generate data. The study reveals that integrating CK into the teaching and learning process enables teachers to guide the design of

horizontal and vertical curricula for a subject based on their own CK. It also focuses on subject area content to be considered in teaching and learning at the expense of other factors that are important at school. Mpungose (2020c), together with Khoza et al. (2021) and Nene (2022), states that CK relies on the perpendicular (vertical) curriculum because it is informed by what is written down (CAPS). Hence teachers must be aware of socio-political and technological aspects of education to address subject matter effectively.

In other words, content knowledge (CK) is either guided or restricted by teacher-structured integration, as teachers are trained through departmental policies such as CAPS documents and ATPs. Therefore, district- and provincial-level intervention processes are crucial for CK, as they help teachers mediate the implementation of knowledge plans in schools. Further, according to Nene (2022) CK relies heavily on constructive integration, focusing on existing written theories, ideas, and organisational frameworks to address the subject matter. Moreover, a qualitative study by Mlilo (2019) on integrating technology-based resources into Intermediate Phase Mathematics classrooms found that horizontal and vertical curricula limit CK teachers' understanding of practical curriculum implementation. In this manner, these TPACK components constrain teachers, potentially undermining their ability to fully integrate CK into the curriculum's high standards when using technological resources.

In line with Koehler and Mishra (2009), Teague (2017) conducted a mixed-methods study of online course facilitators' perceptions of mobile technology. The design and TPACK framework's affordances affirm the technological content and pedagogical knowledge. The TPACK framework, developed by Michigan State researchers Mishra and Koehler, builds on Shulman (1987) seminal research on teachers' pedagogical content knowledge (PCK) and adds the affordance of technology. In simple terms, PCK drives bright ideas, minds, and innovation by integrating content and technological knowledge to produce effective technology-based teaching strategies. In this context, this framework can be described as a process of evolving education to reflect teachers' growing technological and pedagogical maturity, while focusing on subject content across the educational spectrum. Therefore, this study aims to explore how rural primary school teachers utilise content knowledge, content-related skills, and Life Skills education to integrate technological resources.

3.3.2 Pedagogical Knowledge

One of the important principles of TPACK is that teaching requires integrating technology effectively into three knowledge bases: content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK) (Koehler & Mishra, 2009; Petko et al., 2025). In order to do this, teachers must draw on their experiences from different integration levels: structured, unstructured, and personal integration. This section addresses pedagogical knowledge (PK) to create a convincing teaching and learning context, integrating technology as a resource to develop engaging pedagogical approaches. Machmud et al. (2022) and Megawati et al. (2024) state that Indonesia has significant room for development, particularly in the use of TPACK in EdTech and physical education. However, a significant body of research on these themes has received less attention. The study further suggests that future TPACK studies should focus on engineering and technology education, learner engagement, and the systemic learning environment. This implies that, in this new dispensation, the South African education system must focus on integrating technology into CAPS subjects, specifically to enable teachers to structure TPACK across different educational contexts.

Similarly, studies by Suherman and Vidákovich (2022), Suherman et al. (2019), Friskawati (2021), and Astuti and Muhafifah (2023) show that in the field of engineering and physical education, especially in hardware, software, and ideological ware, there are fewer comprehensive studies about pedagogy in deep rural schools in areas like the Zululand district. Little has been done about rural primary school teachers who must have a sound pedagogical understanding of TPACK to explore the components of learner engagement and the systemic learning environment, with limited technological skills, specialised knowledge, and the necessary knowledge to make TPACK more effective in instruction and learning processes (Saubern, Henderson, et al., 2020; Saubern, Urbach, et al., 2020). Therefore, to intensify the integration of TPACK at the school level, which addresses pedagogical knowledge (PK), the South African Government and the Department of Basic Education (DBE) should consider international research trends, technology applications, and potential improvement strategies for EdTech resources, particularly in South Africa's rural primary schools.

According to Mishra (2019) and Petko et al. (2025) the TPACK framework emphasises that these three domains must be understood and integrated to create compelling learning experiences, with technology serving as a tool to enhance pedagogy and content, rather than an isolated subject. Pedagogical knowledge (PK), according to Koehler and Mishra (2005, p. 133), refers to teachers' knowledge and understanding of "practices, processes, strategies, procedures, and methods of teaching and learning". This means that PK could shape compelling teaching experiences in any way (structural, unstructured, or personal integration), as influenced by teachers' knowledge and understanding of practices, processes, strategies, procedures, and methods of teaching and learning.

Moreover, the TPACK framework emphasises teachers' depth of PK in applying key curriculum concepts (Mishra et al., 2009), which helps learners construct knowledge, acquire critical skills, and engage with modern technologies (Coulanges, 2025). Likewise, Khoza and Biyela (2020) explored and decolonised students' understanding of technology, pedagogy, and content in the first-year Bachelor of Education Mathematics curriculum. The study purposively selected ten students who had completed a Mathematics module at a South African university. Data were generated through semi-structured interviews, observation, reflective activities, and questionnaires, guided by a critical action research framework.

The learners' knowledge indicated that technological pedagogical content knowledge (TPACK) was beneficial when used as a learning framework, helping generate module curriculum ideas that support students' understanding of technology, pedagogy, and content. This is in line with Koehler and Mishra (2009) regarding the decolonisation of the TPACK of first-year Mathematics students, in that technological and content knowledge must dominate the learning components of the subject, resulting in PK self-reflection to understand identities, consistent subject content delivery, and the subject matter. The study consequently recommends that learners utilise their knowledge of technology, pedagogy, and content as a framework for learning to address mathematics, individual, and societal needs through the integration of technology. This points toward the need for teachers to initially inhabit their structured integration of pedagogical and content knowledge as taxonomies of teaching to address Life Skills, specific needs, and societal needs through the integration of technology. Consequently, this could decolonise both teachers' and learners' knowledge of

pedagogy, technology, and content in rural primary schools in South Africa. In short, teachers must draw on their structured integration of EdTech resources to acquire pedagogical knowledge and teach Life Skills effectively, regardless of the challenges they face in their location settings. By doing so, they could gain PK about technology, which may be beneficial. Ironically, this suggests that teachers teaching Life Skills may have a limited understanding of diverse theories and approaches in integrating digital technology resources. Therefore, this limitation may stem from chronic underinvestment, staff shortages, poor infrastructure, and systemic neglect of rural schools (Petko et al., 2025; Scherer & Cohen, 2025).

Pedagogical content knowledge encompasses an individual teacher's objectives, values, and purposes, as well as the numerous factors that influence PK (Mailizar & Fan, 2020; Neves et al., 2024; Petko et al., 2025). In line with Mishra and Koehler (2006) on TPACK, Ali et al. (2025) acknowledged that PK represents a comprehensive (structured) understanding of teaching strategies and procedures. This means that teachers must have an individual, comprehensive pedagogical content knowledge (PCK) informed by subject guidelines (CAPS documents, etc.), to consider the impact of integrating technologies and social and environmental aspects. Moreover, Mdhlalose (2023) explained that technological knowledge (TK) requires teachers to possess diverse technological theories and approaches (semi-structured) to address the scourge of the digital divide. In these Life Skills education cases, technological and content knowledge dominated learning; the technological pedagogical knowledge (TPK) that emerged from their self-reflection on their identities guided the module throughout. This indicates that teachers draw on their own knowledge of technology, pedagogy, and content, as well as that of their peers to address difficulties in Life Skills education and socio-educational needs through technology integration.

Similarly, Chirinda et al. (2025) and Coetzee (2025) posit that TPK depends on self-structured integration, as teachers had to rely on their own improvisation to use EdTech innovatively and solve unfamiliar problems arising in the online learning environment. This further confirms that PK is entirely reliant on individual teachers' critical thinking ability and their understanding of practices, processes, strategies, procedures, and methods of teaching and learning (Koehler & Mishra, 2009; Mishra et al., 2023). Tsoka and Kriek (2025) and Mpungose (2020c) argue that the implementation process is based on a CAPS curriculum policy that stipulates that

teaching occurs in a face-to-face classroom environment and therefore requires structured pedagogies to achieve the curriculum objectives. Briefly, the South African CAPS curriculum policy is rigid. In simple terms, CAPS is silent on integrating miscellaneous EdTech resources. Therefore, when no measures are in place to control, the integration of EdTech resources into CAPS subjects steers teachers toward both personal and structured integration to upgrade their technological skills and enhance curriculum implementation and attainment.

This is evident from the statements of Mtshali and Singh-Pillay (2023) and Ankiewicz (2021), which affirm that content centred on the topic 'pragmatist play' involves teaching in intended real-time contact. This is a synchronous platform with a scheduled contact time, during which the teacher provides immediate feedback to learners. This further suggests that our educational reform system, guided by the NCS CAPS document, is skewed toward traditional teaching approaches while disregarding EdTech resources. Therefore, this causes many schools, particularly rural ones, to lag other educational systems internationally in terms of TPK among both teachers and learners; as a result, there is no framework to guide the integration of EdTech resources into CAPS subjects. This makes it more challenging for teachers to implement the provision of and access to quality education, while considering factors affecting rural primary schools' technology infrastructure and incorporating varied activities to consolidate teachers' knowledge.

A study by Phillips et al. (2025) and Mishra et al. (2023) found that TPK encompasses a forward-looking, creative, and unprejudiced search for technological applications, not for their own sake, but to advance teachers' teaching and understanding. However, an essential aspect of TPK is the creative flexibility in planning to leverage contextual factors, which is critical for shaping teachers' TPACK practice and determining available resources for specific pedagogical purposes (Petko et al., 2025). In simple terms, if teachers lack technological skills, are driven by unstructured integration, and place little importance on content and pedagogy, then they represent an insufficient understanding and application of TPK in real content. This further widens educational inequalities in rural school communities.

According to Mpungose (2023) and Ndibalema (2022) TPK refers to the understanding of how teaching and learning are altered when specific technologies are integrated

into curriculum implementation. In this respect, there is a need to understand how to infuse PCK and PK in this new dispensation, particularly in educational contexts where technology and pedagogy extensively intersect. Currently deep rural and rural primary schools that lack technological infrastructure and a solid understanding of TPK are more likely to lack policies or guidelines to support technology modernisation and to impede continuous professional development for teachers in integrating PCK and TK. Similarly, this suggests that in schools where teachers are driven by personal integration, they develop their own methods for acquiring TK and PCK to informally integrate EdTech resources, intervening to overcome barriers to technology and facilitate ongoing professional development.

Likewise, Mishra and Koehler (2006, pp. 1026-1027) outline that PK is driven by “teachers’ knowledge”. Mercader (2020) conducted a study on the use of TPACK by digital pedagogy in higher education. The study maintains that PK emphasises teachers’ knowledge, which may not stimulate learners’ knowledge. In simple terms, it is stereotyping, if not limiting. This constraint is also evident in Mwalongo (2023) study, which explores factors influencing the use of information resources among open and distance learners living in remote areas of Tanzania, demonstrating that it affects school choice in isolated primary schools in Tanzania. This means PK is determined by personal integration, particularly teacher-centred rather than learner-centred, which requires teachers to carry out all teaching activities. A study by Nene (2022) found that teachers need to use the appropriate method (ideological ware) when integrating resources into their teaching. Accordingly, this study aims to explore whether rural primary teachers are integrating appropriate methods and theories into their teaching to mitigate technological barriers. Consequently, for this study TPACK enables the researcher to explore the relative importance of the TK component compared to the others, thereby improving productivity in the integration process.

3.3.3 Technological Knowledge

Khoza and Biyela (2020); Fomunyam (2021); Mpungose (2020c) and Frans and Pather (2022) posit that technology in education (TIE) and technology of education (TOE) comprise resources, hardware, software, and ideological ware employed in the teaching and learning process to communicate the curriculum. Nene (2022) describes EdTech TIE as tangible technology that can be seen or touched, such as a mobile

phone, a laptop, or an overhead projector. Conversely, TOE encompasses any EdTech that cannot be physically touched or directly seen and that depends on TIE, such as Zoom meetings and PowerPoint presentations (Nene, 2022). These technological resources in teaching and learning are driven by social needs, as emphasised by (Khoza & Biyela, 2020). In short, when teaching and learning engagement is driven by unstructured integration, it may endanger the desired curriculum learning outcomes.

In addition to the above, the study by Nene (2022) suggests that integrating educational technological resources requires teachers to draw on their structured experience, in which teaching and learning are communicated through different hardware (computers), software (social media and learning management systems), and ideological ware (theories, models, and strategies). This means understanding the process and integration of technology resources, hardware, software, and ideological ware in Life Skills education, and how this affects teaching practice, is necessary for collaborating on the curriculum. For instance, it enables teachers to draw on structured integration of TK to enhance pedagogical technology and address the high levels of technical content knowledge (TCK) deficit which may prevail in rural public schools.

Andoh et al. (2025) describe TK as individual teachers' knowledge of technologies used in education. Makumane et al. (2024) and Mpungose and Khoza (2022) define TK as encompassing a variety of resources and technologies, ranging from traditional to digital, including the internet, computer simulations, interactive whiteboards, discussion forums, hardware, and software. In short, teachers experience the power of technology in various ways- semi-structured, personal, or structural- and are influenced by different technology platforms and resources. This means that TK stems from various technological resources, encompassing both tangible and intangible technologies, as well as ideological approaches. As a result, understanding the power of technology enables them to acquire knowledge of its content, thereby enhancing their technological understanding when teaching CAPS subjects.

A mixed-methods approach study conducted by Govender and Khoza (2024) examined lecturers' experiences of integrating information and communication technology into teaching at a college of education. The findings indicated a positive

user experience, highlighting the importance of technological knowledge (TK), as educators require the knowledge and skills to use digital platforms effectively. Then, to support teaching and learning and to illustrate the role of technological knowledge in adopting digital teaching tools, Nene (2022, pp. 75-76) states that TK refers to “a different range of resources and technologies, ranging from traditional technologies such as pencil, paper, chalk, and chalkboard to digital technologies such as the internet, computer simulations, interactive whiteboards, discussion forums, and software programs”(Nene, 2022, pp. 75-76). This is reinforced by the qualitative study of Mailizar et al. (2021) which explored the effects of demographic variables on Mathematics teachers’ TPACK in the Indonesian context. The study shows that TK is about understanding PowerPoint, multimedia, interactive whiteboards, and more advanced technologies such as the internet and digital videos. Ejoh (2020) and Ratnaya et al. (2024) argue that TK is informed by unconstructive integration, hence involves the skills required to operate technologies.

Moreover, according to studies by Mishra, Phillips, et al. (2024) and Mishra, Oster, et al. (2024), TK is informed by constructive integration, which is based on teachers’ understanding of technologies to be integrated into the classroom. This suggests that both personal and structured integration may inform TK integration (deep) in rural primary schools, as some schools have limited access to digital technologies, including the internet, computer simulations, interactive whiteboards, discussion forums, and software programs. Likewise, Koehler and Mishra (2009) defined TK as the ways of thinking about and working with technology that can be applied to all technological tools, regardless of the context in which they emerged. In essence, TK is parallel to the notion of fluency in information technology ‘fitness’ as suggested by the Committee on Information Technology Literacy (Kuhn, 2022), as it posits that conceptualisation of TK does not posit an end state but instead assumes it is developmental, evolving over a lifetime of generative interactions with multiple technologies. With due consideration of the above assertion, in most rural primary schools teachers have limited access to consistent internet connectivity, digital devices, or the integration of technology into their teaching practices (Hart-Anderson & Holme, 2023). These challenges may make it difficult for them to integrate TK and resources effectively, thereby hindering their understanding of TPACK principles. Briefly, teachers in marginal rural areas face significant challenges because

infrastructure and facilities are often neglected or sidelined in development and technological innovation.

Ejo-Orusa (2020) conducted a study on the influence of Mathematics teachers' use of technology on secondary students' motivation, attitudes, and achievement in Nigeria. The primary purpose of this ex post facto, causal-comparative study was to compare differences in student motivation, attitudes, and achievement scores between students in Mathematics classrooms with low technology use and those in classrooms with high technology use in private secondary schools in Nigeria. Furthermore, the study is framed by the TPACK theoretical framework. The study is disheartened that learners in Nigeria are not leaving school with the mathematics skills needed for gainful employment and economic self-reliance, possibly due to limited technology use in Mathematics classes. Hence, specifically, the influence of technology use in Mathematics classrooms on students' motivation, attitude, and mathematics achievement in Nigeria was not well understood. This suggests that learners are demoralised by the lack of technology resources, which compels them to attend a school of choice rather than a school of need.

Likewise, findings indicate that greater integration of technology into Life Skills classes can foster positive social change, as students may be more likely to develop the skills needed to enhance future employment opportunities and economic independence. This suggests that most learners worldwide, especially in rural, disadvantaged primary schools, are leaving school without adequate technology skills, which hampers their ability to live and work with advanced digital tools. In this context, teachers may struggle to use technological resources or may lack access to them, thereby impeding learners' technological and academic development. As a result, teachers may resort to unstructured, personal approaches, which can hinder the achievement of learning objectives and understanding of the importance of integrating EdTech resources into the curriculum.

Consequently, teachers delivering Life Skills education may have a limited understanding of the technology used in these classrooms. This could negatively impact teachers' and learners' motivation, attitudes, and success in acquiring life skills in South African rural public schools. Therefore, access to EdTech resources and understanding the rationale and role of technology are crucial in modern education.

Evidently TK in TPACK assists teachers in enhancing learners' achievement by effectively integrating EdTech resources, thereby aligning with comprehensive curriculum goals in accessible content. This further enables teachers to offer practical activities alongside extensive assessment-guided TPACK components, helping them thrive in challenging environments. Furthermore, in the South African context, this suggests that the Department of Basic Education could collaborate with the Department of Science and Innovation to strengthen teachers' ability to integrate technology, thereby improving reading and writing skills that contribute to social well-being. Additionally, initiatives can be implemented to raise awareness that Life Skills proficiency is independent of TK. Therefore, it is essential to understand the effectiveness of intervention strategies in improving TK in rural primary schools, ensuring that teachers can integrate technological resources constructively and systematically into Life Skills education through changes in TPACK theory.

For these reasons, South African education appears imbalanced and inequitable in the distribution and integration of technology resources into teaching practices. This further becomes a contextual factor influencing TPACK implementation, rather than serving as a catalyst for quality teaching and learning or for producing learner-developed content to explore educational opportunities for lifelong success. These limitations somewhat hinder them as they attempt to become more knowledgeable about technology (TK), the integration of technology in their subject content (TCK), technology implementation in their teaching (TPK), and the multi-faceted interactions of content, pedagogy, and technology knowledge (TPACK) compared to when they first started the course (Ji & Shin, 2020; Nene, 2022; Petko et al., 2025). In this manner, technological and content knowledge dominated the learning in the subject; the PK, which resulted from their personal integration into their individualities, guided the subject throughout TPACK development. Therefore, they are not compelled to adopt a personal, unstructured approach to exploiting ordinary smartphone apps for teaching and learning, as sufficient support is available for teachers' professional development.

Findings from a study conducted by Khoza and Biyela (2020) on migration to a digitalised curriculum at the University of KwaZulu-Natal showed that integrating different technologies aligned with the online teaching environment. In simple terms, transition is a cognitive function; hence, teachers must swiftly adjust to a digitalised

curriculum and have not grappled with technology. According to Khoza and Mpungose (2022) these technological resources are guided by teachers' TK in teaching and learning, which is driven by social needs. This means that an unstructured integration significantly influences the teaching process. Therefore, teachers must consistently maximise their TK and understanding of EdTech resources to harness the potential positive impact of classroom technologies. This enables them to implement the curriculum fully (through structured integration), as outlined in the ATPs and CAPS documents, and achieve the desired learning outcomes.

A study by Chirinda (2021) found that teachers faced challenges due to their limited knowledge of online platforms and teaching technologies. According to Khoza and Biyela (2020), Khoza and Fomunyan (2021), Mpungose (2024), and Kyakulumbye and Pather (2022) these challenges suggest that teachers must be equipped with knowledge of hardware, software, and ideological technology in the teaching and learning process, thereby strengthening their technological expertise. This challenges government departments, specifically the education ministry, to provide learners and teachers with the necessary tools and skills, particularly in rural areas, to bridge digital gaps.

Coulanges (2025) employed an interpretive qualitative paradigm in a case study exploring rural middle school teachers' experiences with integrating arts into their daily classroom lessons in a small rural school district in the southeast USA. The study shows that CAPS is a performance-based curriculum primarily designed for the face-to-face environment, requiring traditional hardware technologies, as well as ideological ware to implement it. In this regard the South African curriculum (NCS-CAPS) neglects technology content knowledge in many aspects, including the Life Skills subject. This may prompt teachers to integrate EdTech resources at various levels and across multiple aspects of their curriculum implementation. Therefore, the Life Skills CAPS policy merely references computer hardware technologies, such as the Life Skills Grade R to 7 textbooks, obsolete computers that are not serviced due to financial constraints, and papers and compact discs. This knowledge is accompanied by ideological ware such as philosophical beliefs, ideas, and so on (Govender & Khoza, 2024). As a result, teachers' knowledge of hardware technology is thoroughly integrated into structured learning and teaching; however, it disregards software resources and the application of that knowledge. This further calls on teachers to

resort to unstructured integration to bridge and hedge knowledge gaps with the implemented curriculum.

According to Coulanges (2025) and Adedoyin et al. (2023) other resource forms are rarely mentioned, and collaborative efforts cannot sustain digital access; only the Technology subject is mentioned in the official curriculum. This further demonstrates how CAPS is rigid and confines South African rural primary schools to a technological-pedagogical knowledge base that is not reflected in the curriculum. Mishra and Koehler (2006) state that teachers with TK are familiar with operating systems and hardware, and can utilise standard software such as word processors, spreadsheets, browsers, and email. On this point, Mpungose (2020b) argues that this assertion has limitations, because it focuses solely on technological resources such as software tools for classroom integration. It does not provide theories such as constructivism and connectivism for integration with these resources (Nene, 2022). In other words, disadvantaged schools with limited or no access to modernised technological resources are left behind in operating their technology systems.

Similarly, they can only integrate what they have in terms of software, such as smartphones, into technology-based content and assessment practices that prioritise understanding of knowledge guided by CAPS policies. Therefore, shifting to concrete, precise, and methodological approaches is important for improving technology integration that encompasses all TPACK aspects in curriculum implementation. Tsipianitis et al. (2025) argue that TK encompasses knowledge of how to connect and disassemble technological devices, including those that incorporate AI or robotics.

Nevertheless, the CAPS curriculum is silent on how to integrate TK into Life Skills through the use of technology resources. TK is informed by the unstructured integration of knowledge acquired through shared PLCs, district and circuit educational clusters, and individuals' abilities to improve proficiency in technology integration and curriculum implementation. Subsequently the study aims to understand the role of TK as an extension of the TPACK framework among teachers, in collaboration with the Department of Basic Education.

It also explores how this knowledge supports and balances the key life-beginning skills: Beginning Knowledge, Personal and Social Well-Being, Creative Arts, Performing Arts, and Physical Education – to promote higher-level learning and

thinking and to foster creative levels among learners. The CAPS document remains silent on the importance of technology integration within the system. Hence this study seeks to explore which technological knowledge and approaches are employed to integrate EdTech resources and enhance Life Skills education, particularly in rural South African primary schools where traditional systems and practices prevail. The next section offers an overview of the affordances of TPACK.

3.4 Affordances of the TPACK framework

Abel et al. (2022) and Dinc (2019) define affordances as the ability to select and utilise TPACK technologies flexibly and purposefully to enhance learning with increased EdTech resources. Technological affordances, as articulated in TPACK, are capabilities that teachers must understand and embed (Scherer et al., 2021; Tondeur et al., 2021; Tondeur et al., 2025). According to Chasokela (2025), Francom (2020), and Scherer and Cohen (2025) TPACK affordances involve integrating technology for pedagogical and knowledge-based aims, such as utilising EdTech resources to deepen understanding of educational concepts. In brief, correctly applying TPACK's components enables structured integration, making it a comprehensive framework for the South African curriculum, especially in rural primary schools. This implies that it could reduce uncertainties and disparities between well-resourced urban schools and underserved rural schools. It also suggests that TPACK simplifies the theory of educational change and technology in curriculum development.

However, Sullivan et al. (2024) and Gawrisch et al. (2020) argue that TPACK affordances do not necessarily require innovative technological modifications, nor do they guarantee learner engagement or improvements in motor skills, and they may even decrease the effectiveness of traditional teaching methods. The study also indicates that the extensive body of TPACK research across educational fields and its application in Physical Education, particularly in low-resource settings, has been largely overlooked. In summary, TPACK enables teachers to identify technological approaches, regardless of the level of technology used, that align with Life Skills content knowledge.

In addition to the above, Chukwuemeka (2025), Schmid et al. (2020), Kurt and Çakıroğlu (2025) and Akuta et al. (2025) position TPACK in technology integration as

a meaningful incorporation of digital tools to enhance curriculum goals, rather than as digital replacements for traditional methods, with this shift serving as the foundation. Consistently, Demirtaş and Mumcu (2021) and Maulet et al. (2024) state that the TPACK framework promotes a rational integration of technology, pedagogy, and content that supports creative, practical teaching and learning by emphasising a shift from tool mastery and knowledge acquisition to evaluating the value of digital resources in relation to literacy learning. In other words, TPACK can help create a future in which teaching is no longer a rigid environment, but a profession that can happen anytime, anywhere. Nevertheless, schools that aim to bridge the digital divide need the right EdTech resources and mindset to survive in this complex, dynamic environment and to compete with traditional methods.

Besides this, a study by Anis (2024) describes TPACK as a supportive platform within technology that amplifies differentiated teaching, empowering modified pedagogical pathways that foster critical thinking and lifelong learning (Aregbesola et al., 2025; Koehler et al., 2011; Omoso & Odindo, 2020). Concisely, TPACK suggests that what was is no longer what is, as it appears to positively impact teachers' digital fluency through structured integration of EdTech resources. This indicates that teachers should apply the various components of TPACK to Life Skills, Social Well-Being, Physical Education, and the Arts, both in performing and creating, ensuring that unstructured activities do not disrupt learning in these areas. In doing so the Department of Basic Education could formally adopt the TPACK framework and gradually implement it across the education system. To conclude, TPACK could offer a promising framework for disadvantaged rural primary schools to enhance sustainable teaching, guided by teacher professional development and technology.

Consequently, Roper (2025), León (2024), Montelongo and Eaton (2020) and Moodley (2022) argue that the successful integration of TPACK largely depends on its local context, and that it requires reinvention in new settings, subjects, resources, and socio-economic demographics. Gawrisch et al. (2020) suggest that in a country such as South Africa, where rural schools predominate, teachers are compelled to rely on adapted technologies to measure TPACK among Life Skills educators. In this case, the specific affordances of the TPACK components technology, content, pedagogy, and knowledge are not fixed; instead, they are shaped by the classroom context and purpose (Huang, 2021; Ozudogru & Ozudogru, 2019). As a result, the affordances of

content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK) are opportunities provided by technology for integration, perceived by teachers based on their knowledge, experience, skills, attitudes, and goals (Bahtiar et al., 2023; Ibrohim et al., 2022; Irwanto et al., 2022; Seldura et al., 2024).

Additionally, this includes time for lesson preparation and the design of learning and teaching support materials, support from SMTs and colleagues, and an innovative school culture that values technology integration and the trial of new practices (Ibrohim et al., 2022; Prasetya & Irwanto, 2025). In other words, content and context matter most for TPACK. This further enables the integration of EdTech resources and digital lessons, both structured and unstructured, guided by knowledge of content, pedagogy, and technology. For these reasons, TPACK offers multifaceted approaches to integrating different knowledge components in technology-based teaching practices when teachers are well-trained, developed, equipped, and exposed to current technologies.

However, Koehler and Mishra (2008), Amiresheva et al. (2025), and Gangone and Fenwick (2024) argue that TPACK provides both a theoretical and a practical framework for teachers to engage with technology across various learning contexts. This is demonstrated in a qualitative self-study by Aravind (2025) titled ‘Self-study in a rural school secondary Mathematics classroom’, that explores TPACK to foster learner engagement. The study aims to explore how technology integration within the TPACK framework influences learner engagement and learning in a secondary Mathematics classroom. It also examines the teachers’ experience in planning, implementing, and adapting technological tools to meet students’ diverse needs, especially in under-resourced environments. Nevertheless, this transition poses a distinct challenge in rural schools, where limited resources and infrastructure can impede effective implementation of technology.

Additionally, in addressing these challenges data from teacher journals and learner portfolios offer valuable insights into the teaching and learning process. The analysis revealed that technology integration significantly affects student engagement, underscoring the importance of TPACK in balancing technological tools with personal integration support needs. In summary, inadequate or inaccessible resources continue to pose serious concerns for teaching Life Skills in many rural primary schools. It also

hinders effective technology integration and potentially limits teachers' and learners' ability to meet the needs and demands of modern society (including technological, academic, social, interpersonal, and digital communication skills).

However, Koehler and Mishra (2009) maintain that the TPACK framework assists teachers in moving beyond teaching challenges to enhancing teaching and learning by effectively integrating technology, pedagogy, and content knowledge. This suggests that TPACK may enable teachers in these environments to navigate these challenges with ease by integrating EdTech resources in unstructured, personal ways that meet learners' needs. Moreover, if schools are supported with proper infrastructure and centralised internet towers this ought to change teachers' behaviour technologically and their professional development (structured integration). As pointed out above, TPACK continually enhances different knowledge and skills as an essential part of ongoing teacher professional development, focusing on globalised, localised, and personalised learning across educational settings. In this context TPACK offers teachers the belief that technology can empower education, improve personal and social well-being, and streamline teaching activities.

Consequently, it enables teachers to implement teaching practices that assess proficiency and allow learners to engage more deeply with vital life skills, including personal and social well-being, physical education, creativity, and the visual and performing arts. It also helps schools operate and develop more effectively and efficiently under challenging circumstances. Therefore, TPACK is not an opaque process but an approach anyone can use to positively affect abstract operators, namely the integration of EdTech resources into Life Skills education.

Similarly, TPACK promotes the in-depth integration of content knowledge and facilitates students' online collaboration with suitable tools, structures, and activities, helping them construct different representations of integrated content knowledge through EdTech resources such as Mind maps, Wiki, Google Sites, and Moodle Platform (Teague, 2017; Zhang et al., 2025). This shows that integrating TPACK assists teachers in developing and subsequently integrating content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK), while also connecting them to knowledge domains such as pedagogical content knowledge

(PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK).

Furthermore, it indicates that some teachers should not overlook the importance of understanding the various TPACK components; instead, they should focus on contextual factors within their schools to improve the integration of digital resources and to align curriculum goals. Therefore, TPACK offers a body of knowledge to support teachers in successfully incorporating EdTech resources into their teaching strategies, regardless of the school's specific context. This suggests that TPACK responds to the school's environment and the accessibility of resources. Therefore, teachers should prioritise knowledge of content, pedagogy, and technology as a foundation for the continuous integration of technology to enhance academic performance and learning outcomes. Consequently, it improves teachers' intellectual TPACK and engagement in the context of technology development, where the most significant impact on school and learner improvement should be emphasised. Priorities in education, such as reading and writing skills and assessment practices, should always be considered.

Furthermore, this suggests that TPACK equips teachers with the technological skills, abilities, and capabilities for any educational environment. This allows them to teach effectively throughout the learning process and to utilise different levels of integration (constructive, unconstructive, and personal) during instruction. This study examines how teachers fully understand their TPACK role and how they utilise it in their teaching practice. Additionally, it investigates how their perception of the rationale for using a blended teaching method is structured around knowledge of content, pedagogy, and technology, supported by modernised technology integration. This approach assists teachers in developing technology-related professional knowledge and integrating EdTech in the rural primary context. However, everything that is possible also has constraints.

3.5 Limitations of the TPACK framework

Zulu (2025) explores how preservice Mathematics teachers integrate educational technologies to enhance learners' visualisation of mathematical concepts. The study highlights the transition from well-resourced teacher-training environments to resource-constrained schools, emphasising the challenges and adjustments in the

practical application of technology in Mathematics education. The TPACK framework was utilised to examine how digital tools such as GeoGebra, Sketchpad, and interactive visual aids enhance mathematical understanding. The analysis considers systemic barriers, including a limited understanding of TPACK, power outages, and restricted access to technology.

Moreover, these factors influence preservice teachers' capacity to understand and depend on technology during implementation and integration into educational practices. The findings highlight that the lack of essential technological resources, such as data projectors, constrained the effective implementation of TPACK, which compromised teachers' ability to incorporate technology into their pedagogy during the lesson. As a result, teachers were unable to integrate technology meaningfully into their pedagogical practices during classroom instruction. The time needed to set up and troubleshoot digital technology can also hinder teaching and learning, as the available lesson time is usually less than an hour. It therefore depends on teachers' understanding of all learning and teaching activities involving technological resources.

Mishra and Koehler (2006) further state that pedagogical, content, and technological knowledge require teachers to have a deep understanding of formative assessment, which includes, but is not limited to, teachers' understanding of technological resources. Succinctly, TPACK is a fragile, vulnerable, and underprovided concept and is therefore closely linked to individual teacher capabilities. This suggests that integrating it into any curriculum could be more vulnerable in rural schools that lack adequate technology resources, professional development, and support. Consequently, this results in an unstructured, personal approach to integration.

In addition to the above statement, Mlaba (2020) conducted a qualitative action research study of four postgraduate lecturers' reflections on the use of the Moodle learning management system in teaching Business Studies at the University of KwaZulu-Natal. The data were generated through reflective activities, artefacts, and one-on-one semi-structured interviews.

The study found that integrating TPACK with technology resources and information alone is insufficient to overcome limitations, particularly in a rural context. This means inconsistencies in TPACK are further influenced by a lack of collective understanding of TPACK among teachers across traditional, modern, or blended teaching

approaches, which confuses novice digital immigrants, in rural, disadvantaged schools, when integrating technological resources guided by this framework. These limitations hinder the adjustment of TPACK contributions to keep technologies affordable and sustainable in different forms. Subsequently, this study seeks to understand teachers' perspectives on TPACK across traditional, modern, and blended teaching contexts in rural primary schools' teaching and learning environments.

3.6 Brief Overview of Life Skills Education with the Integration of EdTech

Resources

Dixon et al. (2018) provided an overview of Life Skills education from precolonial times to the democratic era. Life Skills were initially designated as a curricular element in 1980 (Arasomwan & Mashiya, 2021; Dixon et al., 2018). Life Skills education has roots in health education dating back to the 1970s (Bettman, 2025b; Jamil et al., 2024; Prajapati et al., 2017; Scheuring & Thompson, 2025). In other words, what is called Life Skills education today was not always about life skills but rather about health-related questions; it has a history (Dixon et al., 2018). Studies by Dixon et al. (2018), Bettman (2025a), and Sheldon (2015) trace the origins from Christian National Education apartheid syllabi through C2005 Planning et al. (1997) and the RNCS Secretary et al. (2002), to CAPS Education (2011), showing that Life Skills originates in Physical Education. In this regard, teachers' understanding of the TPACK components of Life Skills is supported through Physical Education, an essential aspect of health education, which may require learners to develop a new technological mindset and integrate several procedures in an innovative technological way. This can embrace technology integration through social media, involving personal, unstructured integration that helps learners solve problems (structured integration), think critically and creatively, communicate effectively, and build academic connections.

Furthermore, in C2005, this distinct learning area of education was combined with Art, known as Art and Culture, which covers dance, drama, music, visual arts, arts and technology, and media and communication (Dixon et al., 2018; Sheldon, 2015). This package was also unpacked into dance, drama, music and visual arts. In simple terms, this integrated approach aligns with the principles of TPACK, which require teachers to combine content knowledge, pedagogy, and technology when teaching Life Skills. Consequently, teachers in rural schools can use educational technologies to enrich

learners' understanding of Life Skills, promote creativity and self-awareness, and design meaningful learning activities and assessments aligned with clearly defined learning objectives, thereby increasing learners' interest in the subject when assessing EdTech resources.

Likewise, this makes curriculum implementation realistic to attain and thus not vague and undefined for underprivileged rural schools. Therefore, in Life Skills, TPACK can come to the fore during the CAPS era, when content, pedagogy, and technology become disconnected. Hence, its four key focus areas come from Life Orientation and Social Sciences (Beginning Knowledge) and Natural Sciences (Personal and Social Wellbeing) (Dixon et al., 2018; Isaksen et al., 2025; Scheuring & Thompson, 2025). This was concluded by South Africa's adoption of OBE in 1997. In this context, teachers incorporating EdTech resources into Life Skills education ensure that technology is an intrinsic component of the educational experience through CAPS implementation. This presents a challenge for the Department of Basic Education in bridging the digital gap, regardless of the environment, thus enabling disadvantaged rural learners to participate in curriculum-oriented Life Skills activities at any time by structurally integrating EdTech resources into their daily lives.

This phase demonstrates a shift away from focused prevention measures toward a more comprehensive approach that prioritises the development of adaptive behaviours and practical life skills (Bettman, 2025a). Dixon et al. (2018) opine that during the 1970s Life Skills education emerged from prevention-focused programmes, such as those addressing drug, alcohol, and tobacco use. During the 1980s, the concept was formalised as a distinct field of study with assistance from academics such as Adkins and Swann in the 1930s. In the 1990s, the World Health Organisation (WHO) considerably broadened the concept to encompass skills in self-awareness, communication, decision-making, and emotion regulation, portraying it as a critical element of children's and teenagers' mental health and welfare (Chisale, 2024; James et al., 2017; Orih et al., 2024). Therefore, this study seeks to determine how well-accepted the shift from the traditional way of teaching Life Skills to blended methods that integrate technological resources is, thereby augmenting the TPACK concept to encompass pedagogical technological skills.

Kizhakkethalackal and Deepa (2024), who conducted a study on Life Skills education, found that it is a well-integrated subject that equips individuals for the enigmatic world. Further, Life Skills education is a well-integrated subject that prepares individuals to become well-rounded, adaptive, and responsible members of society. The study examines the fundamental components of Life Skills education, including personal, social, and citizenship skills. It also emphasises the benefits and employment opportunities. Moreover, it discusses how to properly incorporate Life Skills programmes into formal education systems, and potential techniques for learning these critical abilities. This is consistent with Isaksen et al. (2025) and Bettman (2025a), who define Life Skills education as the development of individual adaptation skills, hence constructively impacting persons' behaviour in efficiently dealing with demands and problems. This is consistent with the WHO's 1993 definition of Life Skills education as the development of individual adaptation skills, thereby positively impacting people's behaviour in dealing with the demands and obstacles of daily life. This clearly shows that when Life Skills is successfully implemented as an academic revolutionary agenda it can work miracles when combined with EdTech resources and curriculum programmes within formal education systems.

Academic knowledge is helpful, but what truly empowers learners is their ability to use it in real-world situations (Kizhakkethalackal & Deepa, 2024). Steyn et al. (2012), Shuman (2025) and Hanuliaková and Porubčanová (2024) define Life Skills education as a subject that prepares individuals to face academic, social, and technological challenges with long-term consequences; a failure to integrate sustainable digital tools for learning in rural schools limits learners' chances of success in the real world. In this regard teachers could resort to unstructured, personalised integration of EdTech resources to address the demands and challenges of ordinary life. In contrast, in an ever-changing educational curriculum, academic knowledge alone is insufficient; this suggests incorporating technology, along with teachers' technological development, to improve teachers' competence in using it in the practical contexts of disadvantaged schools. As a result, systematic integration of EdTech resources into Life Skills training, especially in rural schools, has the potential to influence teacher behaviour.

Similarly, integrating EdTech resources through TPACK in Life Skills education can lead to higher academic achievement for teachers and learners, improved mental health for individuals challenged by an unproductive working environment and, as a

result, stronger employability skills and productivity, allowing learners to meet the demands and challenges of being digitally behind others. Simply put, teachers' and students' knowledge, emotional, and cognitive skills, combined with an awareness of technology and pedagogy improve content, creativity, critical thinking, and problem-solving. However, Zamiri and Esmaeili (2024) contend that Life Skills education fills the gap between basic functioning and capabilities. It also improves individual teachers' and students' abilities to fulfil the needs and demands of modern society while helping them address the difficulties outlined above in ways that promote desired behavioural outcomes in practice (Mekade & Joshi, 2024).

A study by Bora (2022) and Roodbari et al. (2013) found that Life Skills training enhances a variety of cognitive critical thinking abilities, including active living, teaching responsibility, and future planning. Integrating TPACK into the curriculum empowers teachers to access limited technology resources, regardless of the situation, understand critical subject objectives and goals, and clarify their roles and the rationale for using myriad digital resources. In other words, EdTech resources for Life Skills education in rural primary schools are vital to the long-term viability and development of our educational system, as they can bridge digital gaps and enhance teachers' ability to meet technical and societal requirements.

This further demonstrates how merging EdTech resources can provide digital Life Skills training tools through Life Skills education, supporting teachers, students, and other educational stakeholders in overcoming obstacles and narrowing the digital literacy gap, thus leaving minimal room for technology accessibility issues. As a result, including a variety of digital resources, such as hardware and software, in instruction improves learners' technological expertise and leads to better learning outcomes.

Life Skills education, according to Thippeswamy et al. (2025) and Sinsay-Villanueva et al. (2025), includes psychosocial competencies and interpersonal skills that assist teachers in making appropriate decisions, problem-solving, critical and creative thinking, effective communication, building healthy relationships, empathising with others, and managing their lives in healthy and productive ways. This states that structured integration strengthens instructors' skills in numerous ways while enabling their learners to better understand the subject matter by balancing the four essential life skills: Beginning Knowledge, Personal and Social Well-Being, Creative Arts, and

Physical Education. In brief, these are the primary knowledge domains of Life Skills education in South Africa's curriculum.

According to Farooq and Alyana (2025), UNICEF (2019), and Khodabandelou and Amerian (2025), Life Skills are a behaviour-change or behaviour-development approach that focuses on balancing three areas: knowledge, attitude, and skills. The WHO defines life skills as adaptive and positive behavioural abilities that enable individuals to cope effectively with the demands and obstacles of daily life. In a nutshell, incorporating EdTech resources into Life Skills could move the focus of behaviour development toward logical, social, and emotional abilities. As a result, it assists rural primary school teachers in transitioning to developing technology-related professional knowledge, organised content, and teaching methodology.

3.7 Chapter summary

This chapter traced the origin of the TPACK framework, which emerged from TPCK and integrated PCK and is now recognised as TPACK. The principles of TPACK were then detailed, linked to and supported by TPACK knowledge, namely, technological pedagogical content knowledge. The chapter continued with a concise justification of TPACK as used in the study under review. It concludes with a discussion of TPACK's limitations and a brief overview of Life Skills education for integrating EdTech resources, alongside the key curriculum concepts: accessibility, environment, time, subject objectives, teachers' roles, rationale, activities, and assessment. The research methodology of the study is discussed in the following chapter.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

In the previous chapter the rationale for formulating TPACK as the guiding theoretical framework for this research was discussed. It contextualised the TPACK framework within the scope of this study. Consequently, this chapter provides a comprehensive overview of the processes undertaken to achieve the study's objectives, beginning with the research paradigm, followed by the approach and research design. It further discusses participant sampling, data-generation methods, data analysis procedures, steps taken to ensure the trustworthiness and integrity of the findings, and ethical considerations. All of these are accompanied by their strengths and limitations where applicable.



Figure 5: Flow chart Research Method of Chapter 4

4.2 Research Methodology

This study uses a qualitative research approach, as described by Creswell and Inoue (2025) and Creswell and Creswell (2017). This research methodology is a systematic, step-by-step approach used by researchers to conduct research and answer research questions. Studies by Creswell and Inoue (2025), Bertram and Christiansen (2014), Denscombe (2025), and Cohen et al. (2017) further explain that methodology details the researcher's approach to data gathering, analysis, classification, and organisation for answering the research questions. Adeyiga and Mpungose (2025) explored English second-language reading comprehension pedagogy in secondary schools in Ogun State, Nigeria and found that only qualitative methods, such as semi-structured interviews and classroom observations, can help researchers understand the reasons behind teachers' choices, rather than merely the outcomes. This suggested that I employed semi-structured interviews, reflective activities, and classroom observations to generate comprehensive qualitative data on participants' practices and their observations regarding the integration of EdTech resources. This approach simplified a systematic understanding of their behaviour within their natural environment.

However, Christou (2023) and Hirose and Creswell (2023) argued that research methodology includes an overall strategy, data collection, and analysis methods. However, it also justifies the specific choices made to ensure the results are valid and reliable (Maxwell, 2021). In this context, the research methodology explains the 'why' behind the study. In simple terms, qualitative research seeks to understand participants' perspectives through non-quantitative methods such as one-on-one, semi-structured interviews, reflective activities, and observation. This section justifies the specific method used in this study.

4.3 Research Paradigm

This study adopted an interpretive paradigm; therefore, it sought to understand how rural teachers experience, understand, and make sense of integrating educational technology resources in their everyday teaching contexts. This aligned with the objective of the study, which is to identify factors shaping educational technology integration, not to measure behaviour or connectedness. As a result, the interpretive paradigm recognises that people understand and give meaning to their experiences

in different ways, particularly within the social and cultural contexts in which those experiences occur (Bertram et al., 2021; Braun & Clarke, 2022).

Similarly, Duarte (2025), Ugwueze and Chukwunweike (2024) and Padayachee and Howard (2024) explain that interpretive research seeks to understand phenomena from the perspectives of the people who experience them. In other words, these interpretations shaped my understanding of the paradigm as an approach that keeps participants' experiences and meanings central to the research process (Christopoulos & Sprangers, 2021; Connelly et al., 2023; Cresswell, 2013; Mokhtar, 2021; Saunders et al., 2023). Hence, this was particularly relevant to the present study because teachers work in different rural school environments and may experience technology use in different ways. Factors such as access to devices, connectivity, electricity, previous exposure to technology, school conditions, and teachers' own knowledge and experiences can shape how technology is understood and used. Consequently, the interpretive paradigm enabled me to listen to teachers' perspectives and understand educational technology resource integration from their perspectives and within their particular contexts.

Likewise, the paradigm also shaped how I approached the interviews, observations, and reflective activities, helping me avoid predetermined expectations about what successful technology integration should look like; I sought to understand how participants described and interpreted their experiences. Furthermore, I then considered their reflections in relation to the research objectives and the TPACK framework. Thus, the interpretive paradigm provided a foundation for understanding the knowledge of the participating rural teachers and guided my interpretation of the meanings they attached to EdTech resource integration in their teaching practices.

According to Alharahsheh and Pius (2020), Goldkuhl et al. (2020), Junjie and Yingxin (2022), and Braun and Clarke (2022), the term 'paradigm' derives from the Greek '*paradeigma*', meaning 'design' or 'pattern'. Several studies adopted the term to describe paradigms from their own perspectives, referring to resolutions (Alharahsheh & Pius, 2020; Braun & Clarke, 2022; Husband, 2020; Rahman, 2016). Duarte (2025), Creswell and Creswell (2017), and Thorne (2025) describe the paradigm as the set of beliefs and practices that guide a field and can be used to summarise researchers' values. According to Paudel (2024) a paradigm is a loosely organised collection of

assumptions, concepts, or propositions that guide thinking and shared beliefs in the study of social order. This suggests that a paradigm functions like a tanker, carrying and combining various methodological components, such as research design, sampling, data collection methods and tools, data analysis plans, and ethical considerations. It provides a broad framework along with specific phases for conducting a study. Consequently, the paradigm emphasises the importance of understanding and expressing interpretations of reality, what can be known, and how knowledge is acquired (Ramrathan, 2021). In brief, it enables researchers to examine the social-educational landscape from participants' perspectives and beliefs regarding the real-world application of EdTech resources across different school settings.

According to Ramrathan et al. (2024) and Ryan and Dahinden (2021) a research paradigm provides researchers with principles and lenses to understand the world in pursuit of truth and knowledge. Essentially, it serves as a system, model, and pattern of assumptions based on the framework that guides the construction of knowledge about the social world. Additionally, a paradigm is described as “a basic belief system and theoretical framework with assumptions about ontology, epistemology, methodology, and methods”(Rehman & Alharthi, 2016). Saunders et al. (2023) simply define a paradigm as a researcher’s worldview or set of assumptions that shapes their research. This highlighted that ontology and epistemology are fundamental to understanding and exploring the world through research. A study by Rasyidi and Al Idrus (2024) further emphasises that researchers need to understand and clearly state their beliefs about the nature of reality, what can be known, and how to acquire that knowledge.

Moreover, my epistemological assumption was that I could understand teachers’ experiences by developing actionable recommendations based on the study's findings to improve technology integration in rural primary schools. Thus, my ontological assumption was that teachers’ practices and knowledge are socially constructed within a non-singular reality, and I sought to gather an understanding of existing technology resources, usage patterns, and the pedagogical approaches employed by teachers in these schools. Ontology concerns beliefs about the nature of reality, which influence assumptions about its existence and knowledge (Adler, 2022; Berndt, 2020; Brinner et al., 2025; Chin et al., 2025; Creswell, 2024). It questions whether a single verifiable reality exists or if multiple socially constructed realities do. Epistemology concerns the

nature of knowledge and its acquisition (Cheung et al., 2025; Mugleston et al., 2025; Ramrathan & Moodley, 2024; Rehman & Alharthi, 2016; Savin-Baden & Major, 2023), addressing objectivity, subjectivity, causality, validity, and generalisability. Ontological beliefs shape epistemological ones; belief in a single objective truth focuses on understanding objective reality, whereas belief in multiple realities focuses on understanding subjective experiential contexts.

To address this challenge, I employed data triangulation to enhance the research's trustworthiness, as discussed in subsequent sections.

4.3.1 Why is the Interpretive Paradigm Utilised in the Integration of Educational Technology Resources?

Khoza and Fomunyam (2021) and Makumane et al. (2024) examined the alignment of digital resources with human requirements in teaching Master of Education (MEd) students. Data-generation methods included semi-structured interviews, focus group discussions, and document analysis. Purposive convenience sampling was used to select the eight most readily available participants. The study found that interpretive researchers draw on the experiences and ideologies of other participants. This means it provides a secure diversity of ideas, thereby increasing the study's validity, triangulation, and trustworthiness. In other words, it removes constraints imposed by the individual's experience and the researchers' biases. This is confirmed by studies by Sprake and Palmer (2022), who view interpretivism as comparable to approaches grounded in social experience rather than assumptions. Interpretivism consequently highlights both community and personal aspects of social phenomena. It shapes insights into the integration of EdTech resources in Life Skills education, influencing what is considered reality, how data are gathered, and which methods are considered valid. It further underpins an education system that emphasises the use of technology in rural primary schools, not just by individuals.

Khalema et al. (2025), Mashazi et al. (2025), and Jideani (2025) argued that Interpretivists engage in unstructured integration, are influenced by others' opinions, and are hence motivated by participants' perspectives on the subject. As such, the interpretivist paradigm allows participants to express their ideas and thoughts in structured, unstructured, or personal ways. The interpretive paradigm facilitates

understanding of human actions and meanings (Bertram & Christiansen, 2014; Pillai, 2024), with its flexibility enabling rich descriptions through interviews and observations, which are essential for rural EdTech research. This provides a diversity of ideas, thereby increasing the study's rationality. Therefore the paradigm is firmly rooted in unconscious core beliefs and assumptions regarding phenomenal reality, participants' knowledge, and the values that influence research (Morgan, 2022). Hence it guides both researchers' and participants' perspectives and interpretations of the real-world phenomenon, thereby facilitating the constructive integration of reality and the phenomenon. This further shows that the strength of qualitative research lies in its ability to capture socially constructed realities and contextual depth (Fraenkel & Meierhenrich, 2018; McChesney & Aldridge, 2019).

4.3.2 Disadvantages of the Interpretive Paradigm in the Integration of Educational Technology Resources

According to Bertram and Christiansen (2014) the interpretive paradigm is well-suited to integrating EdTech resources into Life Skills teaching in rural primary schools because it highlights the intrinsically subjective nature of teachers' life experiences and interpretations. In contrast, the interpretive paradigm has the disadvantage of relying on a small number of cases that do not represent the broader population, thereby preventing data generalisation (Bertram & Christiansen, 2014; Saunders et al., 2023). Hence, it risks its dependability, reliability, consistency, and transparency. Correspondingly, this study aimed to examine how underprivileged teachers in a rural, socio-economically deprived area navigate the responsibilities of integrating EdTech resources while contending with socially constructed norms of teaching and learning that are often imposed on them. This suggests that interpretivism places greater emphasis on current events than on social reality (Nene, 2022). Therefore, to address these issues I further ensured that the data were sufficiently meaningful through data triangulation, thereby enhancing the trustworthiness of the exploration, as discussed in subsequent sections. Triangulation was highly secure, consistent, and reliable. As a result, I focused on understanding specific phenomena within the context rather than making broad generalisations (Creswell & Inoue, 2025).

Similarly, according to Adil et al. (2021) and Saiyed et al. (2024) interpretivism minimises the political and ideological influence of these factors on knowledge and

social reality. Thuy (2024) and Even et al. (2024) argue that it emphasises current phenomena at the expense of individual empowerment. (Mvune, 2020) conducted interviews and focus groups with 20 teenage fathers in rural KwaZulu-Natal to explore how underprivileged young fathers navigate motherhood and societal norms. This demonstrates that interpretivism prioritises recent events over social realities (Nene, 2022). Khoza and Fomunyam (2021) and Khoza (2023) opined that interpretivist researchers often neglect systematic experiments that could address their limitations. Their study examined the integration of EdTech resources into the curricula of rural primary schools, based on socially constructed realities. This suggests that interpretivism places greater importance on current events than on social reality (Nene, 2022). According to Khoza and Fomunyam (2021) interpretivist researchers ignore systematic experiments. To address the interpretive paradigm's shortcomings, this study focused on research related to the phenomenon and its integration levels, structured, unstructured, and personal, in rural primary schools. Subsequently, data were generated from socially constructed realities regarding the integration of EdTech into CAPS curriculum subjects, specifically Life Skills education. The next section discusses the qualitative research approach.

4.4 Understanding the Qualitative Research Approach

A study by Thornhill (2022), Saunders et al. (2009), and Czernek-Marszałek and McCabe (2024) categorised research designs as qualitative, quantitative, or mixed-methods. Meanwhile, Simelane and Mutambara (2022) classified and differentiated qualitative and quantitative approaches, noting that qualitative approaches involve data-generating methods such as interviews and analysis, including data categorisation. At the same time, the quantitative approach employs data collection tools such as questionnaires and analyses, including graphs and statistics (Guba & Lincoln, 1994; Sikhosana et al., 2025; Simelane-Mnisi, 2022). In short, the mixed-methods approach combines two methodologies to understand participants' behaviour and experiences within their natural environment. In this study, a qualitative method was used because data were generated in participants' natural settings to examine how EdTech resources are integrated into Life Skills education. The study adopts an interpretivist paradigm, aligning with qualitative research that seeks to understand participants' natural environments. Denzin and Lincoln (2011), as cited in Saunders and Townsend (2016) and Walker et al. (2025), stated that qualitative research is often

associated with the interpretive philosophy. According to Rauteda (2025) and Creswell and Creswell (2017) qualitative research involves direct interaction with and observation of participants in their natural contexts, capturing how they experience the issues under study.

Sprake and Palmer (2022) conducted qualitative research to explore the interpretive paradigm as a guide for students' learning in sports. They argued that qualitative research has its own specialised vocabulary, and understanding these 'isms' and 'ologies' is essential for producing high-quality research. The study aims to help students navigate research paradigms, especially those doing interpretive, qualitative research at both undergraduate and postgraduate levels. Recently, scholars have emphasised that researchers should openly share their axiology and values and show a commitment to reflexivity, being transparent about how their presence and beliefs influence the research process. In essence, exploring and comprehending these 'isms' and 'ologies' can foster trustworthiness in this qualitative research. Ultimately, becoming a qualitative researcher involves embracing uncertainty about what we claim to know, as research is unpredictable and results may vary (Grecic et al., 2025; Sprake & Palmer, 2022).

Moreover, Khoza (2021) and Khoza and Mpungose (2022) conducted an interpretive case study on teaching without understanding curriculum visions and goals. The purpose of the study was to explore postgraduate students' understanding of the curriculum's vision and goals in teaching their subjects. The study further argued that qualitative research is concerned not only with the objective nature of behaviour but also with its subjective meanings, including individuals' accounts of their attitudes, motivations, and behaviour. This definition aligns with the research by Emiliussen et al. (2021) and Christiansen et al. (2021) in an introduction to reading research, which defines qualitative methods as approaches that provide a deeper understanding and exploration of a problem or situation. For example, the Zululand district is at the centre of underprivileged rural areas, with a complex socio-educational and financial system. It also faces numerous challenges that require a comprehensive understanding of the underlying context. Therefore, qualitative approaches are appropriate for the study's flexibility, and a thoughtful process for identifying input requirements is essential to understanding the 'how' and 'why' of the phenomenon (William, 2024). Consequently, the study aims to examine rural primary school teachers' objectives and to propose a

context for ongoing support for EdTech resources for rural teachers using EdTech resource platforms, ensuring that these resources are seen as tools for empowerment rather than as a means of digital resource inaccessibility.

4.4.1 The Objective of Qualitative Research in Exploring EdTech Resources

Javaid and Siddiquah (2021) state that qualitative research aims to understand participants' perspectives. This is supported by Ortega-Galán et al. (2020) and Iyamu et al. (2025), who state that this method aims to explore the multiple meanings individual participants ascribe to their social situation by examining the sense they make of it. In contrast, Makumane et al. (2022) note that the qualitative approach aims to deepen understanding of why things are as they are in reality and why people behave as they do. This is beneficial for this study, as it explains why teachers may be reluctant to develop a technologically responsive, resource-based EdTech framework that incorporates indigenous knowledge systems into Life Skills education, ensuring the framework is relevant to rural primary schools in South Africa.

Alharahsheh and Pius (2020) and Panya and Nyarwath (2022) assert that qualitative research aims to explore an individual's specific understanding and interpretation of a phenomenon based on their experience of it. Building on this, Salvador (2016) demonstrates that qualitative research aims to provide a detailed textual description of how teachers experience certain phenomena. According to Uren and Edwards (2023) qualitative researchers are interested in how people interpret their worlds, form hypotheses about them, and attribute meaning to them. Study by Hatch (2023) which aim to understand the phenomenon have the potential to bring about change in people's lives. The depth and richness of qualitative research therefore support interpreting Life Skills education perspectives and experiences in real-life contexts, offering the researcher insights into how participants hypothesise about their environment and what they attribute to the integration of EdTech resources. Hence, this study utilises a qualitative research approach to explore teachers' insights on integrating EdTech resources into Life Skills education.

Correspondingly, Creswell (2024) and Muhammad et al. (2024) highlight its flexibility, which is vital when unrest or disasters may disrupt fieldwork. Furthermore, Muhammad et al. (2024) argue that qualitative methods simplify complex situations, providing

reliable insights into EdTech in rural schools. Accordingly, the researcher adopted a qualitative approach, as it is simple and effective for assessing the limitations of data-related misrepresentation. Hence, it reflects a clear relationship between identity-related technology problems and socio-educational issues which contribute to the digital divide and educational disadvantage in the distribution of curriculum quality in South Africa, particularly with respect to technological advancement in the schooling system.

Ahmed (2024) and Star et al. (2025) state that qualitative assessments often lack sufficient detail to differentiate risk sizes, thereby limiting their usefulness, particularly for minor risks. Although flexible and qualitative, these methods are slow and less costly; however, they require fieldwork, transcription, and analysis, which is expensive (Crick, 2021; Day et al., 2020; Miles et al., 2025). To mitigate bias extended participation and reflection are necessary, but limited funding favours larger-sample quantitative studies, restricting qualitative contributions (Abbey et al., 2025; Enworo, 2023; Gunawan, 2023; Ryan & Dahinden, 2021; Thomas & Thomas, 2021; Thomas, 2021). This means that some risks are sufficiently significant to the study's success, yet qualitative methods struggle to distinguish them with confidence; hence some researchers may mistakenly rely on practical quantitative assessments, given the inherent unreliability of qualitative approaches. Therefore developing practical qualitative methods is essential, as they help ensure reliability and facilitate the distinction between insignificant flaws and significant risks.

4.5 Research Design: Case Study

Neuman et al. (2011) defined a case study as an in-depth investigation of a specific entity. Additionally, Pelzel-McCluskey et al. (2021), Yin (1994), and Das (2025) view a case study as an in-depth research design that aims to generate a descriptive understanding of a phenomenon occurring in a particular context. Centobelli et al. (2025) and Ling et al. (2025) also define a case study as an “empirical inquiry that investigates contemporary phenomena in depth and within its real-life context” (p. 13). Bertram (2022) and Yin (2003) share the view that a case study aims to put oneself in another person’s shoes to understand their situation. Studies by Creswell (2024), Denscombe (2025), and Creswell and Clark (2017) examined an individual’s understanding and interpretation of specific individual experiences. In this case, the

examination concerns 10 teachers at rural primary schools who teach Life Skills. In other words, a case study research design ensures a comprehensive examination and analysis of issues within a specific context (Mtshali & Singh-Pillay, 2023; Ndlovu, 2024; Nene, 2022). This study is an interpretive qualitative case study that describes teachers' experiences with integrating EdTech resources into Life Skills education and identifies barriers to effective integration. Consequently, Ndlovu (2024) and Moore and Hanson (2022) a case study enables the investigation of the practices, procedures, and conditions of both abject and virtuous teachers, along with detailed particulars of events and experiences, to develop theories from the collected data.

This is supported by the view that research involves the systematic collection and analysis of data to generate new knowledge (McDermott et al., 2022; Mumtazah & Hayati, 2023). Hence the focus of the phenomenon is on integrating EdTech resources with traditional teaching methods, thereby aligning both systems and improving Life Skills education. A case study is a research method in which a researcher conducts an in-depth analysis of a specific case, such as a person, group, school, community, or organisation (Baillifard et al., 2025; Greenaway et al., 2026). Therefore the research design specifies the study's aim, objectives, and research questions (Thompson, 2023; Tracy, 2024). This makes a case study suitable for empirical inquiry into the contemporary integration of EdTech resources. In addition, it is a method for addressing problems associated with designing complex control, teaching, and integration systems for technologies in CAPS curriculum subjects. I therefore adopted a case study as a model-based research design to balance interpretive approaches with the exploration of a phenomenon in its natural context.

Different case study types serve distinct research purposes (Creswell & Inoue, 2025; Fage Ibrahim et al., 2023). According to White and Cooper (2022) an intrinsic case study describes a specific case, whereas Yin (2009) and Moore and Hanson (2022) argued that multiple case studies investigate differences within cases to replicate findings. Yin et al. (2025) described a descriptive case study that details an intervention or phenomenon in its real-life context. When outcomes are unclear, researchers may use an exploratory case study. Cole (2024) also emphasises that an instrumental case study aims to achieve goals beyond understanding a specific situation, such as proposing interventions based on participants' perspectives. Team

et al. (2025) present a descriptive case study that provides a detailed, in-depth account of a phenomenon in its real-life context.

Furthermore, Yin (2013) and Guo et al. (2025) focus on mapping out the 'what' and 'how' of the situation, often guided by pre-existing theory, unlike an intrinsic case study, which focuses on understanding a specific case in its own right (Drisko, 2025). The design is well-suited to this study, which seeks practical recommendations to improve technology integration in rural primary schools. Consequently, the study is a single-case study that aims to provide in-depth details on the integration of EdTech resources in rural primary schools.

Conversely, Mtisi (2022) and Hyett et al. (2014) show the limitations of case studies, warning that insufficient detail and justification reduce credibility (Christiansen & Bertram, 2019; Maipath & Zulu, 2025; Mathebula, 2025). Neuman et al. (2011) defined a case study as an in-depth investigation of a specific entity. To address this the research includes a detailed design and trustworthiness principles to ensure alignment with the research paradigm, approach, data generation, and analysis. The sampling procedures are discussed hereafter.

4.6 Sampling

The sampling procedure selected the Nongoma Circuit Management Centre and participating primary schools based on their rural context and relevance to the study of educational technology integration. Makwana et al. (2023), Taherdoost (2016), and Berndt (2020) defined sampling as the process of selecting objects, subjects, or participants from a specified category. Researchers have several sampling methods, including random sampling, stratified sampling, purposive sampling, opportunistic sampling, convenience sampling, and snowball sampling (Doak et al., 2021; Ramrathan et al., 2017). Studies by Khoza and Biyela (2020) and Christiansen and Bertram (2019) assert that among these methods random and purposive sampling are the primary approaches, both of which integrate elements of the original sampling techniques. In conducting this study purposive and convenience sampling methods complement each other effectively.

4.6.1 Purposive Sampling

This research study employed purposive sampling to sampled life skills teachers who could provide relevant and experience-based information about the phenomenon under investigation. Purposive sampling allows researchers to deliberately select participants with characteristics or experiences relevant to the research problem (Creswell, 2021). In this study, this meant that purposive sampling is widely regarded as an essential method for participant selection, as it is well-suited to addressing research questions (Abbasi et al., 2026; Saunders, 2012; Villamin et al., 2025). Owino et al. (2024) and Sharma (2017) argued that purposive sampling is a methodology for intentionally choosing participants who can provide valuable data for the research. In essence, purposive sampling involves deliberately selecting participants who offer meaningful insights into the phenomenon under investigation. According to studies by Creswell (2021) and Ramrathan et al. (2017), Ahmad and Wilkins (2025), Mulisa (2022), and Gill (2022) intentionally select participants in accordance with established criteria that are developed and validated prior to selection. This indicates that a purposive sampling approach is goal-oriented and hence operates according to criteria that justify participant selection: why, what, and how to describe a particular population.

The sampling process in a study depends on its purpose, which in turn determines the data required (Rahman, 2023). Rahman (2023) and Villamin et al. (2025) indicate that purposive sampling is appropriate for this study, as it is designed for researchers who purposively select participants, thereby facilitating the identification of knowledgeable individuals willing to provide information based on their experience. This research assesses teachers' ability to integrate EdTech into Life Skills education in rural South African primary schools. In contrast, purposive sampling has its confines, as participant selection may be biased and rely heavily on the researcher's judgement (Sharma et al., 2024; Thomas, 2022). This issue is exacerbated if the researcher fails to elucidate the selection criteria (Berndt, 2020). In this study this limitation was addressed by specifying clear criteria for selecting study participants, specifically teachers who integrate or do not integrate EdTech into Life Skills education in rural South African primary schools, in the Zululand education district of KwaZulu-Natal.

Consequently, participants were recruited through convenience sampling to elicit subjective accounts of the socially constructed truth about the phenomenon.

4.6.2 Convenience Sampling

Saunders and Townsend (2018), Frimpong et al. (2025), and Shaikh et al. (2026) describe convenience sampling as a method in which researchers select participants who are most readily accessible. Saunders (2012), Chandler and Shapiro (2016), and Islam and Aldaihani (2022) opined that this technique is typically used at the start of sampling to select readily available participants. Additionally, convenience sampling involves recruiting participants who volunteer to participate rather than being directly recruited by the researcher (Clemmow et al., 2024; Mulisa, 2022; Rahman, 2023). This suggests that convenience sampling allows participants to be selected based on the researcher's location, thereby saving time and resources and providing in-depth data on the phenomenon. The study employed a convenience sampling method, comprising 10 participants from 9 rural primary schools within the education district accessible to the researcher.

Furthermore, the sampling method benefits researchers in several ways: it is less costly and time-consuming and requires minimal effort (Marshall et al., 2023; Sarker & AL-Muaalemi, 2022; Subedi, 2023). Despite the fact that convenience sampling (Marshall et al., 2024; Subedi, 2023) appears accommodating and thus flexible, it may produce sampling bias, whereby cases appear in the study simply because they are easy to access. This suggests that the selected participants may not accurately reflect the widespread communities, issues, or individuals within the general population. Consequently, the sampling method may not produce the most accurate information from participants (Giri, 2024; Mulisa, 2022). This confines the study, thereby suggesting that its findings are restricted to the convenience sample of participants targeted for the phenomenon under investigation. Additionally, according to Marshall (1996), Tajik et al. (2025), Bernalte-Martí et al. (2026), and Adedeji et al. (2025) the suitable sample size for a qualitative study is the one that adequately addresses the research question, as selected according to the criteria outlined in the next section, and integrates semi-structured one-on-one interviews, observations, and reflective activities. Table 1 outlines the participants' profiles.

Table 1: Overview of Participants' Profiles

Teacher No.	School	Subject taught	Grade	Qualification	Gender	Ethnicity	Teaching Experience in the Subject (years)
1	Primary	Life Skills	4	BEd Honours	Male	African	1
2	Primary	Life Skills	6 & 7	MEd	Female	African	12
3	Primary	Life Skills	6	BEd Honours	Female	African	16
4	Primary	Life Skills	3	BEd degree	Female	African	4
5	Primary	Life Skills	5	BEd degree	Female	African	5
6	Primary	Life Skills	6	BEd degree	Female	African	4
7	Primary	Life Skills	7	BEd Honours	Female	African	9
8	Primary	Life Skills	5 & 6	BEd degree	Female	African	7
9	Primary	Life Skills	4	BEd degree	Female	African	4
10	Primary	Life Skills	12	BEd degree	Male	African	5

4.6.3 Inclusion and Exclusion Criteria for Sampling

Criteria are essential for determining which participants should be included or excluded from a study (Connelly et al., 2023). Mamabolo and Durodolu (2023), Myende et al. (2020), and Martarelli et al. (2021) characterise this process as criterion sampling, which involves using specific criteria to guide the sampling methodology. In practical terms, the researcher must implement concrete strategies to recruit participants who are willing to participate and meet the established criteria. I generated participants' contact information and other details through visits to their schools and, in some cases, by recruiting at PLCs meetings.

Additionally, this approach offers the advantage that most PLCs meetings are held at the school where I am employed. My concern is that participants may feel overwhelmed by this research due to their workload, which remains negotiable. This indicates that the teachers participating in this study teach Life Skills in rural primary schools within the education district, across the Foundation, Intermediate, and Senior Phases, and are accessible to me. In essence, any teacher involved in teaching Life

Skills at these levels may participate, regardless of their position, such as a post-level-one teacher, department head, deputy principal, or principal, provided they possess the relevant teaching qualifications. These participants may or may not incorporate EdTech resources into Life Skills education. Therefore, these participants could answer the research questions posed to them.

Contrary to inclusion criteria, exclusion criteria define attributes that preclude an individual from participating in the study (Connelly et al., 2025; Connelly, 2020; Lim et al., 2020). In other words, exclusion criteria exclude undeserving participants from the study. This suggests that the exclusion criteria preclude teachers from urban, semi-urban, and semi-rural primary schools. Additionally, only teachers teaching Life Skills in rural primary schools within the specified phases are included. These participants are purposively selected; setting these criteria and sampling methods is a crucial step toward gathering high-quality data.

4.7 Data-generation Methods

Connelly (2020) and Goldkuhl (2019) defined data generation as comprising activities such as searching for, focusing on, noting, selecting, extracting, and capturing data. This aligns with the definitions provided by studies (Alhaidari et al., 2023; Baseer et al., 2019; Goldkuhl, 2019; Rehman & Alharthi, 2016): data-generation methods that follow a qualitative approach include interviews, reflective activities, and observations. In simple terms, data-generation methods refer to the methods used to generate evidence or information to address research questions (Bertram et al., 2015; Ickes et al., 2020; Myende et al., 2018). Qualitative research methods, which comprise one-on-one semi-structured interviews, reflective activities, and observations, generally provide valuable opportunities to generate detailed, in-depth data. Nevertheless, each approach presents specific challenges, including potential biases, time demands, and complexities in data analysis, although fewer methods are commonly used to gather qualitative data (Taherdoost, 2022).

4.7.1. One-on-One Semi-Structured Interviews

The semi-structured interview instrument was guided by the research objectives, research questions, and TPACK framework. The questions further focused on

teachers' experiences, reflections, and practices in integrating educational technology resources into Life Skills, particularly how technological, pedagogical, and content knowledge intersect. Studies by Doody and Noonan (2013) and Pathirana and Shamindi (2026) described a flexible, conversational interview method guided by a predetermined outline to elicit detailed responses. According to Subedi (2024) and Blignaut et al. (2022) interviews are the primary method for data generation in qualitative research. Ramrathan et al. (2017) and Ohme et al. (2024) highlight the value of probing for insights and adapting responses. In simple terms, the interview schedule moved from broad questions to more specific ones, allowing participants to explain their experiences in their own words while providing opportunities for probing.

Khoza and Biyela (2020, p. 20) defined it as "a conversation between researchers and participants." In this study, the one-on-one semi-structured interview aims to generate reliable data on teachers' technological, pedagogical, and content knowledge and foster a relaxed, honest environment (Creswell & Plano Clark, 2023a; Longpre et al., 2024). In this regard, participants had 40 minutes of their spare time for the interview. Some asked for a second interview, and I allowed anyone willing to do so another chance. In short, they were interviewed twice, depending on their willingness, to share insights into their attitudes, barriers, and the integration of EdTech. I generated data through two series of semi-structured, one-on-one interviews. The decision to use two interview series was thoughtful. This meant that, instead of expecting participants to provide all relevant information in a single interview, the first interview created an opportunity to understand their initial experiences, reflections, views, and interpretations of the phenomenon under study. Then, the second interview revisited issues that emerged in the first interview, sought clarification where needed, and allowed participants to expand on or reflect more deeply on their earlier responses. This process helped me develop a fuller understanding of participants' perspectives on integrating EdTech resources.

Additionally, its open-ended nature generates large volumes of data, complicating analysis and increasing the risk of bias, including interviewer and social desirability biases (Dong et al., 2022; Doody & Noonan, 2013; Masitoh et al., 2023; Nene, 2022; Subedi, 2021). Connelly (2020) and Connelly et al. (2025) noted that unpredictability can cause conversations to stray or lose focus, impeding data collection. To mitigate

bias and ambiguity, questions were open-ended, clear, neutral, and directly aligned with the study objectives. The instrument used also avoided leading, confusing, and assumption-based questions. As a result, probing questions prompted clarification and deeper responses. This ensured consistency across interviews while still allowing participants to raise experiences that were meaningful to them, prompting reflection on EdTech integration.

4.7.2 Reflective Activities

My professional background as a rural teacher shaped my understanding of the challenges associated with educational technology integration. This experience with educational technology resources and teacher development gave me insight into the practical challenges rural teachers face daily. Reflective activity, as defined by Thornhill (2022), Khoza and Biyela (2020), and Braun and Clarke (2024), allows study participants to reflect privately. It aims to improve study quality by deepening understanding of assumptions (Webb et al., 2020). Studies by Phillips and Johnson (2022), Wang (2025), and Mdlalose et al. (2025) found that reflective practice offers insights, clarifies actions, and captures internal experiences, fostering self-awareness. This suggests that participants analyse their experiences, perspectives, emotions, and assumptions through methods such as reflective activities and interviews to understand the nature of the phenomenon.

Nevertheless, it has drawbacks such as subjectivity and inconsistency, which make objective comparison difficult (Cohen et al., 2017; CohenMiller et al., 2022; Creswell & Plano Clark, 2023a; Creswell & Poth, 2016). Although this experience provided valuable contextual insight, I recognised it could also shape my assumptions and how I interpreted participants' experiences. I therefore maintained reflexivity by using neutral, open-ended questions, allowing participants to express their experiences freely, and grounding the analysis in their accounts instead of my expectations. This suggests that my background served as a contextual strength while actively managing its potential influence on the research process and interpretation of findings.

Additionally, participants may provide misleading answers to please researchers, especially when they fear negative feedback. High self-awareness can be challenging; however, applying it to interventions in rural South African schools helps prevent

superficial data collection. This systematic approach allows me to act as a participant observer and rely on sensory data (seeing, hearing, touching, smelling, tasting) (Kimball, 2025; Lindlöf et al., 2025). Therefore, by adhering to the principles of triangulation and trustworthiness while remaining impartially assisted, I deepened my understanding of assumptions, clarified participants' actions regarding the use of technological resources in rural primary schools, and gained insights into reflective practice. Reflexivity concerns how the researcher's values, history, characteristics, and decisions made during the research affect the results (Bailey et al., 2018). In this context, the qualitative research approach required me to reflect on its interpretive patterns. Specifically, I used thematic analysis to examine participants' experiences and interpretations, identifying patterns in the educational factors that influenced their technology integration.

4.7.3 Observations

Classroom observations complemented the interview data and provided insight into how teachers integrated educational technology into Life Skills lessons. I observed two lessons for each participating teacher. According to Squires (2023) and Khoza (2023) this approach involves observing and recording behaviours in natural or controlled settings. In simple terms, I maintained neutrality for comprehensive data by adhering to studies by Mpungose (2025), Nduku (2025), Ntshangase et al. (2025), and Mthembu and Khoza (2024), who concurred with Sokhulu et al. (2024) that observation captures genuine actions, minimises recall bias, and provides detailed insights into the environment, interactions, and nonverbal cues. This suggests that I noted the technological resources available and used during the lesson, the purpose for which technology was introduced, how the technology linked to Life Skills content and teaching strategies, learners' involvement with the resources, and contextual factors that enabled or else constrained technology use. Observers remain neutral, enabling natural behaviour (Adeyiga & Mpungose, 2025; Dlamini, 2025; Zhai et al., 2023). However, according to Lee and Bonk (2024) and Paradis and Sutkin (2017), the Hawthorne Effect refers to the phenomenon in which participants change their behaviour when observed during Life Skills teaching.

Observer bias can influence observations and interpretations, depending on the researcher's perspective. Observing can also be slow and time-consuming (Creswell et al., 2003; Kim et al., 2022; Lee & Mori, 2021; Moon & Lee, 2022; Paradis & Sutkin, 2017). I participated in the team but refrained from interfering with teaching and learning (Feng et al., 2022; Phillips et al., 2020). The aim was to generate data in natural settings without systematic interference. Therefore, observations focused not only on whether technology was present, but on how and why it was used within the teaching and learning process. I recorded field notes during the observations and later considered them alongside the interview data during thematic analysis.

Similarly, Life Skills teachers were observed twice (once a week) during classroom lessons to assess their use of EdTech, thereby ensuring the trustworthiness of the data. Table 2 summarises the three data-generation methods. Paradis and Sutkin (2017), Moon and Lee (2022), Chand (2025), Anis et al. (2020), Yilmaz et al. (2023), Creswell et al. (2003), and Taherdoost (2022) point out various data-generation methods that follow a qualitative approach, including interviews, reflective activities, and observations.

Table 2: Summary of Data-generation Methods

Effectiveness and weakness of data-generation methods	Reflective activity	Semi-structured interview	Observation
Effectiveness	Access to internal, personal meaning and growth	• Understanding motivations and personal experiences • Thoughtful understanding through adaptable, personalised conversation	• Reproduces real behaviour rather than relying solely on reported behaviour • Understanding context and non-verbal behaviour
Weakness	Favouritism, potential for superficial responses	• Searching and analysis are time-consuming	• Hawthorne effect (altered behaviour) • Observer bias

		• Demand a high level of skill from interviewers • Understanding personal processes and development	
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As noted above, data-generation methods significantly affect how data on EdTech resources are integrated into analysis, particularly in identifying and organising key details for understanding, which is the next step in the discussion.

4.8 Data Analysis: Thematic Analysis

This study used both deductive and inductive reasoning. The research objectives and TPACK framework provided an initial analytical orientation, while the participants' accounts and observations allowed additional patterns and meanings to emerge from the data. Cohen et al. (2017) define data analysis as the process of identifying key details in the generated data and organising them for meaning. In a qualitative study, Chowdhury (2015) defines data analysis as a nonlinear process, given its flexible, iterative nature and lack of a strictly sequential, step-by-step progression. This study adopted a thematic data analysis approach to identify and analyse themes within the study data (Braun & Clarke, 2006, 2023). In this context, themes were reviewed against the coded data and the research questions to ensure that they were coherent, distinct and grounded in participants' experiences. Attention was also given to contradictory or less common views rather than focusing only on dominant patterns.

Thematic analysis was preferred for data analysis, particularly for both deductive and inductive reasoning in the study under review. A qualitative study by Lee and Mori (2021) analysed data as a non-linear process, given its flexible, iterative nature and lack of a strictly step-by-step progression. Furthermore, Nowell et al. (2017) reported that thematic analysis was selected for its ability to explore participants' perspectives and to highlight similarities and differences in their experiences. In short, thematic analysis was an inclusive data analysis method that involved comparing information from multiple sources. Adeyiga et al. (2025) utilised an inductive approach to thematic analysis; Instead of fitting the data into predefined categories, they allowed the themes

to emerge naturally from the transcripts of their semi-structured interviews and classroom observations. This approach ensured that the unique cultural and structural challenges of the Nigerian classroom, such as overcrowded classrooms and a lack of libraries, were effectively captured.

4.8.1 Deductive and Inductive Reasoning Approaches

According to Bertram and Christiansen (2014) deductive reasoning in data analysis allows researchers to start with predefined categories and systematically organised data, aligning it with research questions and the study's purpose (Christiansen, 2024; Emiliussen et al., 2021). Consequently, this approach helped me identify, organise, and analyse data, and it was used in this study to identify themes within the collected data (Braun & Clarke, 2023). In simple terms, deductive reasoning in data analysis begins with predefined themes based on TK, PK, and CK from the TPACK framework, used for data organisation.

The study also employed inductive reasoning, allowing themes to emerge from the data and helping identify additional themes. Inductive reasoning was used in analysing interview data and reflective activities to develop insights. Moreover, themes were organised into descriptions through six stages of analysis: familiarisation, coding, searching, reviewing, defining, and reporting (Braun & Clarke, 2006, 2023; Naeem et al., 2023). In this process I explored how EdTech is integrated into Life Skills education in rural South African primary schools. I also aimed to identify any barriers to effective integration and to assess rural teachers' perceptions and readiness to use EdTech, particularly regarding sensitive issues such as personal and social well-being. Therefore, formulating research questions and analysing results helps guide the process by recognising patterns.

In contrast, inductive reasoning, in which themes emerged from the data itself (Bertram et al., 2021), was used to analyse data from interviews, activities, and observations as they unfolded. Therefore, data were coded directly from recordings to preserve meaning, and any residual codes informed category construction. Moreover, to reinforce the trustworthiness of the qualitative study under review I employed various methods to address credibility, transferability, dependability, and confirmability. Data were generated through semi-structured interviews, reflective

activities, and observations, enabling triangulation across sources (Jideani, 2025). This means that, unlike other methods (Braun & Clarke, 2021), thematic analysis is not grounded in a specific theoretical framework and does not require adherence to epistemological or ontological positions. The flexibility of the qualitative approach enabled me to apply thematic analysis throughout this exploration, and I selected a research design that aligns with participants' interests and expertise regarding the phenomenon under discussion (Braun & Clarke, 2023).

4.9 Measures for Ensuring Trustworthiness in Qualitative Research

The interpretative paradigm, as defined by Zungu (2025) and Pervin and Mokhtar (2022), emphasised that research design reliability, methodological relevance, researcher trustworthiness, and the objectivity of findings were essential to the credibility of findings. However, Amankwaa (2016) argued that trustworthiness refers to the quality and credibility of a study, defined as a process that validates credibility, transferability, dependability, and confirmability. In simple terms, trustworthiness in this interpretive paradigm of qualitative research entailed providing a detailed description of the data generated, thereby reducing bias. This was achieved through data triangulation, which was necessary and essential because it provided a verifiable foundation for establishing the study's trustworthiness in terms of credibility, transferability, dependability, and confirmability.

4.9.1 Credibility

In this study, credibility was strengthened through prolonged engagement with the data, triangulation of interviews and classroom observations, and careful comparison of participants' accounts. Grant and Lincoln (2021) and Adler (2022) emphasised the importance of credibility for external verification, enabling the validation of findings through the submission of credentials. Participants' data analysis support this (Enworo, 2023; Kekeya, 2021). Credibility was based on the significance and reliability of results, with participants sharing their experiences with digital resources. Dunne et al. (2026) saw credibility as error-free and unbiased. Flick (2022), Humphreys et al. (2021), Myeza and Nkhi (2026), and Mthombeni (2023) agreed on the importance of evaluating producers' credibility in implementing rigorous quality standards and fulfilling the requirements for qualitative research. In this context participants' teaching

experience and perspectives on the phenomenon ranged from 1 to 16 years, which enhanced the study's credibility.

In the same way, data generation aimed to leave a positive impression, within resource constraints. Researchers used original questionnaires and interview records, although participant perspectives might have been influenced by inexperience or socio-educational motives (Cloete & Swanepoel, 2024; CohenMiller et al., 2022). I substantiated data accuracy, reviewed the integration of EdTech into Life Skills education, and documented challenges, all in accordance with ethical guidelines. This supported data interpretation, insight identification, and assessment of transferability or generalisability.

4.9.2 Transferability

Transferability was supported by providing sufficient contextual and participant information to enable readers to assess the relevance of the findings to similar settings. According to Alonzo and Teng (2023) and Herderich et al. (2024) transferability is described as the dissemination and generalisation of outcomes across various contexts. It provided a broad description that gives external researchers essential information to evaluate the research's transferability (Lopez-Fierro & Nguyen, 2024; Villamin et al., 2025). Therefore, features of this research were derived from the TPACK theoretical framework, which included three knowledge components: technology, pedagogy, and content. This was emphasised by the interpretive paradigm, which held that findings should not be generalised but rather derived from integrating findings from technological resources. In simple terms, the study conclusion can be transferable to comparable contexts. To assess whether the qualitative results were transferable to other contexts, this study outlined the methods for data generation and analysis, enabling readers to interpret the findings and thereby ensuring dependability.

4.9.3 Dependability

Dependability was addressed through maintaining a clear record of the research and analytical procedures. In interpretive case studies researchers (Khoza and Biyela (2020) Walker (2025) highlighted dependability as the process of maintaining the

stability and consistency of research methods over time. Some qualitative researchers, including Golafshani (2003), Miller et al. (2022), and Hong et al. (2025), habitually use the terms dependability, consistency, and reliability interchangeably in their findings. In brief, these insights address the study's trustworthiness, which must be maintained when studying, recording, and analysing data on the phenomenon. Essentially, it affects the level of control within the research (Abbasi et al., 2025). The research questions and methodology are explained in detail, along with the procedures for data generation and analysis, to establish reliability. To enhance the credibility of this research process I kept an audit trail of data recording and transcription and verified participants' credentials and the accuracy of interview transcripts (Cohen et al., 2002; Coker et al., 2025; Golafshani, 2003; Gray, 2021). This indicates that consistency was considered an explicit condition for generalising the study. I consequently mitigated uncertainties and discrepancies in the research.

4.9.4 Confirmability

Confirmability was supported by reflective engagement with the researcher's position, systematic documentation of analytical decisions and grounding interpretations in participants' accounts. According to Mtshali and Mashiya (2022) and Mzimela (2026) the conditions of a study influence the researcher's reflections, indicating that confirmability depends on participant-generated results. Essentially, confirmability is subjective and free from research errors, reducing the chance of misconceptions in the study. Moreover, a qualitative study by Kocaman (2025) concluded that to establish confirmability, researchers must assess whether the methods and procedures were clearly and sufficiently articulated to facilitate data verification. In accordance with Clarke et al. (2023), Sokhulu et al. (2025), and Lapierre et al. (2024) the researchers share similar perspectives, as evidenced by the data. The following measures were implemented to ensure the verifiability of this research approach, as part of the research paradigm and design, to facilitate data generation, analysis, and report processing. I was therefore self-aware of the research process, and participants' words are quoted verbatim. This further allows readers to use the specified circumstances to confirm the research findings. Finally, data will be retained for the period agreed upon with the supervisor, typically five years. This provides greater transparency about how methodological rigour was maintained throughout the study.

4.10. Ethical Considerations

Several ethicists have attempted to justify adherence to certain principles when engaging human participants in research (Koski & Pihlainen, 2022; Tenny et al., 2017). Nouvet et al. (2026) stated that ethical issues in qualitative research are categorised under procedural ethics, which involve ethical considerations derived from integrating independent presentations and motivational interviewing. Likewise, Hadebe-Ndlovu (2022) discusses ethical considerations such as regulations and expected conduct toward participants. Studies by Cohen et al. (2025) and Christou (2023) emphasised the importance of ethics in research involving people, highlighting respect for rights and dignity. In brief, it was my ethical, legal, and personal responsibility to consider various aspects of ethical frameworks that reinforced my principles and clarified what is right or wrong in data generation that involves participants' social well-being.

Moreover, Naureen et al. (2022) identified essential ethical categories, including issues like personal identifiers, harm prevention, informed consent, privacy, and honesty. Pseudonyms were used to safeguard confidentiality (Mohajan, 2018; Newman et al., 2021). Ethical considerations such as confidentiality, privacy, harm prevention, and trust-building were addressed by using pseudonyms to maintain anonymity. I ensured that I obtained the consent of every individual participating in this study. Furthermore, to safeguard anonymity the schools and participants' privacy rights were protected by using pseudonyms (e.g., members 1, 2, and 3) rather than their actual names.

Ethical approval was obtained from both the University of South Africa and the Department of Education, and consent forms were provided to participants, circuit managers, and principals. Participants were informed about voluntary participation and their right to withdraw at any time. The data generated included the two participants' reflective activities and five interview audio recordings, which will be shredded after five years; observation schedules will be permanently deleted thereafter. The data for this study were safely stored in a locked storeroom within the supervisor's area of supervision. These indispensable data-generation instruments (interview recordings and observation schedules) were password-protected before being stored alongside the reflective activity records. Only the supervisor and I knew the password. Throughout the process the university's ethical reporting standards and

guidelines were rigorously followed to address potential issues and limitations related to research principles. Thus, all ethical considerations were carefully managed during data generation and analysis, reducing potential limitations and constraints.

4.11. Possible Limitations and Boundaries

Limitations are factors that may affect how data is generated or collected (Hodgkinson et al., 2025; Mahabeer & Amin, 2025). De Camino and Infante (2026) stated that confirmability depends on researchers clearly describing their methods and procedures in detail to verify data. This understanding was supported by Hanssen et al. (2021) and Nasiri et al. (2021), whose data reflected similar perspectives. To ensure verifiability several measures were integrated into the research paradigm and design to support data generation, analysis, and reporting. This suggested that I maintained self-awareness throughout the process, and participant quotes and words were included verbatim, enabling readers to verify the findings through the cited sources. The generated data were securely stored for five years under the supervisor's supervision.

Similarly, given my professional relationship with the teachers (participants), a strong commitment to a professional work ethic was essential. There was no conflict of interest in either sampled group, except for some participants withdrawing from the research project for personal reasons. To mitigate potential challenges participants' contact details were obtained directly from them and provided in writing, thereby ensuring that their personal information was obtained voluntarily; they could withdraw from the research at any time, should they wish to do so. Consequently, participants received a schedule of interviews and visits. It was also possible that some participants had been extensively researched, or possibly had never previously engaged in research projects of this nature; this further posed a challenge for the researcher in addressing these issues and ensuring their availability. Hence, I thoroughly informed participants about the research procedures, privacy, and confidentiality to alleviate their anxiety and any uncertainty about the exhaustive research process.

4.12. Chapter Summary

This chapter explained the research methods used to achieve the research objectives. It detailed the research paradigm, approach, and design, which gave a clear understanding of the methodology. Participant sampling focused on data generation through one-on-one semi-structured interviews, reflective activities, and observation. The analysis used a thematic approach that integrated both inductive and deductive reasoning. Ethical considerations and trustworthiness procedures, aimed at enhancing transparency, reliability, and integrity, were also described. The chapter concluded by discussing research limitations and how they were managed. The next chapter presents the data and analyses the findings from interviews, observations, and reflective activities, in accordance with research standards.

CHAPTER 5: DATA PRESENTATION AND ANALYSIS

5.1 Introduction

Chapter 4 explained the research process, including methodology, data-generation methods such as interviews, reflection, and observation, and thematic analysis. It also covered trustworthiness, ethics, limitations, and context. This section presents and analyses data to clarify complex findings, focusing on two key questions: which EdTech resources are used in Life Skills education in rural South African primary schools, and what barriers hinder their effective use? The study generated data through two series of one-on-one semi-structured interviews, observations, and reflective activities. Subsequently, these sources provided different but related perspectives on the phenomenon being studied. This means that the data were not treated as isolated pieces of information; however, they were considered together to develop a deeper understanding of the participants' experiences and views. Therefore, I presented and analysed findings from these different sources together as separate sets of findings.

The presentation follows the research objectives and the themes that emerged during the analysis. Where relevant, participants' interview responses are discussed alongside information obtained from observations and reflective activities. Bringing these sources together made it possible to see where observations supported participants' accounts, where they provided further explanation, and where different perspectives emerged. Briefly, the analysis was guided by thematic analysis, using both deductive and inductive approaches. The research objectives and the TPACK framework provided an initial guide for identifying issues relevant to the study, while the study participants' responses and experiences also allowed new patterns and ideas to emerge from the data. Therefore, the analysis remained open to issues that were not anticipated at the beginning of the study but became meaningful during engagement with the data. For this reason, the findings were organised around the themes and issues that emerged across the different data sources, not specifically around the method through which the data were generated.

The study aimed to understand the infrastructure, policy, teacher training, and resource challenges that affect technology integration. It explored teachers' perspectives and attitudes, noting hesitations stemming from technological skill gaps, environmental concerns, and insufficient emphasis in the CAPS Life Skills document, which led to varied usage and outcomes. The six themes described in detail below, which are: barriers to integration; teachers' perceptions and understanding of technological knowledge; integration of EdTech; in-service training on pedagogical knowledge; teachers' need to understand content knowledge for technology integration; and implications for rural teachers' understanding of technology. Deductive and inductive reasoning analyses were conducted in depth to arrive at the study's findings.

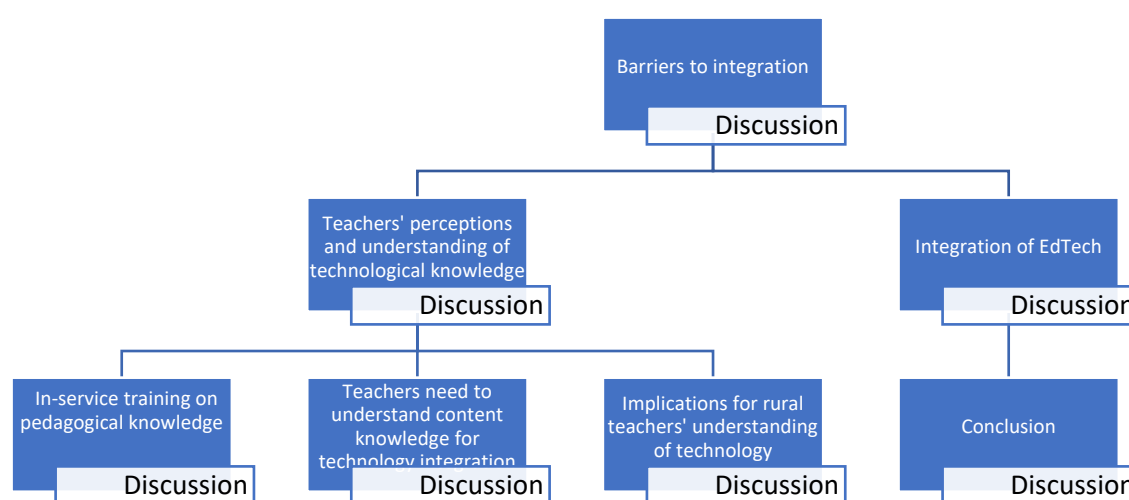


Figure 6: Flow diagram for Chapter 5

5.2 Deductive and Inductive Reasoning Analysis: Themes

The findings from the two-interview series, observations, and reflective activities were presented and analysed together. The presentation was organised around the research objectives and the themes that emerged from the data, with the TPACK framework guiding the interpretation of participants' experiences and perspectives. As a result, the study employed thematic analysis, drawing on both deductive and inductive reasoning. According to Chiu (2026a) and Bautista et al. (2024), while the development of TK, CK, and PK remains essential, the principal limitations of TPACK lie in its limited emphasis on human-centred learning within the framework of the

Fourth Industrial Revolution, which somehow impacts the integration of technology of some sort in rural environments.

Moreover, these deficiencies can be categorised into four primary areas: tool agency, epistemological challenges, ethical issues, and dynamic collaboration, which are delineated through deductive analysis (Chiu, 2026b). This suggests that I inductively analysed the data to identify shared responses and coded for new themes, including barriers to integration; teachers' perceptions and understanding of technological knowledge; integration of EdTech; in-service training on pedagogical knowledge; teachers' need to understand content knowledge for technology integration; and implications for rural teachers' understanding of technology. The analysis included data from interviews, reflections, and observations, all of which are discussed together.

Deductive reasoning in data analysis begins with predefined themes based on TK, PK, and CK from the TPACK framework, used for data organisation. The study also employed inductive reasoning, allowing themes to emerge from the data and helping identify additional themes. Inductive reasoning was used to analyse interview data and reflective activities, developing insights. In this process, I explored how EdTech is integrated into Life Skills education in rural South African primary schools. I identified barriers to effective integration and assessed rural teachers' perceptions and readiness to use EdTech, particularly regarding sensitive issues such as personal and social well-being.

5.2.1 Theme 1: Barriers to Integration

Specific barriers to the effective integration of EdTech in Life Skills include inadequate technology infrastructure in rural schools and challenges with internet connectivity.

Member 1 (reflection 1) outlined: "I teach life skills in rural areas using my phone and laptop to integrate technology. Rural learners often struggle with online engagement due to limited access, so sessions are mostly face-to-face. Urban learners, with better connectivity and smartboards, are exposed to technology earlier. Overall, rural environments are less suited for integrating educational technology."

Member 2 (reflection 2) noted: “A key barrier is identifying environmental issues hindering educational technology in rural South African primary schools, such as poor internet and electricity, device shortages, limited teacher training, large classes, multigrades, PLC time constraints, and slow devices.”

Member 3 (reflection 3) maintained: “Socio-economic challenges hinder tech adoption in my rural school. Professional Learning Communities support teachers and share resources. Basic phones and simple interfaces help teachers with limited tech skills.”

Member 4 (interview 2) argued: “Background factors affect teachers and learners in Educational Technology by creating barriers and limited awareness, especially online, blended, or face-to-face. A lack of internet or electricity renders resources ineffective. Despite teachers' enthusiasm, obstacles persist after 30 years of democracy.”

Member 5 (reflection 5) specified: “Rural schools lag behind urban ones because of a restrictive environment. Incorporating educational technology requires training teachers, upgrading infrastructure, updating curricula, and fostering collaboration. Without these, students and teachers remain digitally unskilled. Urgent action is needed.”

5.2.1.1 Discussion

Upon discussion with the participants, it became evident that the effectiveness of the implemented curriculum, particularly its integration of EdTech resources, is profoundly influenced by the environmental context. In this case, member 8 (interview 1), along with all the other participants, concurred that “the environment can serve as a factor, particularly in rural schools where reliable digital resources are scarce and access to technology is limited. I hardly ever integrate it when teaching Life Skills.” The environmental context in which it occurs, including broader socio-economic, physical, and systemic factors, affects teaching and learning, particularly in rural schools. Furthermore, barriers such as network connectivity, infrastructure (classroom environment), and institutional support, to name a few, have a broader effect on the definition of technology integration, engagement, and the enhancement of understanding of digital resources among both teachers and learners in rural primary schools. In simple terms, the environment plays a vital role in frustrating teachers' efforts to integrate EdTech resources. This therefore suggests that teachers are driven

by informal and personal integration, which is dominant in this sphere due to environmental factors.

Furthermore, the South African CAPS, as outlined by Du Plessis and Mbunyuza (2014) and Munasi (2025), aims to help learners acquire and use knowledge and skills in meaningful, environment-relevant ways in their lives. It emphasises that the curriculum develops understanding within local contexts while also considering global priorities. Additionally, one of its core principles is promoting human rights, inclusivity, environmental awareness, and social justice. These principles and practices are rooted in the Constitution of the Republic of South Africa, shaping social and environmental justice and human rights. However, this declaration contradicts the participants' experiences. On this point, environmental and educational social justice have not been served; instead there are environmental threats to the integration of EdTech resources.

Also, CAPS restricted opportunities for teachers at these schools to provide a platform for the empirical integration of technology, thereby limiting discussion of the characteristics of integrating EdTech resources to address environmental change within the implemented curriculum. This contradicts the principle of social transformation in the NCS Grades R-12, which aims to address historical educational inequalities and promote equal learning opportunities for all schools, regardless of geographical context. In this context educational and social transformation through technological migration remains a dream in these schools, thereby widening digital gaps across the country's population.

A study by Husin et al. (2025) on environmental education in schools highlighted teachers' goals of educating students, serving as role models, and pursuing training to improve their environmental knowledge and skills. Teachers also want to integrate technology-related environmental issues into other subjects, expecting students to apply their knowledge and values in daily life. The findings indicate that the integration of EdTech resources must be professionalised. It also suggests that the constantly changing digital environment demands effective technological pragmatism and rationality in rural primary schools. In other words, using technology effectively for teaching and learning. This includes not only knowing how to operate current technological devices in some schools, but also understanding that these devices may

evolve or become unavailable in the future, especially in disadvantaged schools. Therefore, this approach can help teachers enhance their technological knowledge, reducing unseen barriers to integrating hardware, software, and ideological tools into their curriculum. The environment is ultimately crucial, serving as the foundation for understanding technological knowledge and as the meeting point between technology and its influence.

5.2.2 Theme 2: Teachers' perceptions and understanding of technological knowledge

Technological knowledge is regarded as important in the current curriculum, particularly concerning the types of resources used in teaching and learning processes: hardware, software, and ideological ware, especially within the context of rural primary schools.

Member 1 (reflection 1) explained: "Technological knowledge encompasses software like Microsoft Word, PowerPoint, WhatsApp, and hardware such as laptops, tablets, smartphones, projectors, and whiteboards, which I access online independently for work."

Member 2 (reflection 2) detailed: "I teach Life Skills without software. Teachers, including me, rely on smartphones and laptops to clarify content. We lack ideological resources due to limited exposure to helpful teaching tools."

Member 3 (reflection 3) reasoned: "As a Life Skills teacher, I use LMS [learning management systems], communication platforms, gamification, content creation, digital whiteboards, and devices like laptops, phones, and circuit clusters. I lack resources and training to adapt digital content."

Member 4 (interview 2) described: "Digital awareness is essential for dispelling misconceptions, modernising teaching, and enhancing access, covering software and hardware. Sadly, poor infrastructure and internet issues hinder lessons and access."

Member 6 (interview 3) affirmed: "Everyone enjoys progress and learning, which brings innovations like new resources, computers, smartphones with Google and Chrome, and teaching aids. A teacher is a lifelong learner, eager to adopt new technological knowledge."

5.2.2.1 Discussion

Engagement with the participants shows that teachers' understanding of technological knowledge and its context enables them to navigate across digital platforms regardless of context. Furthermore, technology offers benefits that traditional approaches cannot. This is evident in the discussion with member 6 (observation 1): "Knowledge of technology is important, especially for learners facing challenges like technological illiteracy. One learner struggles, but a large screen helps him keep pace. Regrettably, the screen has not been serviced due to financial constraints." This shows that understanding and integrating EdTech resources enables teachers to solve problems and upskill in different ways. In this regard digital literacy is vital for integrating EdTech into rural primary education, particularly for accessing ideological resources, which are essential for using technology to enhance Life Skills instruction. Therefore this indicates that when structured integration guides teachers' practices and their mindset is prepared, social and educational inequalities can be tackled effectively at a structural level.

Most teachers seem driven by unstructured integration, with no policy documents or curriculum guidelines referenced. This suggests a lack of monitoring and supervision by SMTs, possibly due to limited technological expertise. Teachers must adjust their approaches to integration to enhance their effectiveness in educational settings (Aboagye et al., 2021; Tadle et al., 2021). Hannaway (2024) and Hanaway (2020) further argue that technological innovation increases motivation and enhances collaboration, while connecting both teachers' and learners' contexts to the global community, regardless of setting. In this context both rural teachers and learners must be encouraged and familiarised with technological resources, regardless of the environment. As a result, they are exposed to the digital world. Consequently, a lack of technological knowledge among SMTs and teachers could lead to the unstructured integration of EdTech resources, potentially producing stagnant, inactive, uncritical learning and discouraging an active, critical approach to technological learning.

Furthermore, this suggests that teachers who used various tools in their Life Skills classes were driven by personal integration. Literature by Fomunyam and Teferra (2017) and Khoza and Fomunyam (2021) highlighted that teachers tend to select which ideological ware resources they integrate, and that these EdTech resources

influence their teaching methods and their choices to avoid certain practices. In CAPS technological knowledge is the understanding of the concepts, materials, and processes required to develop practical solutions that address human needs and desires (Ajani, 2021; Du Plessis & Mbunyuza, 2014; Motshekga, 2013; Munasi, 2025). This indicates that teachers are open to using various EdTech resources but face challenges that hinder effective integration of EdTech in CAPS subjects in South African schools, such as insufficient resources and limited technological knowledge of CAPS.

The results also showed that while teachers were aware of various technological resources, some were confused about how to use them, rather than intentionally disregarding them. Additionally, this suggests that the integration of EdTech resources in these schools was unstructured. This further means the intersection of technological knowledge and environmental sustainability calls for the critical integration of EdTech resources to address technological hindrances in the most disadvantaged schools and overcome digital inefficiencies. Consequently, to prevent haphazard implementation and integration of digital resources in the curriculum in-service training focused on pedagogical knowledge is necessary, as discussed next.

5.2.3 Theme 3: In-service Training on Pedagogical Knowledge

In terms of in-service training, the main objectives are to strengthen professional networks, address workplace challenges, and promote the sharing of insights aligned with policy guidelines and curriculum statements.

Member 4 (reflective 4): “There is no specific training on integrating educational technology, but using SMART to Google has helped me find a structured way to incorporate educational technology into Life Skills.”

Member 5 (reflective 5): “To improve my knowledge of pedagogical technology, I need to attend effective workshops, not just any. The lack of effectiveness indicates a deficiency in the organisers' expertise, which compromises the process. District workshops on integrating educational technology into various subjects beyond coding and robotics were limited to select schools.”

Member 8 (interview 3): “Pedagogical knowledge builds a strong educational foundation. Foundation-level educators must be well-trained and stay current on new curricula to effectively teach the younger generation.”

Member 9 (Observation 2): “Various methods can be used to integrate EdTech resources via mobile phones, which everyone, including parents, possesses, though not always practical.”

Member 10 (interview 4): “No workshop has discussed integrating educational technology into subjects, mostly focusing on content and teaching methods. I use resources to incorporate EdTech into Life Skills education. Whether this approach is correct is uncertain.”

Discussion with the study participants clearly shows that there is no effective professional development system to help teachers integrate EdTech and digital resources in these schools. According to member 2 (reflection 2): “I need to understand technology and methods to use it effectively, requiring training like workshops, ongoing professional development, and assessments. In my free time, I watch YouTube videos of other teachers applying these technologies.” This specifies that informal methods drive technology integration in these schools. It also reveals a lack of quality education in our country, particularly in the distribution of scaffolding tasks across different forms of integrating formative teaching, learning, and assessment, and in the use and selection of appropriate EdTech resources.

The policy further emphasises that effective inclusive education can only be achieved when teachers have a sound understanding of how to recognise and address barriers to learning and plan for learner diversity, as member 7 (interview) said: “... properly organised workshops likely to provide pedagogical knowledge that helps us with different integrating strategies and reconceptualise content knowledge in ways that are more accessible to learners.” Consequently, teacher development in the pedagogical and technological aspects of differentiated teaching, involving individual and group strategies in infusing pedagogical knowledge, capabilities, Life Skills, and technology-related knowledge, remains fragmented.

This staggering of in-service training could prevent both teachers and learners in rural contexts from reaching their full potential within an inclusive environment in the global technology school community. As a result, in digital applications it is vital that every

learner has equal access to quality pedagogical technology education and opportunities to create and participate in a better future for themselves and the world.

Teachers need professional development to address specific teaching and learning needs, including theoretical and practical pedagogical content knowledge directly linked to curriculum implementation (Shalem & De Clercq, 2019).

Additionally, literature by Msomi et al. (2025), Harvey and Teledahl (2022), Hordern (2026), and Shalem and De Clercq (2022) argues that effective teaching requires teachers to have strong subject matter knowledge and a broader understanding of education. Winch (2022) states that organised and relevant knowledge is essential for action. This supports the need for teachers to possess pedagogical content knowledge (PCK), as defined by Bustamante and Gómez Trigueros (2026), to teach effectively while adhering to curriculum standards.

Studies by Bertram (2015), Garet et al. (2011), Geletu (2026), Bustamante and Gómez Trigueros (2026), Msomi et al. (2025) and Ngcobo (2026) emphasise that effective teaching relies on strong subject knowledge and broader educational understanding. Winch (2022) and Winch et al. (2015) highlight organised knowledge as vital for action. In line with Winch (2022) and Chirinda (2021), teachers should primarily rely on professional knowledge to think creatively, deductively, and critically, and to solve new pedagogical challenges in mastering technology.

In this instance, effective teachers' pedagogical knowledge relies on the structured integration of technologies, enabling them to support efficient teaching and successful curriculum delivery. Therefore, proper in-service training helps teachers adaptively and constructively integrate EdTech across different contexts, styles, and needs, boosting relevance and inclusivity. This training supports the use of digital resources, such as simulations and learning platforms, to enhance integration and learner outcomes. Overall, pedagogical knowledge that informs active engagement strategies and constructive teaching and learning enables teachers to understand techniques, resources, and approaches for specialised integration of technology beyond simple content delivery.

The Life Skills policy document is not explicit about how, when, and by whom to conduct teacher in-service training. However, the NCS Grades R–12 is based on principles which make inclusivity a central part of the organisation, planning and

teaching at each school. Motshekga (2013) further maintains that this can only happen if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity, as member 7's earlier comment illustrates. This implies that without in-service training teachers might not recognise the importance of following sequential steps in integration to ensure success. In essence teachers without adequate development may rely more on their own understanding of integration. This may lead to a distorted pedagogical approach in implementing the South African curriculum. Clearly a learner who does not receive teaching with integrated, creative use of EdTech resources may face difficulties with technological innovations. Integration of EdTech resources is discussed hereafter.

5.2.4 Theme 4: Integration of EdTech

This section assesses whether a structured approach to integrating EdTech resources can improve the application of technology knowledge when teaching Life Skills in these contexts.

Member 1 (reflective 1) stated: "No structured way to integrate educational technology (EdTech) resources to enhance the use of technological tools in teaching Life Skills education."

Member 3 (reflective 3) affirmed: "No, when I am using Google I have discovered a structured way to integrate educational technology into Life Skills. It shifts the focus from technology for its own sake towards intentional, skill-oriented, and pedagogically sound use."

Member 10 (interview 4) maintained: "We are teaching learners according to annual teaching plans. No, we have no other systematic method for educational technology resources, since we are in poor, rural, disadvantaged schools and are not exposed to the integration of sophisticated resources."

5.2.4.1 Discussion

From the participants' perspectives, the integration of EdTech appears to be a unidirectional process. Members 4, 5, 7, and 9 (interviews and reflections) expressed that "there is a structured method for integrating EdTech resources to improve Life Skills teaching". The teachers ensure that digital resources are used during lesson

planning to improve understanding, helping learners connect theory with real-life experiences beyond the classroom. However, member 1 (reflection 1) further showed glimpses of understanding that integration has levels, arguing that “Effective EdTech integration enhances life skills, boosts engagement, updates teaching strategies, and advances digital literacy via policy guidelines. It aims to bridge rural digital divides, prepare learners for a tech-driven society, and promote social inclusion and equal access.” The findings show that interpretations of EdTech are positive; educators recognise that modern learners are digitally oriented, which increases the prospect that lessons integrating EdTech resources meet their goals.

However, this could also reflect the environment in which teachers work. This suggests that the environment comprises various factors that can be seen as providential and gracious, overriding educational intentions. In short, contextual constraints often serve as limiting factors, hindering teachers from professionally integrating EdTech resources and from exceeding boundaries. Therefore, from an educational perspective it can be viewed as an environment composed of multiple factors that may be described as providential and gracious, which can override the adoption of EdTech resources in rural schools.

In the digital era integrating EdTech into education is crucial for creating a dynamic learning environment that meets diverse needs (Eden et al., 2024). Eden et al. (2024), Jaya (2026), and Tufa et al. (2026) studied how technology enhances learning outcomes and equity. The shift towards seamless technology integration has transformed education, redefined traditional methods, and opened new learning opportunities.

Likewise, this study focused on how EdTech resources are used in Life Skills education to improve their integration in rural South African primary schools. Data showed that current technological resources, usage, and teaching strategies are driven by unstructured integration, which may hinder effective EdTech practice. When driven by unstructured integration learners might misunderstand, thereby misrepresenting the value of technology’s applications, engagement, and knowledge for improving their preparation for the digital workforce and real-life situations. Professional, technology-guided integration can profoundly help teachers use digital

resources more efficiently, bridging gaps and developing digital skills for all learners, regardless of location.

The Life Skills CAPS document from the Department of Basic Education (Motshekga, 2011) is unclear on how to integrate EdTech resources. It states that learners should use science and technology effectively and responsibly, understand the interconnectedness of the world, and solve problems. Dean (2025), Moore-Kriwox and Cannon (2026), and Povey and Whiting (2022) opined that White Paper 6 supports technological integration but lacks specifics for CAPS, especially for Life Skills, often leaving technology integration to teachers' discretion. Ironically, as discussed in the literature above, CAPS appears to promote informal integration of EdTech resources while neglecting its role in developing professional life skills.

It is possible that relying on unstructured integration could hamper efforts to address technological disparities, risking inaccessibility and collaboration issues in South African education. Hence drastic measures should be taken to solidify the integration of EdTech resources, facilitate the transition of disadvantaged rural schools from traditional to technology-influenced blended education, and enable them to address challenging situations more effectively. This tangled integration of EdTech resources calls for a technology-specific approach that focuses on integrating disruptive technologies in rural areas and emphasises understanding contextual factors.

In this situation, a bottom-up approach is essential for understanding the technological landscape of rural school communities. This involves examining infrastructure constraints alongside rural social structures, technological readiness and educational capacity, traditional practices, and critical infrastructure components, including internet connectivity, electricity, sustainability, and teacher training. Lastly, analysing these factors both before and after deploying the technological realities can be crucial for bridging the technological gap within the schooling system. The succeeding theme pertains to understanding content knowledge.

5.2.5 Theme 5: Teachers need to understand content knowledge for technology integration

Content knowledge is considered important to the current curriculum, especially in rural primary schools.

Member 1 (reflective 1): described it as follows: “Formal content may include the Life Skills syllabus; I focus on the annual teaching plan (ATP). So, integrating technology is not practical for me, especially in our poor teaching context. I believe we could achieve this well with technology and should focus more on it to support learners' digital well-being.”

Member 2 (reflective 2): detailed: “It is challenging because limited content knowledge affects my work. Teachers form groups to build basic tech knowledge before exploring new topics. I aim to learn to integrate technology into teaching Life Skills.”

Member 3 (reflective 3) explained: “Skills required, so teaching content in Life Skills education, like any subject, is contentious when it comes to technology integration. In our context it was even worse because, you know, trying to teach learners with technological resources that you, as the teachers, are not familiar with becomes more complex.”

Member 4 (reflective 4): further contended that: “For now, it is about curriculum coverage, ATP, and the understanding that the responsibility for addressing future technological needs lies with PLCs, as it is useful to us. It involves enhancing learners' Life Skills related to understanding how to acquire and apply subject knowledge.”

5.2.5.1 Discussion

The participants' revelations show that teaching learners to use advanced technologies without adequate professional development poses major challenges, especially in helping them understand how to apply these technologies and articulate their use professionally. Additionally, it remains evident that teachers often do not fully understand these technological complexities. In essential Life Skills education the comprehensive development of the learner during childhood is paramount.

Yet even the most skilled and capable teachers do not consistently integrate technology into their instruction or receive specialised support due to ruralism. Moreover, content knowledge, particularly in technology transformation and reconstruction, is not static, which further deepens technological colonisation in these schools. Member 3 (reflective 3) notes that “Life Skills education is often relaxed and casual, with little awareness of technology, making complex terminology challenging”. In this context the emphasis is on understanding technological dynamics, standards,

and identity to apply content effectively when implementing the curriculum. This indicates that many rural teachers adopt a technology-driven approach that may undermine educational quality, leaving rural learners socio-technologically disadvantaged compared to urban students. Therefore, understanding the subject content is crucial as a foundation for the systematic integration of any resources, whether technological or not.

Content knowledge (CK) is teachers' understanding of the subject matter they teach, which enables them to provide the knowledge necessary for learners to engage in organised, systematic learning (Merono et al., 2021; Mpungose, 2024; Nicholas et al., 2024). According to Krisnaresanti et al. (2026), Zhou et al. (2026), and Mpungose (2024), CK encompasses structured experiences gained through formal education in schools, universities, colleges, and training, which serve as midpoints in mastering extensive CK. This knowledge positions teachers as professionals and subject matter experts, not just social media users, thereby affirming their professionalism. Consequently, teachers must master their content to meet curriculum goals that focus on holistic learner development.

Moreover, this requires integrated content linked to professional growth. Often CK that is not rooted in professional experience remains untapped, hindering improvements in content and the integration of EdTech. The Department of Education (2011), as emphasised by Andersson et al. (2025), emphasises the importance of CK for success in a rapidly changing society. It aims to equip learners with key knowledge, skills, and values for a meaningful life, including understanding technological processes and applications (Torelli et al., 2026). CK enables learners to adapt to technological environments if barriers are addressed promptly. The curriculum covers Beginning Knowledge, Personal and Social Well-being, Creative Arts, and Physical Education. Teachers must impart content impartially, drawing from structured integration. These areas promote the integration of technology with other fields, helping students manage technological complexities and understand their impact on daily life. The implications for rural teachers' understanding of technology in this context are discussed in the ensuing section.

5.2.6 Theme 6: Implications for rural teachers' understanding of technology

Goals involve understanding the impact of EdTech on South Africa's rural primary schools, especially on CK. They aim to incorporate key technologies to improve teaching Life Skills. Outcomes focus on how technology can enhance teaching these skills.

Member 1 (reflective 1): "I use available resources to enhance my understanding of technology and Life Skills, with a focus on problem-solving and critical thinking. My goal is to integrate technology into teaching, promote responsible use, and include it in classwork, homework, and projects."

Member 2 (reflective 2): "What I know is that integrating technology aims to equip learners with skills to access knowledge and use technology for Life Skills. Objectives include skill acquisition; outcomes should enhance education. However, resource shortages hinder progress."

Member 3 (reflective 3): "As a Life Skills teacher at a deep rural primary school, I improved digital literacy and critical thinking, positively impacting teaching. The goal is to enhance learning by using technology to teach how to navigate platforms, use tools, and manage information for life and work."

Member 4 (reflective 4): "Foundation-level educators require comprehensive training and continuous updates on the new curriculum regime to effectively convey the most pertinent knowledge to the younger minds of the next generation."

Member 5 (reflective 5): "To prepare learners for digital society and workplace, I understand that formal content is for the curriculum, informal content is for the device, thus personal content equates to mobile tools."

Member 6 (observation 1): "Learners interact positively when there is something they are not used to; as a result, the lesson is technology-based, and they interact positively."

5.2.6.1 Discussion

The findings show that technology has positive implications for curriculum alignment, ensuring that technology supports educational objectives by connecting digital content

with relevant standards for everyone. Additionally, this means that the delay in changing the unbearable circumstances in terms of environment, training and infrastructure could have serious implications for rural primary schools, especially for young, fragile, developing minds, which may be forced into late development digitally. This may delay their development and that of their teachers to often accept personal integration of EdTech resources as a means to uplift them technologically. This could further reduce their capabilities in an environment where developed nations, including South Africa, are technologically advanced and have already secured or plan to acquire sophisticated digital resources in some schools across the country.

At this stage, there is no formal tangible integration or clarity on whether EdTech will be in place to retain and introduce some digital innovations, except pilot projects like Coding and Robotics that have been piloted in selected pilot schools in semi-urban areas, with a focus on strong implications for a possible change foundation for future curriculum and pedagogical transformation. As member 6 (interview 6) said: “ I set objectives and goals that have both long-term and short-term impacts on understanding technological implications, as some learners face challenges with traditional teaching methods. Therefore, technology has significant implications for our education system in many ways”. In short, the findings revealed that the teachers’ understand the implications of EdTech resources in the implemented curriculum, which have a positive impact on learning outcomes and on bridging widening gaps in technology among South African schools.

Gardoni and Renzi (2026) explored the pedagogical implications of first- and third-order technologies in their study ‘Primum non nocere’. This study explored the differences between traditional analogue and modern third-order technologies in the context of embodied education and cognition. This study further employed interdisciplinary methods, including Florida’s In-betweenness, to understand the theoretical bases of these technologies. The study views these tools as a mind environment that, phenomenologically, transforms spaces, perceptions, and self-regulation. They also discuss pedagogical challenges, such as shifting from error as a mark of human mastery to algorithmic error, and how this affects educators’ roles in care.

Likewise, the fragmented nature of the digital landscape has prompted the development of a comprehensive framework to facilitate the integration of digital technology in education (Omrany et al., 2026). In this manner, the study's findings indicate that EdTech resources are effective in improving the fragmented mind environment, which phenomenologically transforms spaces, perceptions, and self-regulation. Therefore teachers must act as digital assistants to avoid relying solely on personal integration to manage the systematic integration of technologies.

According to Eyitayo (2022) and Mpungose (2020c) the South African CAPS documents state that the Life Skills curriculum integrates technological implications primarily through the study of Beginning Knowledge and Personal and Social Well-being and, in the Intermediate Phase, through Natural Sciences and Technology. This could lead to positive implications for developing a more straightforward understanding of technology integration for teachers, in ways that are engaging and promote technological growth.

However, in practice, Life Skills is a standalone subject with its own principles and procedures that users must follow when administering the curriculum. In simple terms, the policy documents do not highlight the importance of professional growth, creativity, or fostering a technologically informed teacher-learner who can use technology responsibly, understand its influence on academics and society, and participate in practical problem-solving. This suggests then that the Life Skills CAPS document is silent on the implications for rural teachers' understanding of technology. This could have serious implications for these teachers, leading them to adopt an unstructured integration of EdTech resources within a prescribed curriculum, possibly delaying the delivery of teacher technology development in disadvantaged rural schools.

5.3 Chapter Summary

This chapter presented and analysed data collected through interviews, observations, and reflective activities. The analysis was guided by thematic analysis using both inductive and deductive approaches within the TPACK framework. Six themes were identified, each reflecting key aspects of EdTech integration in rural Life Skills education and highlighting both enabling factors and persistent barriers influencing classroom practice. The findings demonstrate that while teachers recognise the

importance of EdTech, its implementation is uneven and heavily influenced by contextual constraints. The next chapter presents the study's overall conclusion and offers recommendations to improve the integration of EdTech in rural primary schools.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

Chapter 5 focused on the presentation of the data and discussion of the research findings obtained through the data-generating instruments: interviews, observations, and reflective activities. The preceding chapter provided the contextual background. The data were analysed using thematic analysis, which identified themes through both deductive and inductive reasoning, aligned with the TPACK framework and emergent findings. Chapter 6 addresses the research questions based on the data generated from this research study: Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools. The flowchart below represents the structure of the chapter (summary, recommendations, and conclusions).

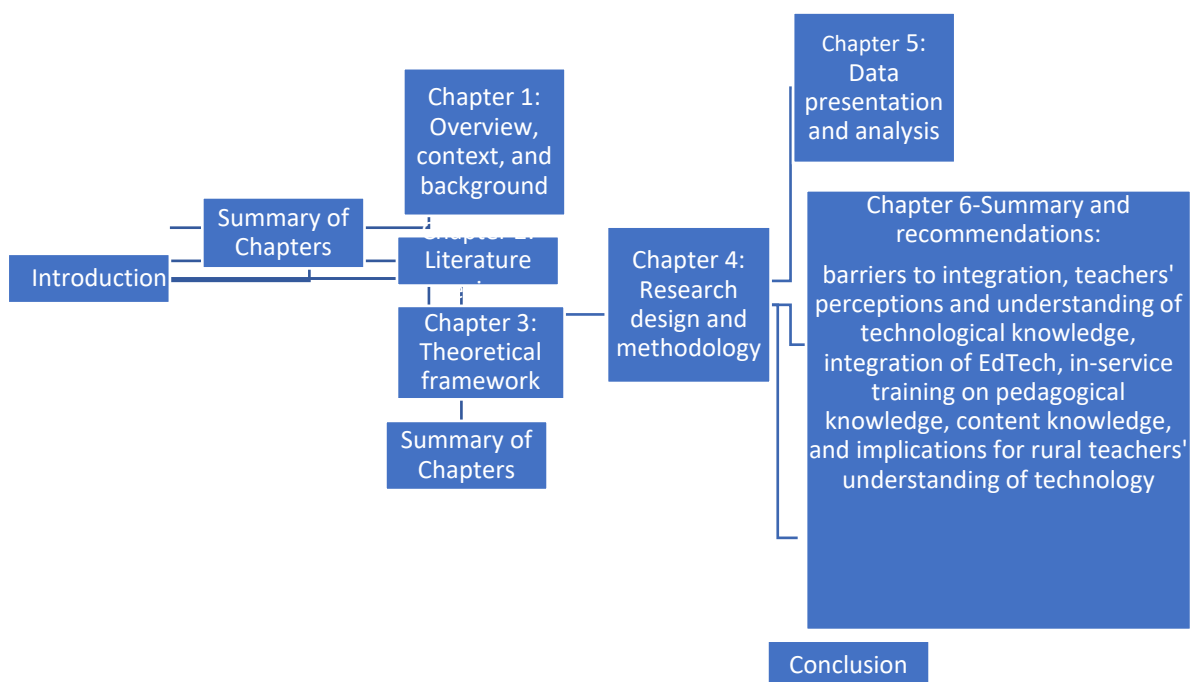


Figure 7: Flow diagram of Chapter 6

6.1.1 Research Question

How is educational technology integrated into Life Skills education in rural South African primary schools?

6.1.2 Research Aim

To explore the Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools

6.1.3 Research Sub-questions

The study had the following three research sub-questions:

- What educational technology resources are being used by teachers?
- How are these technologies integrated into Life Skills teaching and learning?
- What factors facilitate or constrain technology integration?

6.2. Research Objectives

The study had the following three research objectives:

- To explore how teachers integrate educational technology resources in Life Skills education in rural South African primary schools.
- To identify the reasons that inform the Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools
- To understand the challenges and opportunities in the Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools

6.3. Summary of Chapters

This thesis summarises its six chapters below.

Chapter 1: Overview, context, and background

The study began by providing contextual background, focusing on the integration of EdTech resources into Life Skills education in rural South African primary schools. It covered key concepts, the study's rationale, and the theoretical and conceptual frameworks. An initial literature review was also included. The problem statement, research questions, and objectives were outlined. The researcher then detailed the research methodology, including the design, paradigm, and methods used.

Information on data generation, analysis, and trustworthiness was provided. Finally, ethical considerations, scope, and limitations were clearly identified and discussed.

Chapter 2: Literature review

The chapter detailed the various levels of phenomenon integration, including structured, unstructured, and semi-structured forms. It discussed the influence of technological resources in education, shedding light on their role in the ongoing technological revolution. The section explained EdTech resources in Life Skills education, covering hardware, software, and ideological ware devices used for integrated teaching and learning. Additionally, it examined the recent debate on curriculum development in South Africa, focusing on curriculum levels, representation, and development approaches. This provides a comprehensive understanding of the curriculum, emphasising how EdTech can significantly influence it.

Chapter 3: Theoretical Framework

This chapter explored how EdTech resources are incorporated into Life Skills education in rural South African primary schools. It used a three-level knowledge framework: technological, pedagogical, and content. The chapter was organised into sections covering the origins of TPACK, its core principles, including the effectiveness of content, pedagogical, and technological knowledge and its practical applications. It also discussed the advantages and challenges of TPACK within technology integration research. The chapter concluded with a brief history of Life Skills education globally, with a specific focus on South Africa.

Chapter 4: Research Design and Methodology

connectivity. Overall, the procedures went smoothly, except that some participants were unavailable for follow-up questions due to delays caused by network connectivity issues. This was addressed by sending messages through different communication platforms to schedule follow-up sessions. The chapter offered overview of the steps taken to meet the study's objectives, starting with the research paradigm, then the approach, and finally the research design. It also covered participant sampling, data-generation methods, data analysis processes, measures taken to ensure the trustworthiness of the findings, limitations, and delimitations, and concluded with

ethical considerations. Each aspect was thoroughly studied, including its respective advantages and disadvantages, where applicable.

Chapter 5: Data Presentation and Analysis

This chapter presented the data that emerged from the study, to clarify the findings, addressing two main questions: which EdTech resources are used in Life Skills education in rural South African primary schools, and what barriers prevent their use? The study identified challenges in infrastructure, policy, teacher training, and resources that affect technology integration. It incorporated teachers' perspectives, highlighting hesitations stemming from skills gaps, environmental concerns, and the CAPS Life Skills document's limited focus on technology, resulting in inconsistent use. Six key themes emerged: barriers to integration, teachers' perceptions and understanding of technological knowledge, integration of EdTech, in-service training on pedagogical knowledge, content knowledge, and implications for rural teachers' understanding of technology. Both deductive and inductive analyses were carried out to arrive at these themes.

6.4 Themes and Recommendations

The section aims to unpack and deliberate on the themes and recommendations drawn from participants' experiences, understandings, and reflections regarding the integration of EdTech resources into Life Skills education in rural primary schools. The chapter thereafter unpacks the findings as they relate to the research questions, followed by the conclusion and implications for education.

6.4.1 Barriers to Integration

The findings on the environmental barriers, including broader socio-economic, physical, and systemic factors affecting teaching and learning, especially in rural schools, found that teachers often rely on informal, personal integration to address environmental challenges. The data further indicate that a lack of network connectivity, inadequate infrastructure, a shortage of skilled teachers with technical expertise, and limited institutional support, combined with multi-grade classes, create barriers to integration and influence how technology is understood and implemented. Additionally, the findings revealed that qualified, skilled teachers are hesitant to work

in these settings and that teachers' and students' understanding of digital resources remains limited. In essence, the findings indicate that teachers in these deeply disadvantaged rural schools often feel isolated, face incompatible digital value systems, and experience cultural and technological mismatches with other schools due to environmental barriers, resulting in technological incompatibility. Obstacles to integrating EdTech stem from an unfavourable environment rather than from pedagogy, culture, or workload. Despite these limits amid technological change, Life Skills teachers remain committed to curriculum goals through unstructured integration methods.

Recommendation: This study recommends that meaningful EdTech integration in rural Life Skills classrooms depends not on access to technology alone, but on the interaction among teachers' content knowledge, technological and pedagogical knowledge, and the contextual conditions in which these forms of knowledge are enacted, to equip them with a structured approach to integrating EdTech into their teaching. Furthermore, curriculum designers should revise CAPS documents to be able to stand-alone from other policy documents and to accommodate 21st-century EdTech, clearly guiding teachers on integrating technology resources into Life Skills education. This could further help narrow the ever-widening digital gap in schools by equipping them with technological experience, which is rare in rural primary schools, and by structuring the integration of technological resources into teaching, moving from a traditional to a blended approach.

6.4.2 Teachers' Understanding of Technological Knowledge

This study found that digital awareness among Life Skills teachers is vital because they play key roles as teachers, mediators, facilitators, and mentors. It became evident that they are aware of these roles, especially as mentors, teachers, and implementers, having mastered improvisational resources for understanding technological knowledge, even when it is skewed, and for imparting digital awareness. The data also indicated that teachers' attitudes towards understanding and applying technological knowledge are positive, even in challenging contexts. The findings indicate that teachers are increasingly adopting EdTech to meet digital demands, streamline teaching, and promote digital literacy and knowledge. However, many use unstructured digital methods without clear policy guidance and face challenges related

to inadequate infrastructure and internet connectivity. As a result, teachers rely on personal integration because of limited resources, and time constraints and awareness gaps hinder digital skill development. Engagement indicates that understanding technological knowledge and context helps teachers navigate evolving digital platforms. The study further confirms that technological knowledge is vital, especially for teachers with limited exposure to environment-based technology. Technology offers benefits beyond traditional methods, but limited monitoring may stem from a lack of technological knowledge among school management.

Recommendation: This study recommends that strengthening teachers' CK may enable more purposeful selection, adaptation and use of technology for Life Skills teaching, suggesting that professional development should move beyond technical skills towards the integration of content, pedagogy and technology within rural contexts. These guidelines could help raise awareness of various technological knowledge, concepts, theories, ideologies, software, and hardware involved in Life Skills education, especially in rural teaching environments. Implementation of EdTech can also be supported through unstructured integration rather than relying solely on personal integration of technological knowledge, as a lack of such skills can impede curriculum implementation and consequently affect technological-learning outcomes.

6.4.3 In-Service Training in Pedagogical Knowledge

No specific training exists for integrating EdTech resources into Life Skills education. Instead, workshops mainly focus on subject content and teaching methods. The findings reveal lack of an effective professional development system to help teachers integrate EdTech and digital resources in schools. This rural context may be present in other schools across the country. This underlines the need for the Department of Basic Education to provide regular in-service training on EdTech resources that emphasises pedagogical knowledge, particularly on the effective integration of these resources across the implemented curriculum subjects. Such training should comprise methodological and technological workshops led by a qualified technology specialist, not just enthusiastic individuals. District education centres must facilitate continuous professional development and risk assessments grounded in technological-pedagogical principles. The findings also emphasise the importance of the CAPS

curriculum clearly defining the pedagogical theories that support Life Skills teachers in using EdTech to raise awareness.

Recommendation: The study recommends that properly organised in-service workshops be systematised. Life Skills CAPS documents need to clearly articulate how EdTech resources are integrated into the subject, helping teachers use additional technology-integration methods in complex teaching environments alongside traditional teaching and learning practices. The documents should provide an understanding of various curriculum expansion approaches, such as instrumental, communicative, and pragmatic approaches. This requires proper technological training that imparts pedagogical knowledge that helps teachers with different integration strategies and reconceptualises content knowledge to be easily understood. Without constant constructive and technology-informed in-service training teachers may overlook the importance of following proper technological pedagogical knowledge steps when integrating resources, risking reliance on personal understanding and resulting in ineffective integration. Effective teachers rely on the structured use of technological knowledge to support teaching and curriculum delivery, and on in-service training in pedagogical technological knowledge. Proper training enables teachers to integrate technology adaptively and constructively across various contexts, enhancing relevance and inclusivity.

6.4.4 Integration of Educational Technology Resources

The findings reveal no structured method for integrating EdTech to improve Life Skills teaching. Teachers follow annual plans without formally integrating technology. CAPS offers no guidance on software or systems, leaving teachers to rely on unstructured methods, especially in disadvantaged, rural areas with limited exposure. While teachers recognise that learners are digitally motivated, unstructured implementation raises concerns about the quality and effectiveness of the technological curriculum because of factors such as training, understanding, and environmental challenges.

Recommendation: The study contributes a more contextualised understanding of how rural teachers' content knowledge interacts with technological and pedagogical knowledge when integrating educational technology into Life Skills education. In particular, the findings suggest that access to technology alone does not necessarily

result in meaningful integration. Teachers' ability to select, adapt, and use digital resources appropriately is also influenced by their understanding of Life Skills content and by the rural conditions in which they enact this knowledge. The Department of Basic Education and curriculum designers need to provide clear guidelines for integrating theories like hardware, software, and ideological tools into the curriculum. Without guidance, teachers often use tools such as Microsoft Word, PowerPoint, WhatsApp, laptops, tablets, smartphones, projectors, and whiteboards in an unstructured manner. Continuous technology integration could transform education with blended learning.

6.4.5 Teachers need to understand content knowledge for technology integration

The findings show that teachers must understand content and technological knowledge in real-world contexts to meet curriculum goals. An ideological approach in Life Skills education often overlooks technology, making it crucial to simplify complex terms. Integrating technological tools into content knowledge can be easier when addressing areas like Personal Well-being, Creative Arts, and Physical Education. Rural teachers face limited technological knowledge, which affects their work. Some use group work to build foundational skills, but many view content knowledge as about curriculum coverage rather than clarity and context. Responsibility for future technology needs lies mainly with professional development, although some teachers find PLCs helpful. Content knowledge should enable understanding, the integration of technology, and the controlled use of digital resources.

Recommendation: The Department of Basic Education should emphasise creativity and adaptability in the Life Skills CAPS, especially given limited familiarity with technology. Focus areas include Physical Education, Personal Well-Being, and Arts, integrating modern technologies with specific concepts and approaches. Teachers should develop strategies across technology knowledge areas to deepen their understanding of integration in complex environments. Content knowledge becomes part of pedagogical practice, helping teachers use EdTech resources effectively, especially where access is limited.

6.4.6 Implications for Rural Teachers' Understanding of Technology

The findings indicated that understanding and integrating EdTech resources have constructive implications for foundation-level teachers; thus, they require comprehensive training and continuous updates on the new curriculum to effectively convey the most pertinent knowledge to the younger minds of the next generation. Additionally, integrating technology aims to equip learners with the skills to access knowledge and use technology for life. This further shows that integration and use of these digital resources and devices objectively include skills acquisition; outcomes should enhance education. However, the findings revealed that a lack of predisposition toward digital literacy and critical thinking adversely affects the integration of EdTech resources in the digital implementation of CAPS. In this instance, the teacher is motivated to pursue unstructured integration of digital technologies because shortages of basic resources hinder the development of Life Skills at a deep rural primary school.

Recommendation: Rural teachers should be supported not merely to acquire technological skills, but to understand how technology can be purposefully connected to what they teach and how they teach it. The study suggested that learners interact positively when they encounter something unfamiliar; as a result, they interact positively with technology-based lessons. Technology knowledge and curriculum knowledge should work together to support the effective integration of digital resources into teaching and learning. This integration requires teachers to organise curriculum content and sequence it appropriately. It should also draw on pedagogical content knowledge, enabling teachers to select teaching strategies that align with specific curriculum topics. Developing these knowledge domains is particularly important for rural primary school teachers, as it helps them integrate technology in ways that make subject content more accessible and meaningful to learners.

6.5 Unpacking of the Research Questions

The main research question was: What is the integration of educational technology resources in Life Skills education in rural South African primary schools? The study found that teachers draw on three levels: structured, unstructured, and personal integration. The study generated data on existing knowledge of EdTech resources, patterns of practice and integration, and the teaching approaches used by Life Skills

teachers in these disadvantaged schools when collaborating with these digital resources. It also sought to explore the support provided to teachers in delivering and familiarising themselves with EdTech resources (hardware, software, and ideological ware) to enhance technological content knowledge, pedagogical skills, technological knowledge, and content knowledge. Subsequently, this main question was divided into sub-questions to analyse the integration of EdTech resources into Life Skills education within these schools, particularly in rural primary settings, and to explore similar contexts, as detailed below.

6.5.1 How do Teachers Integrate Educational Technology into Life Skills Education in Rural South African Primary Schools?

The study identified several strategies utilised by teachers when integrating EdTech resources in this rural context, which is characterised by limited resources. These strategies include drawing on experience to begin and integrate familiar resources into an unfamiliar approach, employing learner-centred active teaching methods, using digital platforms such as WhatsApp, Facebook, and YouTube for teaching and assessment, and participating in ongoing PLCs and organised professional development workshops. These strategies vividly showed that Life Skills teachers drew on an unstructured approach to enhance the integration of EdTech resources and bridge technological gaps prevalent in most educational districts.

This question was motivated by a desire to assess the current extent of EdTech integration within Life Skills education in rural primary schools across South Africa, with particular attention to schools that may be overlooked by the system in terms of technological development and progression. This question was developed to establish a basic understanding of how technological resources are currently integrated into the subject's teaching, and this understanding may also be extended to other subjects. It was revealed that most rural primary teachers draw on their understanding of unstructured integration to integrate EdTech into Life Skills education, due to myriad environmental factors, including the absence of technological resources. Hence this was an exploratory study of how Life Skills teachers integrate technology resources across content, pedagogical, and curriculum knowledge, given the dearth of technological resources to which they are exposed.

6.5.2 What informs the Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools?

The study achieved its aim of identifying reasons for integrating EdTech into Life Skills education in rural South African primary schools. Findings showed that teachers' attitudes, including their use of digital resources to improve learners' understanding and their relating of theory to real life, were substantially positive. However, this was often overshadowed by unstructured and personal digital integration. Likewise, the stated research question indicated that digital awareness is a vital asset when integrating EdTech resources. This further suggests that additional studies are needed to explore the factors that inform the integration of EdTech resources in rural South African primary schools.

The question was formulated to elicit teachers' perceptions of their roles in developing and transforming Life Skills education through EdTech resources. Additionally, it seeks to explore the knowledge that affects their employment and the integration of EdTech resources into their instructional activities, encompassing technological implications, their teaching perspectives on its efficacy, and its potential influence on learners' knowledge in this underprivileged rural educational setting. This encompasses their awareness of technological knowledge, including content, pedagogical, and technological familiarity, as well as the integration of these components into Life Skills education, which was drawn mostly from unstructured integration rather than from professionally constructed, structured integration of EdTech resources.

6.5.3 What are the Challenges and Opportunities in the Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools?

The study identified specific environmental barriers that delay the effective integration of EdTech in Life Skills education in rural South African primary schools. The research question and data-generation instruments used uncovered some barriers, namely: lack of internet connectivity and reception; shortage of devices and gadgets; electricity challenges and unavailability; limited teacher training on integrating technological gadgets; large class sizes that make it difficult to use the limited gadgets; time constraints; and slowness of gadgets.

This question was designed to assess teachers' understanding of the barriers and opportunities in integrating EdTech into their Life Skills education within their trade. It also sought to identify specific challenges hindering effective technology integration, including insufficient training in integrating EdTech resources, limited educational resources, environmental factors, institutional support, and technological issues. Identifying these challenges helped focus on practical solutions and strategies to enhance the integration of EdTech within the subject. The study ultimately developed actionable recommendations based on its findings to improve the use of technology in rural primary schools.

6.6 Conclusion and Implications for Education

In summary, integrating EdTech resources into education challenges the misconception that education relies solely on traditional, static teaching and learning environments. This environment, characterised by various teaching-learning challenges, such as a lack of technological resources, digital infrastructure, and network connectivity, as well as a dearth of teacher training in integrating EdTech, could further widen the digital divide in our educational system. Sustainable transformation requires coordinated interventions involving infrastructure development, teacher professional capacity building, and curriculum refinement within CAPS. Strengthening these areas will contribute to more equitable, inclusive, and responsive education in rural contexts.

Although progressive digital technologies present challenges, particularly in rural schools, they have also positively contributed to the development of EdTech resources (Chirinda, 2021; Ferri et al., 2020; Gudmundsdottir & Hathaway, 2020; Whalen, 2020). The study demonstrates that for effective and transformational EdTech integration and a transition to online and blended teaching environments, Life Skills educators require targeted, constructive training, supported by the Department of Basic Education, to implement these changes.

Furthermore, the Life Skills CAPS should be refined to better accommodate diverse teaching settings, including the integration of technology. Such enhancements would enable Life Skills teachers to employ structured, semi-structured, and personalised

approaches to integrating EdTech resources that address the digital needs of their rural primary school communities.

The study concludes that integrating EdTech into Life Skills education represents both a critical necessity and a complex challenge within rural South African primary schools. Although structural barriers remain significant, EdTech offers meaningful opportunities to enhance teaching and learning when supported by appropriate policy, infrastructure, and training. Accordingly, it is recommended that further empirical research be conducted on Life Skills education in rural South African primary schools to better understand how EdTech resources are integrated into the curriculum.

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Appendices



Appendix A: Consent Forms

Applicant: Principal Researcher

CONSENT IN TERMS OF THE PROTECTION OF PERSONAL INFORMATION ACT NO 4. OF 2013

1. I declare that all the information furnished by me on this form is true and correct and undertake to inform Unisa of any changes in my personal information.
2. I undertake to comply with all the rules, regulations and decisions of the university and any amendments to it, and I have taken note of advice which may apply to Unisa researchers, non-Unisa researchers and postgraduate supervisors.
3. I, as a researcher and/or postgraduate supervisor, hereby consent that Unisa may collect, use, distribute, process and communicate my personal information for all required research ethics processes about my participation in Unisa research ethics activities, which may include, but are not limited to:
 - 3.1 assessment of research ethics application
 - 3.2 internal administrative processing.

3.3 assessment of complaints and investigations of alleged violations of norms and standards for the ethical conduct of research; and

3.4 Institutional and scholarly research.

4. I also consent that Unisa may share my personal information with other Universities of South Africa, third parties rendering database management facilities on behalf of the university, the Department of Higher Education and Training, the National Health Research Ethics Council, Internal and External Auditors, and for legislative requirements.

5. I understand that in terms of the Protection of Personal Information Act (POPIA) and other laws of the country, there are instances where my express consent is not necessary to permit the processing of personal information, which may be related to investigations, litigation or when personal information is publicly available.

6. I will not hold the university responsible for any improper or unauthorised use of personal information that is beyond its reasonable control.

7. I confirm that I have read the notice and understand the contents thereof.

Note: The nature of personal information collected can be viewed in the Personal Information Inventory Lists published on the Unisa webpage at www.unisa.ac.za

Name in Print:

Simphiwe Zulu

Signature:



Date: 25 December 2025

Approved by supervisor (if applicable) Prof CB Mpungose

To my knowledge, the student has addressed all aspects outlined in the University of South Africa's Research Ethics Policy. I confirm that the form is complete. I will ensure that the student notifies the committee in writing of any changes to the research that may affect the study-related risks to research participants. Subsequently, I approve the submission and recommend approving the research.

Name in Print:.....

Signature:..... Date signed:.....

APPENDIX B: REFLECTIVE ACTIVITY

This Reflective Activity focuses on integrating educational technology resources into life skills education in rural South African primary schools. You may use various sources to complete this activity.

Present your reflections by following the TPACK theory themes/questions.

- 1) How do teachers integrate educational technology into life skills education in rural South African primary schools?

- 2) What is the current state of teacher development in terms of integrating educational technology in Life Skills Education in this rural primary school?

- 3) Is there a structured way teachers are supported to integrate educational technology (EdTech) resources to improve the use of technological tools in teaching life skills education?

- 4) How do teachers learn and gain various types of technology content knowledge needed to organise and enhance the systematic integration of EdTech resources across different contexts?

- 5) What are the implications for technology knowledge when integrating EdTech resources in South Africa's rural primary schools, particularly regarding content knowledge?

- 6) Why do you think technologically pedagogical knowledge must be considered important to the current implemented curriculum, especially in the context of rural primary schools?

7) What EdTech resources do you think are important in improving technological knowledge to teach life skills education?

8) How do you mitigate EdTech resources barriers, technological content knowledge, if any, in teaching life skills?

9) In terms of technological pedagogical knowledge, what is important for teachers to have a deep understanding of EdTech resources integration, specifically for those in rural schools?



ONE-ON-ONE SEMI-STRUCTURED INTERVIEW QUESTIONS

Title: Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools:

The one-on-one semi-structured interview schedule consists of an initial stage in which the participant is prepared for the interview as well as the interview itself:

1. PREPARING THE INTERVIEWER TO CONDUCT THE INTERVIEWS

- Ensure to have a counsellor and the supervisor on standby should any adverse event occur (where applicable).
- Be mindful of the typical signs of distress that can inform the presence of stress or discomfort with the participants (where applicable).

2. INITIAL STAGE OF PREPARING THE PARTICIPANT

In this stage, the participants are prepared for the interview by setting them at ease, as well as informing them of the following:

- 2.1. Their rights as participants in the research.
- 2.2. The purpose of the interview.
- 2.3. The reason for their selection.
- 2.4. The anticipated duration of the interview.
- 2.5. That consent must be of their own free will.
- 2.6. Should the participant feel uncomfortable at any point in the interview, they should please notify the researcher so that the cause of the discomfort can be addressed.
 - 2.6.1. The researcher will have a counsellor on standby should the participant need support services (I applicable);

- 2.6.2. The interview location, if in person, will be the choice of the participant.
- 2.6.3. The researcher will be very sensitive and will ensure the participant's video is on whilst conducting the interviews so that the researcher can observe their behaviour and detect any possible signs of discomfort or distress. The researcher will also frequently check in with the participants to see if they are still comfortable and ready to continue the interviews.
- 2.6.4. The researcher will have their supervisor on standby should any instance occur, for an additional source to refer to, to ascertain the best course of action to protect the participant, the researcher and to ensure data is collected ethically.
- 2.6.5. If the interview is done in person, the researcher will always have refreshments such as water and tissues available.
- 2.6.6. The researcher will make it clear that the participant may take a break when needed and, if the participant prefers, that the interview be sectioned into shorter sessions.
- 2.6.7. The researcher will strive to maintain a positive collaboration throughout the interview.

3. INTERVIEW ITSELF

In this section, the open-ended questions I intend to ask the participants are as follows:

- 3.1 Is there a structured way to integrate educational technology (EdTech) resources to enhance the use of technological tools in teaching life skills education?
- 3.2 How do teachers learn and gain various types of technology content knowledge needed to organise and enhance the systematic integration of EdTech resources across different contexts?
- 3.3 What are the implications for technology knowledge when integrating EdTech resources in South Africa's rural primary schools, particularly regarding content knowledge?
- 3.4 Why do you think technologically pedagogical knowledge must be considered important to the current implemented curriculum, especially in the context of rural primary schools?

3.5 What Educational technology resources do you think are important in improving technological knowledge to teach life skills education?

3.6 How do you mitigate EdTech resources barriers, technological content knowledge, if any, in teaching life skills?

3.7 In terms of technological pedagogical knowledge, what is important for teachers to have a deep understanding of EdTech resources integration, specifically for those in rural schools?

3.8 Why are you integrating Educational technological resources in life skills education in these schools?

UNISA recommends the following guidelines to ensure the safety of the researcher and participant(s):

- Do not proceed with the intended contact data collection visit or meeting if the researcher and/or participant is feeling unwell.
- Telephonic pre-screening before the visit is advised, as well as keeping a register of participants who were involved in face-to-face data collection activities.
- The researcher and members of the research team must also be screened before any human participant contact. Keep evidence of the screening data signed by a witness.

4. FINAL STAGE

In the final stage, the interview is concluded by asking the participants if they would like to add anything (if applicable)

Participants will also be asked whether they feel the need to speak to a professional counsellor because they are reliving specific experiences discussed during the interviews. Participants will be referred to should they think they need counselling or further support.

Appendix D: Observation Schedule



Title: Observation of Teacher on Integration of educational technology (EdTech) resources in life skills education in rural primary school, South Africa

The following schedule will be used to explore how teachers integrate EdTech resources into their classroom environment. This plan is designed to guide the observation process, whether it focuses on teachers who actively or inactively integrate technology in life skills education.

Objective: To observe and analyse how teachers integrate technology into life skills in the classroom environment, either actively or not.

Subjects: Life Skills

Phase: Foundation and InterSen Phase

Observation Duration: [no. of hours per session]

Timeframe: [February-March 2026]

Location: [school, circuit, district]

No.	YYYY-MM-DD	Time	Teacher's Name	Grade	Subject	Observation focus: Technology integrated (if any)	Any notable observations (Comments)
1							
2							
3							

4							
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Observation Focus Areas:

Knowledge: Content, Pedagogy, Technology:

- How does the teacher integrate technology into lesson plans?
- Is the technology utilised to enhance learning outcomes?
- What specific technologies are being utilised?
- Are they used effectively to support learning objectives?
- How do learners interact with the educational technology resources?
- Are there differences in interaction levels between technology-integrated and non-integrated settings?
- Any barriers in preventing them to integrate EdTech resources to the subject?
- How are the teachers' attitudes towards the integration of EdTech resources in the subject?

Appendix E: Ethical Clearance



College of Education _ERC

Date: 04/12/2025

Dear: Mr Simphiwe Ennocent Zulu

**Decision: Ethics Approval from
04/12/2025 to 03/12/2028**

NHREC Registration # : (if applicable)
Ref #: 10445
Name: Mr Simphiwe Ennocent Zulu
Student #: 34950125
Staff # :

Researcher: Mr Simphiwe Ennocent Zulu

PO Box 798

Ulundi 3838

34950125@mylife.unisa.ac.za 0720906504

Supervisor: Prof Cedric Bheki Mpungose mpungcb@unisa.ac.za

Co-Supervisor:

Co-Researcher(s):

Email address:

Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools

Qualification: Master of Education

Thank you for the application for research ethics approval by the College of Education _ERC for the above-mentioned research study. Ethics approval is granted for **three years**.

The **low risk application** was **reviewed** by the College of Education _ERC in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising during the undertaking of the research study that may affect the ethical integrity of the study, including those involving research participants, third parties, or juristic persons, must be reported in writing to the College of Education _ERC without delay.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that may affect study-related risks to research participants, juristic or third persons, must be reported in writing to the College of Education _ERC, accompanied by a progress report.

5. The researcher will ensure that the research study complies with all applicable national legislation, professional codes of conduct, institutional guidelines, and scientific standards relevant to the specific field of study. Where applicable, adherence to the following South African legislation is essential: the Protection of Personal Information Act (No. 4 of 2013), the Children's Act (No. 38 of 2005), and the National Health Act (No. 61 of 2003)
6. Future use of this research data is permitted only in de-identified form and only for secondary research with objectives similar to those of the original study. Any secondary use involving identifiable human data will require additional ethics clearance.
7. No fieldwork activities may continue beyond the stated expiry date (03/12/2028). A completed Research Ethics Progress Report must be submitted as an application for renewal and is subject to approval by the Research Ethics Committee. A Close-Out Report must be submitted upon completion of the research study.
8. The College of Education _ERC may require the submission of regular progress reports on an **annual** basis, in alignment with Section 7.2 of the Unisa Policy on Research Ethics (2024).

Additional Conditions

1. Disclosure of data to third parties is prohibited without explicit consent from the research participants and Unisa.
2. Research data must be stored in compliance with the university's research data management policy for a period of up to 15 years.
3. When publishing the results, the researcher must take appropriate precautions to safeguard the confidentiality and privacy of the research participants, juristic persons, third parties, and the university, in accordance with institutional policies and ethical standards.
4. Adherence to the National Statement on Ethical Research and Publication Practices, specifically Principle 7 on Social Awareness, must be ensured. This principle states: 'Researchers and institutions must be sensitive to the potential impact of their research on society, marginal groups, or individuals, and must consider these when weighing the benefits of the research against any harmful effects, with a view to minimising or avoiding the latter where possible.' The University of South Africa (Unisa) accepts no liability for any failure to comply with this principle.

Note

The reference number 10445 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



Prof Justin Oswin August
Chair of College of Education _ERC
E-mail: augusjo@unisa.ac.za



Prof M Makoe
Executive Dean / By delegation from the Executive Dean of College of Education
E-mail: qakisme@unisa.ac.za

Appendix F: Turnitin Report

Similarity Report	
PAPER NAME	AUTHOR
Turnitin Thesis.docx	SIMPHIWE ENNOCENT ZULU
WORD COUNT	CHARACTER COUNT
27825 Words	183814 Characters
PAGE COUNT	FILE SIZE
98 Pages	940.1KB
SUBMISSION DATE	REPORT DATE
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● Excluded from Similarity Report • Manually excluded sources	

Appendix G: Editor's Report

L. Gething, M.Phil. (cum laude)

16 Rinah Court, Tijgerhof, Milnerton 7441, South Africa;
cell 072 212 5417 Email leverne@eject.co.za

29 June 2026

Declaration of Editing of mini-dissertation submitted to UNISA

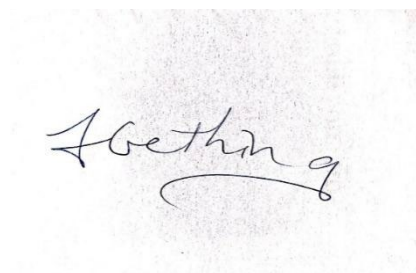
Title: Integration of Educational Technology Resources in Life Skills Education in Rural South African Primary Schools

I hereby declare that I carried out language editing of the above mini-dissertation, excluding the reference list.

I am a professional writer and editor with many years of experience (e.g. 5 years on *SA Medical Journal*, 10 years heading the corporate communication division at the SA Medical Research Council), who specialises in Science and Technology editing – but am adept at editing in many different subject areas. I have edited a great deal of work for various academic journals and universities.

I am a full member of the South African Freelancers' Association as well as of the Professional Editors' Association.

Yours sincerely

A handwritten signature in black ink, appearing to read 'L. Gething', is written over a light blue rectangular background.

LEVERNE GETHING

leverne@eject.co.za