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An investigation of the second-level digital divide in the South African education and training sector

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An investigation of the second-level digital divide in the South African education and training sector.

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Supervisor: Dr Ayanda Magida

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

Johannesburg, 2024

ABSTRACT

This research investigates the second-level digital divide in education and training within the Media, Information, and Communication Technology (MICT) sector. The primary objective is to identify the factors contributing to this divide, analyse its ramifications on education and training, and suggest targeted interventions to enhance digital access and literacy.

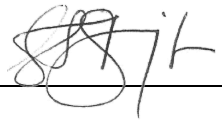
A qualitative approach was employed, integrating interviews with MICT professionals and an extensive literature review. The research draws upon insights from key strategic documents in South Africa to offer a comprehensive understanding of the second-level digital divide within the MICT sector. The participants comprised MICT professionals representing diverse generational cohorts. The sample was carefully structured to encompass various experiences and viewpoints within the sector.

Socioeconomic status, educational opportunities, and access to resources significantly impact the acquisition of digital skills, leading to generational inequalities. The digital divide impedes the effective implementation of digital literacy initiatives, restraining the education and training sector's capacity to fully leverage its potential. Generational distinctions are pivotal in digital competency, influencing skills acquisition and educational outcomes. Strategic initiatives, as delineated in crucial strategic documents, underscore the importance of infrastructure development, skills augmentation, and inclusive policies. Collaborative endeavours involving governmental entities, private institutions, and educational stakeholders are imperative for bridging the second-level digital divide in the MICT sector.

KEYWORDS: Digital divide, Skills Development, Digital Skills, Digital Literacy, Education and training, Digital Infrastructure

DECLARATION

I, Siyabonga Dyosiba, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Mr Siyabonga Dyosiba Signature: 

Signed at Centurion

On the 25 day of June 2024.

DEDICATION

This research is dedicated to the enthusiastic advocates and passionate professionals in the education and training sector in South Africa. Their commitment to dismantling barriers and bridging the second-level digital divide serves as an inspiration. This dedication is a tribute to the educators, learners, innovators, and change-makers who are actively working towards a more inclusive digital landscape. Their efforts shape a future where opportunities are accessible to all, irrespective of socio-economic status and cultural differences. May their dedication drive progress and assist in achieving an educated and digitally empowered society.

ACKNOWLEDGEMENTS

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LIST OF ACRONYMS

DFI - Digital Fluency Index

DIGI-TECH - Digital Technology

e-Learning - Electronic Learning

EC - E-Capability

ICT - Information and Communication Technology

ISTE - International Society for Technology in Education

LMS - Learner Management System

MALL - Mobile-Assisted Language Learning

MOOC - Massive Open Online Course

PISA - Programme for International Student Assessment

TPACK - Technological Pedagogical Content Knowledge

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

The objective of this research was to conduct a case study on the second-level digital divide in the education and training sector, with a specific focus on the Media, Information, and Communication Technology (MICT) sub-sector. The study aimed to investigate the impact of the second-level digital divide on education and training within this sector and propose strategies to bridge the divide.

1.2 Background of the study

The term "digital divide" denotes the inequality in access to and use of technology between individuals who have the necessary resources and those who do not (Faloye & Ajayi, 2021). The digital divide encompasses three levels: access, use, and outcomes. Access refers to the availability of technology and internet infrastructure (van Deursen & van Dijk, 2019), use is the actual consumption of technology (Hargittai, 2002), and outcomes are the benefits from technology use (van Deursen & Helsper, 2015).

According to van Dijk (2019), access to Information and Communication Technology (ICT) includes the availability of necessary hardware, software, and internet connection. Insufficient access can result in exclusion from critical online information and opportunities. Utilizing available technology effectively, known as ICT utilization, is hindered by a lack of digital skills and knowledge (van Dijk, 2019). The benefits derived from technology use are called ICT outcomes, dependent on adequate access and proficient use (van Dijk, 2019). In Africa, insufficient technological innovation and infrastructure contribute to a significant digital divide. Historical factors, such as apartheid segregation in education, have perpetuated this gap in South Africa (Faloye & Ajayi, 2021a).

Despite efforts by organizations like ICASA, DHET, and Stats SA to enhance mobile learning in South Africa, challenges persist, including high data costs (ICASA, 2020). Rural schools often lack technology access, exacerbating the digital gap (Faloye & Ajayi, 2021b). The Ministry of Higher Education and Training (DHET) recognizes the impact of the fourth

industrial revolution and emphasizes ICT integration to prevent a widening digital divide (DHET, 2020).

This study focused on investigating the second-level digital divide within the Post-School Education and Training (PSET) system, specifically the MICT SETA. The divide refers to the unequal distribution of digital skills and knowledge among individuals with access to digital technologies (van Deursen & Dijk, 2014).

1.3 Research problem

The research problem addressed was the presence of a second-level digital divide within the PSET environment, potentially perpetuating socioeconomic inequalities. The DHET report in 2020 emphasized the importance of integrating marginalized students into ICT-enriched PSET environments, including the MICT SETA. In response, the MICT SETA acknowledged the ongoing challenge and implemented a rural strategy (MICT SETA, 2020).

The digital divide has societal implications, especially in the context of the COVID-19 pandemic, which forced reliance on digital means for education and services. Challenges include limited internet access, affordability issues, and technophobia (Faloye, 2022). This study aimed to investigate whether and how the second-level digital divide influences education and training in the MICT sector. The research questions were formulated to address contributing factors, perceived impacts, and measures to close the digital gap in the MICT sector.

1.4 Research questions

This research investigated how the digital divide affects education and training in skills development, specifically within the Medial, Information and Communication Technology (MICT). The study intended to uncover how second level digital divide affects education and training sector with the ultimate objective to provide guidelines on how the sector may bridge the second-level digital divide. The research aimed to answer the following questions:

I. What are the factors that contribute to the second-level digital divide within the MICT sector?
II. How do stakeholders in the MICT sector perceive the impact of the second-level digital divide on education and training?
III. What measures can be taken to close the second-level digital gaps in education and training within the MICT sector?

1.5 Rationale of the study

This research sought to understand how the digital divide affects education and training, specifically in the MICT sector. The aim was to provide a meaningful guideline to bridge the second level with the MICT sector. The study has the potential to contribute to the body of knowledge, specifically by providing guidelines/models/recommendations for bridging the second-level digital divide. The use of information and communication technologies in the education and training sector has increased due to the COVID-19 pandemic. The country was forced into lock-down (Mhlanga et al., 2022)Employers and training providers found it nearly impossible to provide in-person classroom-based skills training. The lockdown resulted in the use of technology as the desired and most convenient tool to facilitate learning and training.

COVID-19 had negative consequences within the training and learning sectors, wherein the sector had to adopt technology to provide training. Training providers, and learners alike had to have skills and capability to use technology to facilitate and access learning material. That is, the use of technology placed facilitators and learners who needed more skill to use technology, as well as those who could not use technology in risk of falling back on continuous learning(MICT SETA, 2021). It is, therefore, apparent that a case study is carried out to identify, analyse and provide a framework/guideline on how to bridge the second level of the digital divide in the MICT SETA. A study of the depth of these issues and potential solutions thereto is required. The study can offer several contributions to the current literature on the second-level digital divide in education and training. Some potential contributions of the study include:

- Identifying specific factors contributing to the second-level digital divide in the MICT sector: The study aims to pinpoint the factors contributing to the second-level digital divide in the MICT sector. This can offer valuable insights into the distinct challenges individuals face in this sector and guide the development of targeted interventions to tackle the divide.
- Exploring the impact of the second-level digital divide on education and training in the MICT sector: The study aims to investigate how the second-level digital divide impacts education and training in the MICT sector. This can provide valuable insights into how the divide influences the quality and accessibility of education and training opportunities in this sector.
- Developing strategies for bridging the second-level digital divide in the MICT sector: The study aims to identify strategies for bridging the second-level digital divide in the MICT sector. This can offer valuable guidance for policymakers, educators, and other stakeholders in the sector on how to address the divide and promote digital inclusion.
- Contributing to the broader literature on the second-level digital divide: The study can contribute to the wider literature on the second-level digital divide by shedding light on the unique challenges faced by individuals in the MICT sector. This can guide the development of more comprehensive and targeted interventions to address the divide in other sectors and contexts.
- Overall, the study presented in the provided document can potentially contribute valuable to the literature on the second-level digital divide in education and training, particularly in the MICT sector. The study's findings can guide the development of targeted interventions to address the divide and promote digital inclusion in this sector.

1.6 Delimitations of the study

The research specifically targeted the MICT sector, deliberately excluding other economic sectors in South Africa. This focused approach aimed to provide thorough insights into the impact of the second-level digital divide on education and training within the MICT sector. Among the various Sector Education and Training Authorities (SETAs), the MICT SETA encapsulates the entire economic divisions in South Africa. It assumes responsibility for

enhancing skills and cultivating a workforce prepared for employment within their respective fields in the sector. This study precisely delved into the ramifications of the second-tier digital divide within the MICT sector, with these constraints serving to elucidate the exact context and scope of the research.

- Concentration on the MICT Sector:
  The research confined its focus to the MICT sector, renowned for developing media and ICT competencies. By singling out this sector, the study endeavoured to provide meticulous insight into how the second-tier digital divide influenced education and training in the MICT domain. This delineation facilitated a targeted and thorough examination of the distinctive obstacles and possibilities within this specified setting. Pertinence to the MICT Sector: The limitations made clear that the study's attention on the MICT sector aligned with the digital divide under scrutiny. This guaranteed that the investigation correlated with the particular requisites and dynamics of the MICT sphere, offering insights directly pertinent to this environment.
- Exclusion of Alternative Sectors:
  The research confined its scope solely to the MICT sector, excluding other economic sectors in South Africa. This exclusion enabled the research to uphold a particular and concentrated methodology, ensuring that the conclusions directly pertained to the MICT sector and its distinct challenges concerning the second-tier digital divide.

By restricting the research to the MICT sector, the study aspired to fully comprehend how the second-tier digital divide influenced education and training within this specific framework. This targeted approach permitted a thorough exploration of the elements contributing to the divide and potential strategies for bridging this gap within the MICT sector.

1.7 Definition of terms

Table Definitions of terms

Term	Definition
Fourth Industrial revolution	The current and developing environment involves the convergence of new digital, physical, and biological technologies, such as artificial intelligence, cloud computing, the Internet of Things, robotics, augmented reality, 3D printing, and biotechnology, which are merging with humans' physical lives and changing the way we interact, live, and work (DHET, 2020a).
Post-Schooling Education and Training (PSET)	Education and training for persons who have finished school. It includes the education of youth, learning institutions to provide a second chance, technical and vocational education and training (TVET) colleges, community education and training (CET) colleges, and education and training provided by SETAs, training colleges, universities of technology, universities and private training providers (DHET, 2020).
Electronic Learning	Training via a computer or other digital device (such as tablets and cell phones) allows for learning anytime and from anywhere. It permits access to or interaction with digital learning resources, engagement with peers and instructors, and involvement in discussions and evaluation. E-learning can occur online, offline, or in a combination of the two (DHET, 2020a).
Training Provider	Organizations that are accredited by relevant bodies within South Africa to train learners in skills development or learning programmes (MICT SETA, 2020a).

Term	Definition
Digital Divide	The unequal distribution and use of information and communication technologies (ICTs) among different groups of people or regions (Deursen & Dijk, 2019).
Digital inequality	The differences in access to, use of, and skills related to ICTs that lead to unequal opportunities and outcomes in various aspects of life (Stevens & Kirschner, 2018).
Digital literacy	The ability to use ICTs effectively for various purposes, including communication, information retrieval, problem-solving, and creation of digital content (Minocha & Petre, 2012).
Second-level digital divide	The unequal distribution and use of advanced or complex ICTs and digital skills among different groups or individuals are often related to factors such as education, income, age, and gender (Warschauer & Matuchniak, 2010).
ICT access	The availability and affordability of ICT devices and services, such as computers, mobile phones, and internet connections (Desjardins et al.,2018).
ICT use	The extent and frequency of ICT usage for various purposes, such as education, work, social networking, entertainment, and civic engagement (Hargittai & Hinnant, 2008).

1.8 Assumptions

The assumptions outlined in this study serve to clarify its perspective and provide a contextual background for interpreting its findings.

1. Assumption regarding the Impact of the Second-Level Digital Divide:

The study suggests that the second-level digital divide significantly influences education and training in the MICT sector. This assumption forms the foundation of the research, indicating that differences in digital competencies and technology accessibility can affect the quality and availability of educational opportunities in this sector.

2. Assumption of Relevance to the MICT Sector:

The study assumes that investigating the second-level digital divide is directly relevant to the MICT sector. This assumption emphasizes the idea that understanding the consequences of the divide within the MICT domain is crucial for addressing the specific challenges and opportunities in this environment.

3. Assumption of the Necessity for Bridging Strategies:

The study assumes that strategies to bridge the second-level digital divide in the MICT sector are necessary. This assumption implies that addressing the divide is essential for promoting digital inclusivity and ensuring equitable access to educational and training opportunities in this sector.

4. Assumption of the Value of Research Findings:

The study assumes that its findings will provide valuable insights into the impact of the second-level digital divide and strategies for reducing this gap in the MICT sector. This assumption underscores the belief that the research will enhance the existing knowledge base and guide practical interventions to promote digital inclusivity.

These assumptions establish a fundamental framework for the study's examination of the second-level digital divide in the MICT sector. They guide the research by shaping its focus, significance, and expected implications of the study's findings within this specific context.

1.9 Report Outline

This chapter establishes the basis for further exploration into the impact of the second-level digital divide and strategies for addressing it within the MICT sector in the following chapters.

- Chapter 1 – Introduction
- Chapter 2 – Literature Review and Theroretical Framework
- Chapter 3 – Research Methodology
- Chapter 4 – Presentation of Findings
- Chapter 5 – Discussion of Findings
- Chapter 6 – Conclusion and Recommendations

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

There has been a growing body of literature on the digital divide in recent years. Scholars hold different perspectives on the origin of the term "digital divide." Van Dijk (2020) argues that it first emerged in the mid-1990s in the United States and was initially used in an official publication of the National Telecommunications and Information Administration of the United States Department of Commerce. Some researchers attribute the term to Andy Grove, while others credit Larry Irving (Parameswaran, 2019).

According to Van Dijk (2020), the term "digital divide" has led to significant misconceptions and serves as an allegory that has given rise to at least four errors. Firstly, the metaphor implies a clear distinction between two divided groups separated by a substantial gap. Secondly, it suggests that closing this gap will be challenging. Thirdly, it may portray absolute differences rather than relative inequities between those who are included and those who are excluded. Ultimately, Van Dijk argues that the digital divide is not permanent or static. The digital divide is commonly defined as the disparity between individuals who have access to various forms of information and communication technology and those who do not. The most prevalent forms include computers and the Internet (van Dijk, 2020). Smartphones and other digital devices and software are sometimes included as well. With increasing levels of Internet connectivity, research on the digital divide has shifted focus from indicators related to Internet access (referred to as the access level digital divide) to indicators of the second digital gap, specifically, the capability or use divide (van Deursen & van Dijk, 2019).

As countries reach a point where fixed and mobile Internet are widely available, attention needs to be given to new technological aspects. Addressing the first-level digital divide requires recognition of disparities in material access in addition to Internet connectivity (J. van Dijk, 2020). Material access refers to the necessary tools for using the Internet, such as PCs, tablets, smart televisions, as well as software and auxiliary devices like printers and hard drives.

2.2 Definition of topic or background discussion

This study sought to investigate the second-level digital divide within the realm of education and training, which encompasses discrepancies in digital skills, usage, and educational outcomes. This phenomenon goes beyond the usual challenges of access, highlighting the importance of effectively utilizing technology. The objective of this research was to identify contributing factors, assess their impact on teaching and learning, and propose strategies to mitigate these disparities. Acknowledging the rapid pace of technological advancements, the aim of this study was to provide nuanced insights that could inform policies and initiatives aimed at promoting digital inclusion in educational settings. The literature review served as the basis for this study, closely examining existing theories, frameworks, and empirical studies to situate the research within the broader context of digital inequality in education.

2.3 The digital divide

2.3.1 Definition of the Digital Divide

The digital divide is commonly defined as the disparity in access to different forms of digital media between individuals who have access and those who do not (Van Dijk, 2020). West (2015) describes the "digital divide" as a simplified term used to refer to the division between individuals who can easily use and access technology and those who cannot. Mori (2011) likens the divide to "the notion of the gorge," using it as a metaphor to capture its mysterious nature. Similarly, Dijk (2005) connects the term "division" to the civil rights movement in the United States during the 1960s. Previous research has shed light on various aspects of the digital divide issue. Initially, the literature on the digital divide primarily consisted of policy papers that focused on access. However, scientific research has since expanded to encompass digital inequalities that go beyond access alone (Vassilakopoulou & Hustad, 2021).

The below figure provides definitions of the digital divide.

Type	Definition
General	A division between people who have access to and use of digital media and those who do not
Specific	• WHO (individuals vs. organizations/communities vs. societies/ countries/regions), • with WHICH characteristics (*individuals*: income, education, age, gender; *organizations*: public or private ownership, size, sector; *countries*: developed or developing, urban or rural) connects • HOW (access, skills, usage) • to WHAT type of technology (computer, Internet, phone, digital TV)? (Hilbert 2011a)
Process	Divisions in the access to and use of four phases in the adoption of digital media: motivation, physical access, digital skills and usage

Figure 2-1 Definitions of the Digital Divide, Source: (Van Dijk, 2019, p 4)

2.3.2 History of Digital Divide

The term "digital divide" was first mentioned in various publications in the United States in 1995. It gained support from the statistics presented in the National Telecommunications and Information Administration's Falling Through the Net study, which discussed the division between those with access to technology and those without (Van Dijk, 2019). The phrase was coined by Webber and Harmon of the Los Angeles Times in their article published on July 29, 1995, highlighting the societal gap between individuals working in information technology and those not (Fürstenburg, 2005).

There are differing opinions on the origin of the term "digital divide." Some researchers attribute it to Andy Grove, while others credit Larry Irving (Boje et al., 2003). As Kinney (2010) suggests, the National Telecommunications and Infrastructure Administration (NTIA) of the United States Department of Commerce (USDC) is recognised for introducing the term in a series of publications titled "The Internet, Public Libraries and the Digital Divide."

During the pre-internet era, before the 1990s, the digital divide was primarily evident in disparities in computer accessibility. Early computing technology was expensive, limiting its availability to wealthy individuals and institutions. This exclusivity worsened the differences in accessing information and technological literacy.

The emergence of the internet in the 1990s shed light on the digital divide. Disparities in internet access became a significant issue, with certain demographics and regions falling behind. This transformation highlighted the importance of connectivity for accessing information, education, and opportunities (Kinney, 2010).

In the 2000s, despite ongoing efforts to narrow the digital gap, disparities persisted (Norris, Pippa, 2000). Socioeconomic factors such as income and education were crucial in determining access to technology. Norris (2000) emphasised the impact of digital inequalities on global civic engagement and information poverty. In the 2010s, the widespread adoption of mobile technology widened the digital divide. While basic mobile phones became more common, disparities in access to smartphones and high-speed mobile internet became evident. Chib and Harris (2018) explored the role of mobile phones in mitigating, although not eliminating, the digital divide. As identified by Ragnedda (2017), current challenges and prospects include the need to continue efforts to reduce the digital disparity, adapt to evolving technologies, and address new aspects such as digital skills and online security.

2.3.3 Levels of Digital Divide

During the early stages of research on the digital divide, the primary focus was on a narrow definition of access. This was limited to physical access, which involved the acquisition of digital devices, software, and an internet connection. Access was associated with typical demographic factors such as education level, income, race, gender, and age. The frameworks utilised in this research were primarily sociological and economic (Dijk, 2017). However, as time went on, communication and media researchers, in particular, began to examine issues beyond access. These included user skills (Hargittai, 2002), diverse internet uses, and the challenges associated with access reconceptualised as the complete appropriation of technology extending beyond physical access. Hargittai (2002) introduced the term "second-level divide" to describe this shift in research focus. Van Dijk (2005) further developed the "deepening divide" concept to emphasize that digital inequality is not solely concerned with physical access but rather starts when digital tools

are integrated into daily life. Most digital divide research has focused on the second-level divide between 2005 and 2015.

The digital divide has been categorised into three distinct levels, which other authors often refer to as the three levels of the digital divide: digital access (first level), digital capability (second level), and digital outcome (third level). Inequalities in physically accessing technology, particularly hardware and software, are called the digital access divide. The second-level divide pertains to the utilisation of technology and individual abilities, whereas the digital outcome divide examines disparities in outcomes once individuals have utilised technology (Hargittai, 2002).

First Level Divide (Accessing media physically)

For a prolonged period, policymakers believed that once a country's Internet connectivity rate reached saturation, the issue of the digital divide would be resolved. However, scholars specialising in the second-level digital divide have determined that Internet skill and usage disparities persist and even intensify despite widespread physical access (van Deursen & van Dijk, 2019). The problem of digital access is the oldest and most extensively studied aspect of the digital divide; it is defined at both individual and societal levels and has always served as the most straightforward factor for delineating digital disparities within any given context. The initial comprehension of the digital divide phenomenon was largely predicated on the frequency of access to digital devices (Adhikari et al., 2017).

Second Level Divide (Capability of Use)

After the first level divide, scholars and policymakers pushed beyond the physical access constraint. Indeed, social scientists introduced phrases such as 'beyond the digital gap' (Mossberger et al., 2003), which aimed to reevaluate the concept of the digital divide (Warschauer, 2003), and to reconceptualise it as a complex and dynamic phenomenon (van Dijk & Selwyn, 2004; van Dijk & Hacker, 2003). The terms 'first-level divide' and 'second-level divide' were originally proposed by Paul Attewell (2001), with the latter

focusing on computer usage and literacy. A year later, Eszter Hargittai (2002) further popularized this concept by addressing concerns regarding uneven online abilities.

Third Level Divide (Result or Outcome)

While research on skills and usage continues, a new academic perspective has emerged over the past five years. With the widespread use of computers and the Internet, especially in developed countries, many researchers and policymakers are now questioning the impact of their adoption on individuals, organisations, and society as a whole. In particular, they are trying to understand the potential positive and negative effects of increased access to and use of computers and the Internet. Consequently, there is renewed speculation about whether the digital divide has finally been bridged.

2.3.4 The factors that contribute to the second level Digital Divide

The study of the digital divide originated from examining individuals who have access to a device and internet connectivity, representing a distinct technical opportunity. Initial research on the digital divide primarily focused on the technological aspect, resulting in the equalisation of media or technology access with physical access. The majority of studies still concentrate on physical access. However, an increasing number of scholars have proposed moving "beyond access," redefining the overly technical concept of the digital divide, and giving greater consideration to the social, cultural, and psychological foundations (van Dijk, 2006).

In recent years, there has been growing recognition of the potential of Information and Communication Technologies (ICTs) to enhance education, even contemplating the development of a virtual education model. Efforts to reconcile traditional education with virtual mediation have been integrated into educational policies. Nevertheless, the true capacity of ICTs to support pedagogical processes has been questioned amid the Covid-19 pandemic (Mhlanga et al., 2022).

Several factors contribute to the second-level digital divide, including:

- Age: Elderly people may have had limited exposure to digital technology and may lack the essential skills and expertise to utilise it successfully (Helsper & Rebecca Eynon, 2010).
- Education: Education is an important factor in determining digital abilities, with those with a greater degree of education being more likely to have advanced digital skills (Hargittai & Hinnant, 2008).
- Income: Money has an influence on access to digital resources and training, with lower-income people less likely to have access to high-quality digital resources (. van Deursen & Helsper, 2015).
- Race: Individuals of particular races and ethnicities may experience challenges to digital inclusion as a result of systemic inequality and prejudice (Mossberger et al., 2008).
- Gender: Gender can also play a part in the second-level digital divide, with women being less likely than males to acquire advanced digital skills and seek employment in technology (Hargittai & Shafer, 2006).
- Geographic Location: Individuals in rural locations may have more difficulty acquiring digital resources and training than those in metropolitan areas (Aruleba & Jere, 2022).

When discussing the factors observed in the use of digital media, the most significant causes are social and cultural resources (Van Dijk, 2005), which are supported by adequate material resources (income) and temporal resources (time). However, mental resources in the form of basic motivations (needs) and attitudes or beliefs in selecting specific digital media applications (van Dijk, 2020) are also relevant.

In addition to socioeconomic demographics, the literature has identified other personal contributing elements such as motivation, personality traits, and digital skills. Various studies have focused on the elderly, often referred to as "digital immigrants" in contrast to digital natives who have been exposed to digital technology since childhood. Building upon the second-level digital divide factors, research conducted in the South African context reveals that these factors may be exacerbated by the country's historical and socioeconomic background. For instance, apartheid-era practices have led to significant disparities in education, income, and access to resources based on race, which persist to this day (National Planning Commission, 2012).

Proposition: The Socioeconomic Impact on Digital Skills Attainment:

This proposition emphasises how socioeconomic factors influence the attainment of digital skills, considering economic status, educational level, and geographic location. It underscores the imperative to rectify disparities in technology access and training programs, aiming to provide equal opportunities for skill development.

The studies have provided evidence indicating that language poses a significant barrier to achieving digital inclusion in South Africa. Despite the country's multitude of 11 official languages, a considerable number of digital resources are only accessible in English, thereby placing individuals who lack proficiency in the language in a disadvantageous position (Department of Higher Education and Training, 2013). Furthermore, social factors such as race, class, and gender exert a significant influence on the second-level digital divide in South Africa. Specifically, the enduring impact of apartheid has resulted in profound disparities in terms of digital technology access, with marginalised groups experiencing lower levels of digital literacy and restricted access to digital resources (Mhlanga et al., 2022).

Cloete (2018) found that race, gender, and socioeconomic status played significant roles in determining internet usage among students in the Western Cape region of South Africa. Students from White and Indian racial backgrounds, as well as those from higher socioeconomic statuses, demonstrated greater access to digital technology and utilized the internet more frequently for educational purposes compared to their peers from Black and Coloured racial backgrounds, as well as those from lower socioeconomic backgrounds. Similarly, Mhlanga and Dube (2019) discovered that students attending underprivileged schools in South Africa faced limited access to digital resources and possessed lower levels of digital literacy, which hindered their academic achievement and full participation in a digital society.

Proposition: Influence of Cultural Diversity on Digital Competence:

This proposition recognises the influence of cultural backgrounds and diversity on individuals' digital proficiency. By acknowledging and addressing cultural influences, educators can formulate inclusive approaches to digital skill development that align with the varied needs of diverse learner populations.

The educational aspect is another crucial factor to consider when examining the second-level digital divide. Educational factors play a significant role in exacerbating the second-level digital gap in South Africa. The quality of instruction and technology accessibility in schools are essential factors influencing students' digital literacy and access to digital resources (Khanare, 2018; Mhlanga & Dube, 2019). For example, Khanare (2018) discovered that a lack of resources and infrastructure in schools, such as computer and internet access, posed a major barrier to digital inclusion among South African students. Furthermore, teachers require additional digital technology skills and training, and the absence of official regulations and procedures for integrating technology into the curriculum further exacerbates the digital divide in education (Khanare, 2018). A lack of digital skills and training among educators can also impact students' ability to acquire digital skills. Studies have shown that many South African educators require proper training in digital technologies and may struggle to effectively incorporate them into their teaching methods (Mhlanga & Dube, 2019).

Likewise, Mhlanga and Dube (2019) found that students in underprivileged South African schools had limited access to digital resources and lower levels of digital literacy, which hindered their academic achievement and full engagement in a digital society. According to the authors, efforts to bridge the digital divide in education should address these educational factors and provide tailored support for teachers and schools to leverage digital technology for improved learning outcomes. These findings suggest that enhancing students' access to technology and digital literacy skills in South Africa requires a comprehensive approach that addresses both pedagogical and infrastructural aspects at the school level.

Proposition: Generational Variances in Digital Competence:

This proposition acknowledges variations in digital skills and knowledge among different age groups. A comprehensive understanding of generational dynamics is essential for customising educational strategies to address the diverse needs of learners across various age cohorts. Additionally, it highlights the significance of considering historical apartheid issues and recognising potential impacts on the older generation who experienced the schooling system under apartheid's restrictive laws.

2.4 Post-school Education and Training (PSET)

The PSET system encompasses all education and training programs for individuals who have completed primary and secondary education, those who have not finished their schooling, and those who have never attended school (DHET, 2021). Since South Africa transitioned to democracy, significant policy development has occurred in the PSET sector to establish clear governance frameworks and education and training implementation. This process began with White Paper 3: A Programme for Higher Education Restructuring, which provided a framework for the comprehensive transformation of South Africa's post-apartheid higher education and training sector into a system that is planned, regulated, and funded as a unified national coordinated system (DHET, 2020a). The White Paper outlines the basis for transformation, emphasising the need for the higher education system to be organised, administered, and funded as a cohesive national system. This approach aims to address the historical issues of fragmentation, inequality, and inefficiency and foster a learning society that harnesses all individuals' creative and intellectual capacities towards the goals of reconstruction and growth (Minister of Education, 1997).

Post-schooling refers to the education and training of individuals who have left formal schooling. It encompasses educational and training opportunities for out-of-school youth, institutions offering second-chance learning, TVET colleges, CET colleges, education and training provided by SETAs, universities of technology, universities, private training providers, and other institutions (DHET, 2020a).

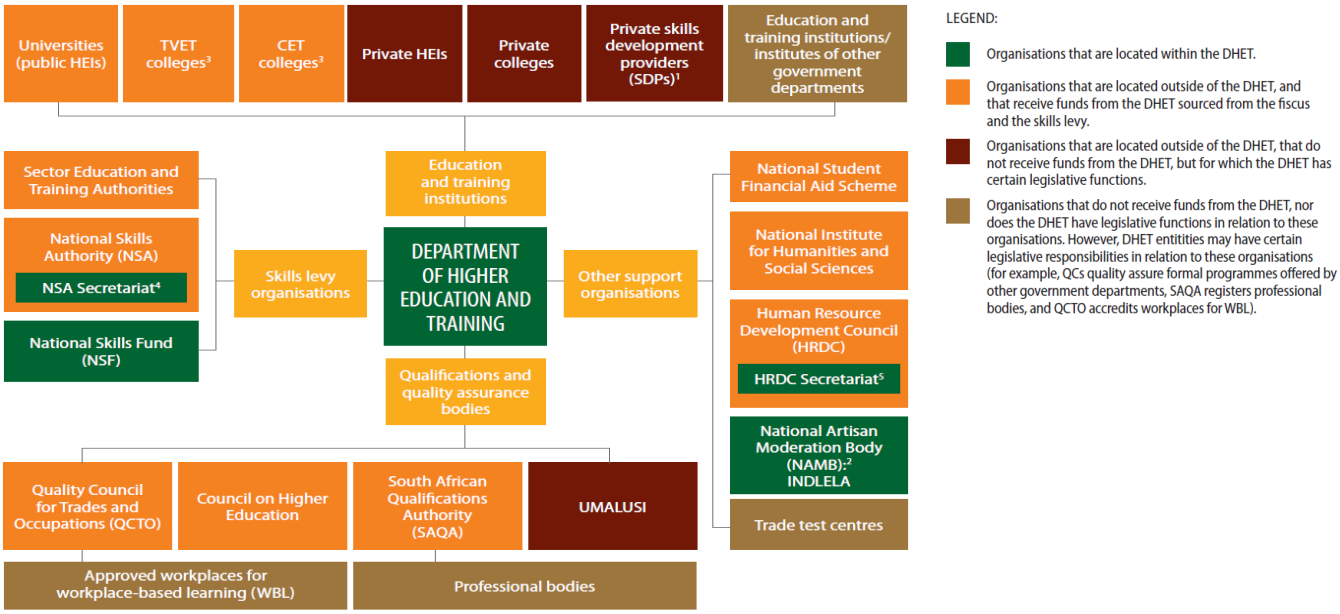


Figure 2-2: The components of the PSET System: Source (DHET, 2020b p.15)

The PSET system has encountered difficulties regarding using ICT to enhance learners' success rate. The program delivery modes still predominantly revolve around lecturers, with limited incorporation of technology for blended learning approaches. The few educational institutions that offer distance education persist in employing the traditional paper-based correspondence method, which provides little support for student achievement and has been associated with low success rates within the South African university sector. The availability of ICT infrastructure varies between institutions and presents a significant obstacle to utilising ICTs to enhance teaching and learning (DHET, 2020b).

Proposition: Effective Integration of Digital Literacy Programs in Formal Education:

This proposition underscores the significance of embedding digital skills training within the educational curriculum. By integrating these programs, educational institutions can empower learners with essential skills to navigate the digital landscape, thereby enhancing their overall competence.

2.4.1 Education and Training in the MICT sector

The MICT sector consists of five distinct and interconnected sub-sectors, namely: i) Advertising, ii) Film and Electronic Media, iii) Electronics, iv) Information Technology, and v) Telecommunications. The key stakeholders within the MICT sector are:

Table 2-1 MICT SETA Stakeholders

Stakeholder	Role
MICT SETA	The Media, Information, and Communication Technologies Sector Education and Training Authority (MICT SETA) is a government body formed by the Skills Development Act No. 97 of 1998. Its mandate to identify and deliver required skills in its sub sectors. In order to address

	identified scarce skills, the MICT SETA collaborates with industry, universities, and TVET institutions (both public and private), among others, in the execution of related learning programs. (MICT SETA, 2020a)
DHET	The Department portfolio covers areas of skill development that were previously handled by the Department of Labour. The Department was created expressly to focus on post-school education and training holistically, and it has greatly expanded its area of activities. Its mission is to provide strategic leadership to the PSET system by developing appropriate steering mechanisms, providing effective oversight, monitoring, and evaluation, providing support services for teaching and learning, and funding PSET institutions and entities.(DHET, 2020b)
DCDT	The DCDT's mandate is to drive South Africa's digital transformation toward digital inclusion, which must result in economic development, by establishing an enabling legislative and regulatory framework. As a result, via digital transformation powered by the Fourth Industrial Revolution (4IR), DCDT play a special role in enabling expanded economic and social engagement by all citizens. Using the 4IR, the Department will focus on establishing a South Africa where residents may experience more economic and social prosperity and comfort, as well as improved levels of health, wellness, and safety. (DCDT, 2020b)
DBE	The previous National Department of Education was divided into the Department of Basic Education and the Department of Higher Education and Training. The DBE oversees all schools from Preschool to Grade 12 and adult literacy programs. Its mission is to create, sustain, and promote a South African school education system fit for the twenty-first century (DBE, 2020).

Institutions of Higher Learning	The entities that provide education and training services include universities, TVET colleges, Community Education and Training Centres, and private institutions. The education and training institutions are at the core of the system and are central to the development, growth, and strengthening of the PSET system (DHET, 2020b).
Employers	Employers are the entities in the industry that employ the learners produced by the PSET system. Employers also provide data on skills needs in the industry.

2.4.2 The education and training ecosystem in South Africa

For the MICT sector to succeed, it requires collaboration and support from other stakeholders. Below illustrate the education and training ecosystem.



Figure 2-3: Education and Training Ecosystem (Source: Authors Construct)

2.4.3 The role of MICT SETA in sector education and Training

The MICT SETA Constitution, published in Government Gazette No. 35336 on May 11, 2012, and related policies address the MICT SETA's policy mission:

- Put the Sector Skills Plan into action.
- Encourage the rolling out of learning programmes in each industry's sub-sector.
- Carry out the duties of the quality assurance body in education and training.
- Coordinate skills development with the National Skills Authority

2.4.4 Impact of second-level digital in the sector

There has been limited research that illuminates the impact of the second level on the sector. In 2019, MICT SETA acknowledged the persistent issue of the digital divide and, consequently, placed a stronger emphasis on implementing the rural strategy. Consequently, the organization introduced its programs in rural regions, primarily targeting the first level of the digital divide, namely access (MICT SETA, 2020a).

2.5 Resources appropriation Theory

Van Dijk (2006) proposed a model that extends the concept of access, which serves as a framework for elucidating the main findings in the study of the digital divide (van Dijk, 2006). This sequence is expanded because access to media or technology should be seen as a multifaceted process, influenced by various social, emotional, and technological factors, rather than as a singular event of obtaining a specific device. This model's progression of access types has been empirically supported in multivariate research. Within this framework, material access is followed by motivational access and subsequently by skills access and use access.

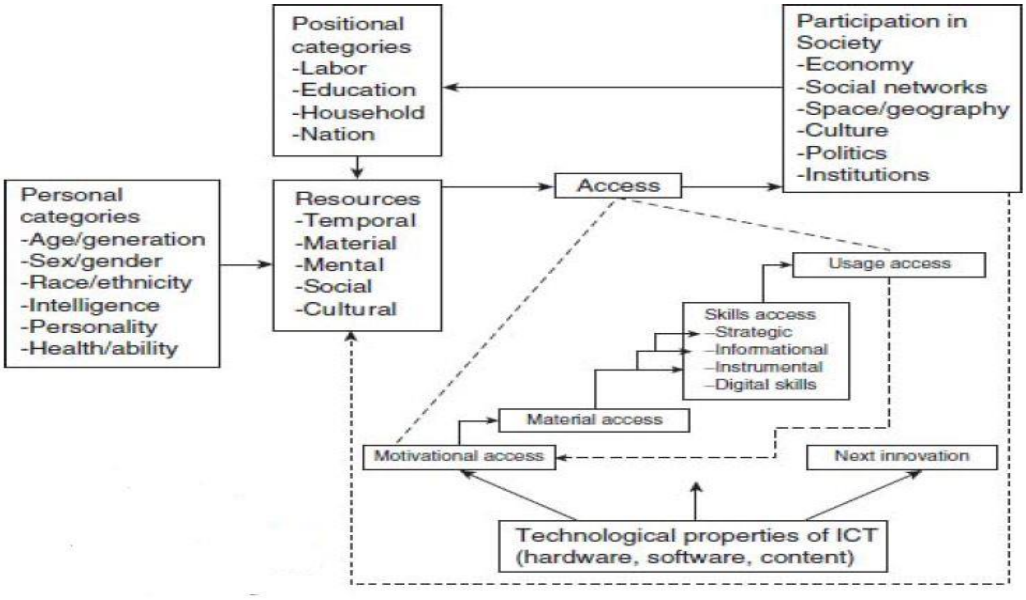


Figure 2-4 A cumulative and recursive model of successive kinds of access to digital technologies. Source: (van Dijk, 2006) p.4

In his influential paper published in 2006, Jan van Dijk presents an extensive and recursive model encompassing successive forms of accessing digital technology. Van Dijk argues that access to digital technology should not be viewed as a binary concept; instead, it should be understood as a complex phenomenon that evolves. Van Dijk identifies five distinct types of access to digital technologies: motivation, material access, skills, usage, and outcomes. This study primarily focuses on the third and fourth types of access, particularly relevant to the second level of the digital divide. Individuals in the third category of access require a range of abilities to utilise digital technology effectively. These abilities can be classified into four main categories: strategic skills, informational skills, instrumental skills, and digital skills.

Skills Access

- **Strategic Skills**

Strategic abilities include the capacity to employ digital technology to attain personal or organizational goals. These abilities include the capacity to recognize and evaluate the

value of digital resources, plan and manage digital initiatives, and successfully connect with people using digital technology (van Dijk, 2006).

- **Informational Skills**

The capacity to look for, identify, assess, and apply digital information efficiently is called informational abilities. These abilities include the capacity to utilise search engines, judge the authenticity of internet sources, and synthesise knowledge from different sources (van Dijk, 2006).

- **Instrumental Skills**

Instrumental abilities include the capacity to use digital technology for specific goals, such as writing documents, spreadsheets, and presentations, utilising email and social media, and organising files and folders (van Dijk, 2006).

- **Digital Skills**

The ability to operate a computer, utilise a keyboard and mouse, browse digital interfaces, and handle basic technological difficulties are examples of digital abilities (van Dijk, 2006).

These four areas of abilities are interconnected and reliant upon each other, and they are all necessary for individuals to effectively utilise digital technology. However, there are disparities in the acquisition of these abilities, which contribute to the second-level digital divide. For instance, individuals with limited education and those living in poverty may face barriers to accessing formal training programs that teach digital skills. Additionally, individuals residing in rural areas or belonging to specific racial or ethnic groups may encounter structural obstacles in participating in digital skills training programs (van Dijk, 2006). Moreover, research indicates that women are less likely than men to possess advanced digital skills, thus contributing to the gender disparity in the second-level digital divide (DiMaggio et al., 2003).

Usage Access

The fourth type of access in van Dijk's (2006) cumulative and recursive model is utilisation, which pertains to the practical application of digital technology for various purposes. This

includes communication, entertainment, education, and work-related activities. The extent of individuals' usage may vary greatly, with some extensively utilising digital technology for multiple reasons, while others may only use it for basic communication and leisure. Utilisation is an essential aspect of the second-level digital divide as it is directly linked to developing digital skills and knowledge. Individuals with limited access to and experience with digital technology may face challenges in using it effectively, regardless of their technical abilities. This can potentially exacerbate the digital gap, as those who can successfully utilise digital technology are better positioned to access educational and professional opportunities that require digital skills.

2.6 Conclusion of Literature Review

Based on extensive literature examining the second-level digital divide in education and training, it is evident that access to digital technology does not always guarantee equal opportunities for acquiring digital skills and knowledge. The second-level digital gap is a complex issue stemming from the unequal distribution of digital skills and knowledge among those with access to digital technologies. Therefore, it is crucial for governments and educators to prioritize not only providing access to digital technology but also enhancing individuals' digital skills and knowledge. This can be achieved by implementing targeted training programs, integrating digital skills into the educational curriculum, and ensuring equitable access to high-quality digital resources.

Moreover, it is important to acknowledge and address the societal and educational factors contributing to the second-level digital divide, such as age, education, income, race and ethnicity, gender, and geographic location. Targeted interventions, legislation, and initiatives to promote digital literacy and foster an inclusive and engaging digital environment can help mitigate these disparities. South Africa's education system is multifaceted and encompasses both public and private schools, as well as many learners who receive education through home-schooling or online platforms. However, the country's education system faces significant challenges, including uneven access to quality education, inadequate funding, and a shortage of trained educators.

South Africa has made notable strides in digital technology in recent years, thanks to the government's commitment to expanding access to digital resources and infrastructure. Nevertheless, despite these efforts, substantial disparities in access to digital technology and skills persist, particularly between urban and rural areas and across different socioeconomic levels. These disparities contribute to the second-level digital divide in education and training in South Africa. Recognising and leveraging Information and Communication Technology (ICT) is crucial for enhancing the effectiveness of education and training, widening access to digital resources and services, promoting transparency, and involving diverse stakeholders in public decision-making processes. Given the increasing prevalence of cloud computing, big data analytics, open data, social media, and the Internet of Things (Sumalinog, 2022), it is evident that the future of education and training will necessitate a comprehensive ICT approach to facilitate public access to and utilisation of digital resources, ultimately advancing a forward-thinking and efficient Post-School Education and Training (PSET) system (DHET, 2020).

Propositions

These propositions lay the foundation for exploring the complex aspects of the second-level digital divide, which encompasses socioeconomic factors, generational dynamics, and cultural influences. A qualitative analysis of these propositions can yield valuable insights into the complexities of acquiring digital skills within educational and training settings. Furthermore, these propositions will contribute to shaping digital competence and informing the development of tailored educational strategies.

The propositions are:

- Proposition 1: The impact of socioeconomic factors on digital skills attainment
- Proposition 2: Effective integration of digital skills programs in formal education
- Proposition 3: Generational variances in digital proficiency
- Proposition 4: Influence of cultural diversity on digital competency

CHAPTER 3. RESEARCH METHODOLOGY

The study aimed to comprehensively explore the process of bridging the digital divide in education and training within the MICT sector using efficient knowledge production. The study extensively analysed the current state of affairs, as well as the reasons behind its existence and potential solutions to address it. This in-depth understanding served as a solid basis for informed decision-making regarding knowledge strategy. Importantly, the research was perceived as a valuable source of innovative insights, enabling further progress in knowledge development within this sector. The figure below visually depicts the sequential steps followed in the research process.

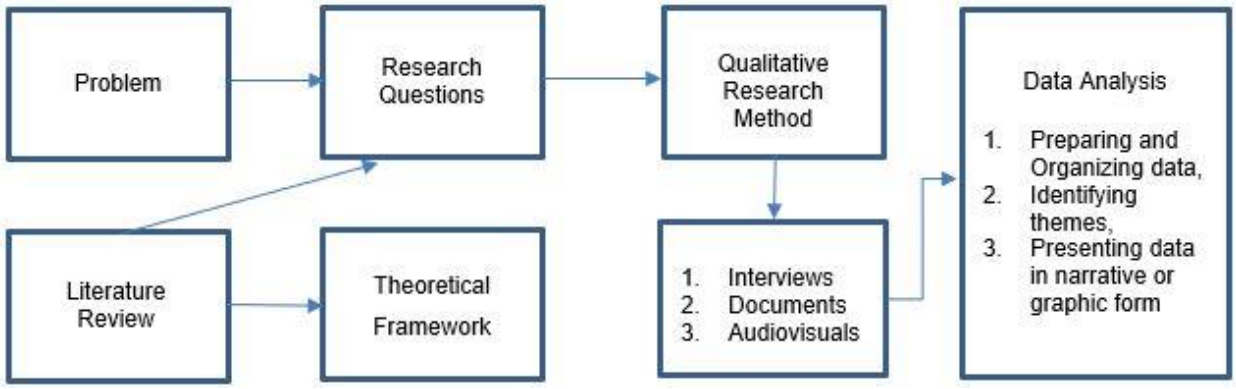


Figure 3-1 Research Process, Source: Author's Construct

3.1 Research Paradigm

Ontology:

Ontology delves into the nature of reality and existence, addressing questions about what is considered real (Creswell & Poth, 2017).

This research aligned with a constructivist ontology, asserting that reality is socially constructed through the diverse and subjective experiences of individuals (Guba & Lincoln, 1994).

Epistemology:

Epistemology investigates the nature of knowledge and how it is acquired, exploring questions related to the nature of truth and the validity of knowledge claims (Creswell, 2014).

Embracing an interpretivist epistemology, this study acknowledged that knowledge is context-dependent and subject to the interpretations of those experiencing the phenomenon. This stance emphasised the importance of understanding social realities from the perspectives of participants (Denzin & Lincoln, 2005).

Methodology:

Methodology outlines the research methods used to collect and analyse data, shaping the overall research approach (Creswell, 2014)

Utilizing qualitative methods, particularly in-depth interviews, aligned with the interpretivist paradigm. This approach aimed to uncover rich, context-specific meanings and understandings of the second-level digital divide within the Media, Information, and Communication Technology sector (Denzin & Lincoln, 2005).

Axiology:

Axiology considers the role of values in research, addressing the ethical and subjective dimensions that may influence the research process. Acknowledging the influence of the researcher's values, this study aims for transparency and reflexivity. By recognising the subjectivity inherent in interpretation, the research enhances the trustworthiness of the findings (Guba & Lincoln, 1994)

Rationale for the Chosen Paradigm:

The interpretive paradigm was selected due to its alignment with the research objective of investigating the second-level digital divide. Acknowledging the dynamic and context-specific nature of this phenomenon, the interpretive approach facilitated a nuanced comprehension of individuals' experiences and perceptions within the sector of Media, Information, and Communication Technology (Denzin & Lincoln, 2005).

3.2 Research approach

A qualitative approach was employed in this study. The distinction between qualitative and quantitative research is often characterised by the utilization of words (qualitative) rather than numerical data (quantitative), or the use of closed-ended questions and quantitative hypotheses as opposed to open-ended questions and qualitative interview inquiries (Creswell, 2014). Examining research challenges related to the understanding that individuals or groups attribute to a social or human situation commences with assumptions and applying interpretive/theoretical frameworks (Cresswell et al. 2016). This research methodology was chosen due to the study's nature and objectives, which aim to investigate and describe the perspectives of key stakeholders in education and training within the MICT sector. This comprehension will contribute to interpreting the perceived impacts of the second-level digital divide in the sector.

3.3 Research design

This study used the instrumental case study technique in particular. According to Baškarada (2014), case study research focuses on a specific case within a contemporary environment. The case study approach was suited for researching a limited case in time or space, as well as gathering contextual information about the case's surroundings. This architecture made it easier to collect large amounts of data from many sources in order to have a thorough knowledge of the situation (Creswell & Poth, 2017). Furthermore, instrumental case studies were used to improve comprehension of a given topic, problem, or worry (for example, adolescent pregnancy), with one or more instances chosen to provide the most insight into the situation.

3.4 Data collection methods

The study utilized various methods of data collection, namely interviews and documents. The model employed in this case study is outlined below. Semi-structured interviews were used to incorporate elements of descriptive research, enabling a comprehensive narrative of daily occurrences and an in-depth analysis of this phenomenon. The objective is to gain a profound understanding of phenomena by exploring the subjective meanings attributed to them by individuals.



Figure 3-2 Data collection method

3.5 Population and sample

The population consisted of diverse stakeholders involved in education and training within the MICT sector.

3.5.1 Target Population

The target population for this qualitative research consisted of stakeholders in MICT sector skills development, including MICT SETA officials, training providers, employers, and government entities. These individuals were actively engaged in the education and training sector within the Media, Information, and Communication Technology (MICT) sector. Participants were selected from various roles and organisational backgrounds to facilitate a thorough examination of the second-level digital divide.

3.5.2 Sample and Sampling Method

Purposive sampling was utilised to ensure the representation of different organisational roles within the MICT sector. Participants were selected based on their direct involvement in education, training, or strategic planning related to digital skill development. This approach aimed to capture nuanced perspectives from individuals with valuable insights into the second-level digital divide. The sample comprised 12 participants, distributed across middle management, senior management, executive management, and a board

member. The distribution of responsibilities represented diverse roles, highlighting the importance of strategic planning, operational management, and governance and strategy execution supervision. This diversity ensured a comprehensive exploration of the challenges and opportunities associated with the second-level digital divide.

Table 3-1 Sample of interviews

Interviewee	Role Level	Objective
MICT SETA		
SETA Representative 1	Board Member	To solicit insights on dynamics, challenges and opportunities faced by the organization in their mandate of skills development within the context of digital divide. The MICT SETA is responsible for advancing Skills Development within the MICT sector in collaboration with various stakeholders.
SETA Representative 2	Senior Management	
SETA Representative 3	Senior Management	
SETA Representative 4	Senior Management	
SETA Representative 5	Senior Management	
SETA Representative 6	Senior Management	
SETA Representative 7	Middle Management	
Institutions of Higher Learning		
University Representative	Executive Management	To solicit insights on dynamics, challenges and opportunities faced by the
College Representative	Executive Management	

College Representative	Executive Management	organization in their mandate of conducting skills development trainings within the context of digital divide.
Employers		
Industry Representative	Executive Management	To solicit insights on dynamics, challenges and opportunities faced by the organization in their mandate of utilising the workforce produced by the education and training sector.
Policy Makers (Government)		
DCDT Representative	Senior Management	To solicit insights on dynamics, challenges and opportunities faced by the organization in their mandate of supporting or training learners, within the context of digital divide. DHET is responsible for national policy mandate that relate to education and Training. DCDT is responsible for national digital skills and infrastructure policy mandate.

3.6 The research instrument.

Qualitative researchers get information by scrutinising documents, watching behaviour, and interviewing persons (Cresswell, John W.; Poth, 2016)The main research instrument employed in this study was the in-depth interview. The interview questions were meticulously constructed in accordance with the research questions and propositions, ensuring congruence with the objectives of the study. The semi-structured format of the interviews facilitated participants' candid sharing of their experiences and perspectives, yielding a wealth of qualitative data for analysis.

3.7 Procedure for data collection

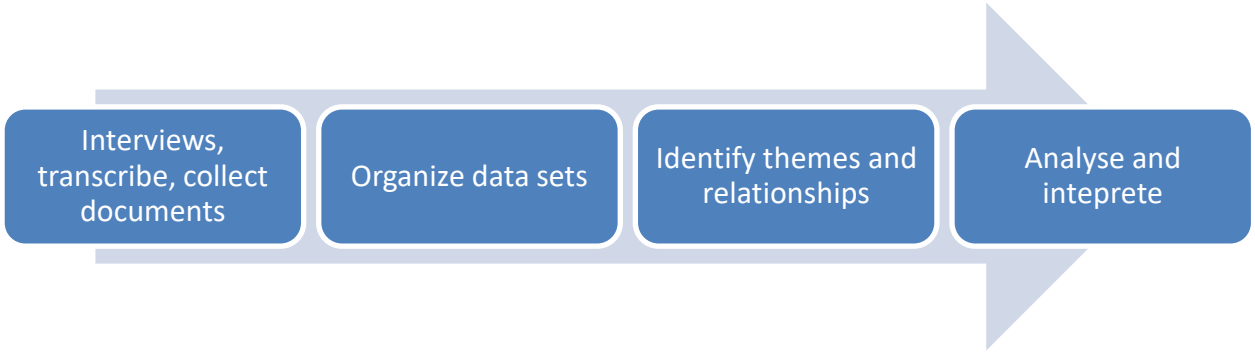


Figure 3-3 Overview of the data analysis strategy

Data was collected using the virtual platform Microsoft Teams to conduct interviews. Furthermore, relevant strategic documents and reports were gathered to support the research. The interviews were organised by contacting the participating organisations to request approval to conduct the interview (see Appendix E). Subsequently, consent was obtained from the participants by having them sign a consent form. The interviews were recorded, and transcriptions were made for analysis.

3.8 Data analysis strategies and interpretation

The study utilised a thematic analysis strategy. The qualitative data gathered through in-depth interviews underwent a rigorous process of thematic analysis, a widely accepted approach for exploring patterns, trends, and meanings within textual data (Braun & Clarke, 2006).

- Interviews:

The qualitative research included audio-recorded interviews to ensure the participants' detailed responses were accurately preserved. These recorded interviews were then transcribed verbatim. The transcription aimed to capture the nuances of the participants' language, tone, and expressions, providing a comprehensive dataset for analysis.

- Organizing Data Sets:

The qualitative data were systematically organized upon transcription. Each interview transcript and any relevant documents the participants provided were treated as a separate data set. This organisational approach facilitated a structured and accessible framework for subsequent analysis.

- Identifying Themes and Relationships:

Thematic analysis was used to identify recurring themes and relationships within the organised data sets. A systematic coding process was employed to tag data segments that represented significant concepts, patterns, or insights related to the second-level digital divide in the MICT education and training sector. These codes were then grouped into overarching themes, allowing for a comprehensive understanding of the diverse perspectives shared by the participants.

- Analysing and Interpreting:

The grouped themes underwent a deeper level of analysis to extract meaningful insights. The analysis involved exploring connections and patterns across the themes and investigating relationships between different aspects of the second-level digital divide. Each theme was interpreted in the context of the broader research questions and propositions, providing a nuanced understanding of the challenges and opportunities inherent in the MICT education and training sector. In the interpretation phase, the findings from the analysis were contextualised within existing literature and theoretical frameworks, enhancing the study's robustness. The emergent insights were triangulated with participants' quotes and perspectives, ensuring the authenticity and credibility of the interpretations. The analysis process allowed for the generation of comprehensive

narratives, shedding light on the multifaceted nature of the second-level digital divide and its impact on education and training in the MICT sector.

By employing these systematic data analysis strategies, this research aimed to uncover rich insights into the factors contributing to the second-level digital divide, its perceived impact, and potential measures to bridge the digital access and literacy gap within the MICT education and training sector.

3.9 Quality Assurance

Ensuring the rigour and trustworthiness of qualitative research is crucial for deriving meaningful insights and enhancing the study's overall validity. In this context, three fundamental aspects of quality assurance, namely transferability, dependability, and credibility, play a pivotal role in establishing the robustness of the research findings.

3.9.1 Transferability:

Transferability, also referred to as external validity in quantitative research, pertains to the extent to which qualitative study outcomes can be applied or transferred to different contexts or settings. In qualitative research, achieving transferability involves furnishing ample detail and context regarding the study's participants, methods, and context, thus enabling readers to assess the applicability of the findings to their circumstances (Denzin & Lincoln, 2005). In this study, the transferability of the findings was bolstered through elaborate explanations of the participants, their organisational roles, and the varied sectors they represented. By elucidating the context and responsibilities of the participants, the researcher was able to evaluate the relevance of the study's insights to analogous educational and training situations within the Media, Information, and Communication Technology sector.

3.9.2 Dependability:

Dependability in qualitative research is akin to reliability in quantitative research, ensuring consistency and stability in the study's procedures and findings over time. Establishing dependability involves documenting the research process comprehensively, making it possible for other researchers to follow the same steps and achieve similar results (Morse et al., 2002). This study ensured dependability by comprehensively describing the research design, data collection methods (interviews), participant demographics, and organisational profiles. The transparency in reporting the study's procedures further augmented the dependability of the research process.

3.9.3 Credibility:

Credibility is a key aspect of quantitative research and is closely linked to internal validity. It refers to the degree to which the study's findings can be believed and considered accurate. Various strategies are employed to establish credibility, including prolonged engagement, member checking, and triangulation. These strategies aim to ensure the reliability and trustworthiness of the data and interpretations (Denzin & Lincoln, 2005).

In this research study, credibility was bolstered by implementing member checking, which enabled participants to review and validate the researcher's interpretations. Moreover, triangulation was employed by involving participants with diverse roles and organisational backgrounds, thereby augmenting the credibility of the study's insights. In summary, this qualitative research aimed to offer reliable and meaningful insights into the second-level digital divide within the Media, Information, and Communication Technology sector by addressing transferability, dependability, and credibility. By adhering to these quality assurance principles, the study's overall robustness was reinforced, rendering the findings more applicable and trustworthy.

3.10 Ethical considerations

Human participants must be protected in all research studies by adhering to proper ethical norms. Ethical considerations carry particular significance in qualitative studies due to their in-depth nature. However, existing ethical standards for conducting qualitative research often provide general principles without specific guidance on practical application,

particularly when studying vulnerable groups of women (Munhall, 2018). Social scientists conducting research involving human subjects increasingly recognise the essentiality of research ethics and professional standards of conduct, especially when exploring sensitive topics (Shaw et al., 2020). In this study, consent forms were distributed to participants to obtain informed consent. The participants' rights to confidentiality and privacy were respected.

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

The qualitative research design was selected to obtain comprehensive insights into the second-level digital divide in the education and training sector. Interviews were chosen as the primary method of data collection to enable participants to convey their experiences and perspectives effectively. The findings are presented based on the research questions and propositions that guided the development of the interview questions (IQ) used to gather data for the study.

4.2 Demographics of participants

Participants were requested to explicate their positions/roles within their respective organisations. The findings reveal a diverse range of roles among the twelve participants, with one individual occupying a middle management position, five occupying senior management positions, five occupying executive management positions, and one serving as a board member. Significantly, one participant assumes a vital role in overseeing governance and the execution of organisational strategies.

Furthermore, the breakdown of responsibilities among the participants is as follows:

- One individual is specifically entrusted with ensuring supervision of governance and strategy execution.
- Ten individuals actively engage in strategic planning and execution, underscoring their crucial responsibilities in influencing the overall direction and objectives of the organisation.
- One participant oversees operational management, highlighting their hands-on involvement in day-to-day organisational duties.

4.3 Profile of participants

Participants were requested to explain their organisation's role in education and training. The diverse range of comments provides a comprehensive overview:

- State-owned entity Responsible for Developing Skills in the MICT Sector:

Six participants stated that their organizations are state-owned, as mandated by the Skills Development Act. Their primary objective is to facilitate skills development in the MICT industry, encompassing subsectors such as film and electronic media, advertising, telecommunications, and information technology. This responsibility involves strategically implementing skill development programs, often achieved through collaborative efforts with training providers, commercial and public higher education institutions, industrial corporations (employers), and other state-owned enterprises.

- Institutions of Higher Education:

Four members represent higher education institutions tasked with educating learners. Their responsibility is to equip learners with the knowledge and skills necessary for success in their chosen fields, thereby contributing to the overall development of a competent workforce.

- Employer in the Technology Solutions Industry:

One participant is an employer in the technology solutions industry. This role reflects a commitment to fostering technological advancement and meeting the evolving demands of the industry. The participant has a specific responsibility for providing innovative technological solutions to small and large enterprises.

- Government Agency Promoting the Digital Economy:

Another participant, representing a government institution, is dedicated to advancing the country's digital economy. This multifaceted task involves providing essential components such as digital infrastructure, digital skills, and digital government services, to propel the nation forward in the digital era.

These diverse roles contribute to the broader landscape of education and training by encompassing various sectors and addressing the unique needs of learners and the greater economy.

4.4 The emergent themes

The study findings yielded several prominent themes, which were subsequently linked to the propositions under investigation and thoroughly analysed. Six distinct themes emerged in total, each of which will be elaborated upon in the subsequent sections.

- Theme 1: Challenges Faced by Education and Training Institutions
- Theme 2: The Participants' Understanding of the Digital Divide
- Theme 3: The perceived factors that contribute to the second-level digital divide
- Theme 4: The Role of Educators in Bridging the Second-Level Digital Divide Divide.
- Theme 5: The Role of Policymakers or Government in Education and Training
- Theme 6: Strategies to Address the Digital Divide

4.4.1 *Theme 1: Challenges Faced by Education and Training Institutions*

Commonly shared views: High Unemployment, Lack of Resources, Digital Divide:

One of the challenges identified is the significant issue of unemployment, which adversely impacts the younger population. This issue is especially pertinent for individuals who have undergone training, as they often face considerable difficulties in securing employment. The participants, such as Participant 1 and Participant 7, have underscored the urgent nature of this problem, highlighting its implications for those in training programs and their ongoing struggles to find employment opportunities.

> *"As a country, we are experiencing a high volume of unemployment, particularly in the youth. Some of the people that we train result in becoming unemployed. Some people are busy hopping from one centre to another to survive because the stipend is life for them." – Participant 1*

"Teachers and trainers first are not going to be able to effectively train kids if they don't have access to devices, they don't have access to the Internet." - Participant 7

Limited access to technology and infrastructure poses obstacles to efficient learning and teaching in urban as well as rural areas. Participants 9 and 3 voiced concerns regarding the unequal availability of technology, highlighting the difficulties that students and educators face in acquiring the essential tools for effective instruction and learning.

."Because how are they actually going to learn or be exposed to this thing if they don't have infrastructure to actually do that? And for those that have infrastructure, They don't have access to the Internet." - Participant 10

"They've got limited access to the devices, limited access to connectivity, and the limited access to competent know-how." - Participant 9

Educators face difficulties adapting to new technologies without adequate support and training programs. Participant 10 stressed the challenges educators face in acquiring the necessary skills to teach using emerging technologies, highlighting the importance of providing them with appropriate training programs and resources.

"Now, there are teachers, they must know these things… you will remember some of these teachers, they didn't go to school to learn technology… And now you are coming up with these new technologies that you expect this young teacher to also learn." – Participant 10

Disparities in digital skills, particularly between rural and urban areas, lead to a second-level digital divide. Participant 5, Participant 6, and Participant 2 discuss the disparities in digital skills, emphasising the need to address these gaps to ensure equal opportunities and prepare learners for the demands of the digital age.

"Yes. Obviously, those who are in the rural areas will present with a low level of digital skills as compared possibly to those that are in the urban areas." - Participant 5

"And the way of the world is moving, new occupations are coming into play, so the animation sector is growing quite rapidly." - Participant 6

Institutions face budget constraints, limiting their ability to provide adequate training and support, ultimately affecting the number of learners they can accommodate. Participant 4 underscores the challenges institutions face due to budget constraints, hindering their capacity to meet the growing demand for education and training and limiting their ability to train more learners.

> *"Every year… we receive a bulk of applications coming from the industry as well as learners…we are unable to fund all the stakeholders that apply for funding every year, which means we're unable to train more learners every year due to a limited budget." - Participant 4*

The challenges collectively highlight the complex landscape education and training institutions navigate. High unemployment rates pose a significant hurdle, intertwining with issues of limited resources, inadequate infrastructure, and the digital divide. Educators also face challenges adapting to technological advancements, while funding constraints further complicate efforts to address these multifaceted issues. The urgency for comprehensive solutions is underscored, emphasising the interconnected nature of these challenges and the need for a holistic approach to foster positive change in the education and training sector.

4.4.2 *Theme 2: The Participants' Understanding of the Digital Divide*

Commonly Shared Understanding of the Digital Divide: Disparities in Access and Skills

> *"When you talk digital divide, you have to mind whether there's adequate connectivity... Digital literacy in a sense that you find that learners are not able to understand what technology does out there in the other areas." – Participant 1*

The interviewees, including Participant 1, recognize the digital divide as a national issue. They emphasise the importance of addressing connectivity challenges and digital literacy to bridge the divide effectively.

> *"So, it still becomes a challenge. Look at what happened during COVID. A lot of these kids, they couldn't be able to study or even write exams, even in tertiary institutions. Forget about primary, middle, or even high schools." - Participant 10*

Participant 10 underscores scepticism about online learning due to infrastructure and access issues, particularly highlighting the challenges faced by students during the COVID-19 pandemic. Participants such as Participant 9, Participant 8, Participant 7, Participant 5, Participant 2, Participant 11, and Participant 4 comprehensively understand the second-level digital divide, emphasising that addressing digital skills and competency is crucial in achieving digital inclusion.

> *"So the digital divide is not that you don't have a computer... It's the fact that what you know about using a computer is different." - Participant 9*

> *"…the digital divide is in three stages. At level one..the issue is that others do not have access to connectivity or …the tools or devices… As you would know, in the past, certain people grew up in certain areas and due to their being disadvantaged, their children do not easily have access to devices, whereas children that grew up in more affluent areas will have the devices". - Participant 7*

> *"Digital literacy and access are not equitable and cannot necessarily be just. Um, it's almost impossible with the kind of society we find ourselves in." - Participant 5*

> *"The digital divide is not just about providing devices and internet access. It's about ensuring that everyone, regardless of socioeconomic background, has the skills and knowledge to thrive in the digital era." - Participant 2*

> *"If we look at a learner who's growing in an urban area and a learner who's growing in a rural area, in terms of digital skills, they are not on the same level." - Participant 4*

The participants collectively demonstrated a nuanced understanding of the digital divide, emphasizing the need to address both access challenges and the second-level divide related to skills and competency. Challenges in infrastructure, access, and the impact of geographical disparities on opportunities are consistently highlighted. The interviewees articulate a comprehensive perspective on the digital divide, recognising its multifaceted nature and the necessity for holistic solutions to ensure equitable access and digital literacy for all.

"I stay in Pretoria and where I stay the Wi-Fi is good, and electricity is always there however, somebody who stays in Mqanduli, does not have the same access to the digital economy as I do, and therefore, there is a divide between myself and that person." - Participant 12

Participant 12 highlights the unequal access to digital infrastructure based on geographical locations, emphasizing the impact of infrastructure availability on digital inclusion and opportunities.

4.4.3 *Theme 3: The perceived factors that contribute to the second-level digital divide*

Participant 1 emphasises targeting under-serviced areas and prioritising digital literacy.

"Once the broadband becomes available, we should then be targeting on educating and then upskilling learners from those areas." - Participant 1

Participant 4 highlights the lack of ICT infrastructure in rural areas.

"In far rural areas, even in high school, there's no lab at all. Learners only experience computers when they go to the university or colleges." - Participant 4

*"Those who are on programs and they don't have access to the infrastructure, access to data, then they tend to be left behind." - Participant 3*Participant 10 stresses the need for basic internet access to bridge the digital gap.

"Access is not a want, it's a need... everybody must have access to the internet." - Participant 10

Participant 9 points out limited access to devices and connectivity as barriers.

"They've got limited access to the devices, limited access to connectivity, and limited access to competent know-how to be able to shift." - Participant 9

Participant 8 highlights the importance of digital skills for effective device usage.

"The second level speaks particularly to the skills of the people in order for them to be able to use the devices that they got." - Participant 8

Participant 4 discussed the lack of exposure to ICT skills at lower education levels.

> *"If you went to school where you were doing biology and all the other subjects, it's very difficult to pursue a career within the ICT." - Participant 4*

Participant 1 focused on aligning training programs with economic sectors.

> *"We also look at the market dynamics. What is the kind of economic sector that is more prevalent in the area?" – Participant 1*

Participant 7 highlights the challenge of translating access to technology into economic empowerment.

> *"Unless you've got access and devices, unless you are trained yourself, you're not going to be able to pass on knowledge that you don't know." - Participant 7*

Participant 5 discussed the absence of clear online learning policies.

> *"I don't even think we have an online learning policy where I work." - Participant 5*

Participant 3 emphasised the role of relevant policies in addressing the digital divide.

> *"Look, I will talk in terms of the SETA's perspective and the effect of not having the relevant qualification that talks to digital." - Participant 3*

Participant 10 addressed disparities in access and digital skills based on socioeconomic backgrounds.

> *"The understanding of the digital divide is... to say you have the haves and the have-nots..." – Participant 10*

Participant 4 discussed the disadvantages faced by learners from rural areas.

> *"Because you have to spend two days typing pages of documents." - Participant 10*

Participant 5 pointed out how cultural norms can restrict access to education and digital platforms.

"As a woman who can't go to school, obviously that means you are also prohibited to even access the education and access to the digital platforms." - Participant 5

Participant 7 mentioned societal issues like crime impacting digital interventions.

"As soon as, in some instances, the government comes and puts these labs, there are issues of crime and these things disappear." - Participant 7

Participant 2 discussed challenges in transitioning from basic to higher education in technology-related subjects.

"It's unfortunate that there's no proper transition from a basic to higher education." - Participant 2

Participant 6 emphasized the role of employers and training providers in addressing the digital divide.

"And the big employers may have different experiences compared to the small and medium employers you see." - Participant 6

Participant 9 highlighted the shortage of faculty know-how for digital literacy.

"There's definitely a shortage of faculty know-how... they haven't been given the supporting frameworks to be competent to roll out." - Participant 9

Participant 7 emphasized the importance of access to technology for effective educator training.

"Teachers and trainers first are not going to be able to effectively train kids if they don't have access to devices, they don't have access to the Internet." – Participant 7

1. Generational and Gender Differences:

Participant 12 recognized generational gaps in technology literacy.

"But you and me used to first read that manual for two days. Before you, you know, you switch that thing on, you don't know where to switch that direct and on." – Participant 12

These quotes provide insights into how each factor is perceived by the interviewees, shedding light on the challenges and complexities associated with the second-level digital divide.

4.4.4 *Theme 4: The Role of Educators in Bridging the Second-Level Digital Divide*

There were commonly shared insights on the Role of Educators in Bridging the Second-Level Digital Divide. Participant 1 emphasised the necessity for collaboration between public and private entities to enhance employability and create job opportunities, particularly in addressing the challenges of the digital divide.

> *"There needs to be a clear partnership between public and private institutions where there is a willingness from private companies to recruit our people where possible." -Participant 1:*

Participant 10 expresses concerns about the lack of programs to equip educators with the necessary skills to bridge the digital divide effectively, highlighting potential gaps in current training initiatives.

> *"…when we engage, you can tell that these guys, they usually don't understand the things that you're talking about. So clearly it says, if they don't understand these things, going back to schools, there are no programs that actually are trying to equip them" – Participant 10*

Participant 9 underscores the critical role of competent educators in addressing the digital divide, emphasizing their impact on students' learning experiences and the overall quality of education.

> *"This woman is just dynamite... She talks about her boys and everywhere she goes, she's picking up ideas of what she's going to teach her boys in the IT class... The quality of the teachers... makes an absolute barrier." - Participant 9*

Participant 8 draws attention to the age factor among educators, stressing the importance of incorporating younger teachers inclined toward technology to bridge the digital divide effectively.

"The DG of DPSA actually presented a gloomy picture of the challenges that are gonna come out very strongly in the next five years, whereby we see that the educators, especially on the foundation stages, we've got 50% of them around the ages of 50 or so."- Participant 8

Participant 7 emphasizes the central role of educators in bridging the digital divide, emphasizing the need for digital literacy training and their ability to impart knowledge effectively.

"They're not going to be able to impart knowledge on how these kids can use this access to devices and information on the Internet, and even the know-how, they're not going to be able to impart." - Participant 7

Participant 5 stresses the importance of work readiness programs and basic computer training to prepare learners for the workplace, emphasizing the role of educators in this process.

"So we see that, um, that that's why in other programs, we have there, there are programs like work readiness programs, uh, that allows us as a teacher to try and prepare our learners for the workplace."- Participant 5

Participant 3 highlighted the crucial role of continuous professional development and support for educators to effectively integrate technology into their teaching methods.

"Educators are the bridge builders in the digital divide. They must be supported with ongoing training and resources to effectively integrate technology into the learning environment and address the specific needs of diverse student populations." - Participant 3

Participant 12 emphasizes the need to democratize knowledge related to digital tools among teachers and underscores the importance of formal education for educators in the digital space.

"Our teachers, especially in the schools that we went to in the townships, only get access to a laptop about four years or five years ago." Participant 12

Participant 11 advocates for industry professionals to play a role in training educators, providing impactful training based on their familiarity with and role in building technologies.

> *"The educators, people who educate within this space, need a formal base of education themselves." - Participant 11*

Participant 4 stresses the importance of standardized accessibility of resources across schools, irrespective of location or economic background, to create an inclusive learning environment.

> *"…we need to standardize the accessibility of resources in a way that a school in Mamelodi, I'm talking about government school in Mamelodi, it must have the same facilities like a school in the city."- Participant 4*

The overall shared insights highlight the diverse perspectives on the role of educators in addressing the second-level digital divide. Collaborative efforts, challenges in training programs, the importance of competent educators, addressing age and skills gap, advocacy for work readiness programs, continuous professional development, democratizing knowledge, and involving industry professionals are crucial aspects discussed by the participants. These insights collectively provide a comprehensive view of the challenges and potential strategies in leveraging educators to bridge the second-level digital divide in education and training.

4.4.5 *Theme 5: The Role of Policymakers or Government in Education and Training*

Participant 1 advocates for breaking government silos and emphasizes a unified government approach, shared services, and collaboration between different government entities to enhance efficiency.

> *"The silos are some of the, I think the silo thing is one critical issue that needs to be considered." – Participant 1*

Participant 5 pointed out the lack of coordination among government initiatives and stresses the importance of collaboration and coordination among government agencies, NGOs, and educational institutions.

"I feel like government is doing a lot in this sense, but the work they're doing is not coordinated. So we will not necessarily bridge the digital divide if we do not cooperate, collaborate and coordinate." - Participant 5

Participant 10 urges policymakers to understand the challenges on the ground and emphasizes the importance of avoiding a blanket approach to policy development.

"Policymakers are urged to understand the real challenges on the ground and avoid a blanket approach in developing policies." – Participant 10

Participant 9 criticizes the lack of focus on measurement, accountability, and consequences in policies. Calls for policies to be effectively implemented at the grassroots level and advocates for a more results-driven approach.

"My criticism of the policymakers is that the policy doesn't go to the issues of measurement and accountability with consequence well enough." - Participant 9

Participant 4 advocates for a proactive role of policymakers, emphasizing the necessity for well-crafted and effectively implemented policies. Suggests monitoring mechanisms and a dashboard for policy implementation.

"Having a clear implementation dashboard, that will say 'This is what we have planned. This is what has been achieved. This is the impact on the ground'." - Participant 4

Participant 8 highlights the role of policymakers in curriculum development and stresses the importance of learning from other countries' successful strategies. Calls for policies to be expedited to align with development goals.

"But also you need to implement some of the strategies that are already there like for instance now in terms of the department we do have the national digital infrastructure strategy." - Participant 8

Participant 7 criticizes the lack of policy coordination and suggests the need for a government department with the authority to direct policies at a central level.

"As it stands, nobody seems to have a mandate or at least the authority to be able to direct policy at a central level of government... none of those things are coordinated. So, all these efforts get wasted." - Participant 7

Participant 2 recognizes the role of policymakers and government in addressing digital divide issues. Suggests that there should be policies in place to support both educators and learners in adapting to the digital era.

"So, there needs to be policies that support this type of integration of technology into teaching and learning." - Participant 2

Participant 12 suggests that policies should ensure equal opportunities for all learners, irrespective of their socio-economic backgrounds. Calls for policies that promote affordable internet access throughout the country.

"And what role then can the policy makers play in addressing the 2nd level digital divide in education and training is to democratize the availability of these resources." – Participant 12

Participant 11 calls for policymakers to understand the second-level digital divide and proposes a tactical approach, solving the problem in smaller bits. Questions the lack of a centralized branch or department dedicated to policymaking for second-level digital technologies within the government.

"The policymakers need to be more surgical about it. You know, we can't be broad anymore, because we know that it affects various sectors differently." – Participant 11

Participant 3 emphasises the vital role of policymakers and government in shaping effective policies to address the digital divide. Advocates for increased funding, targeted initiatives, and regulatory frameworks.

"Policymakers hold the key to narrowing the digital divide. We need strategic policies that allocate resources, foster innovation, and ensure equitable access to digital opportunities for everyone." - Participant 3

Participant 6 stresses the need for clear policies to guide interventions and highlights the importance of collaboration between the government and training providers to ensure policies align with industry needs and technological advancements.

> *"So you need those policies and strategies, but you also need collaboration. You need collaboration between the policy makers, the training providers, and the employers." - Participant 6*

These views collectively under this theme provide a nuanced understanding of the role of policymakers or government in education and training, with an emphasis on collaboration, ground-level understanding, results-driven policies, curriculum development, policy coordination, democratizing access, and strategic policymaking for equitable access.

4.4.6 *Theme 6: Strategies to Address the Digital Divide*

Many participants stress the importance of partnerships with various stakeholders, including government agencies, NGOs, educational institutions, and the private sector. Collaborative efforts are seen as essential to address the digital divide comprehensively.

> *"What we have done naturally, our mandate is mainly that, to ensure that there's adequate skills that are available." - Participant 1*

> *"Partner with them... these academic curriculum, go to the private schools and tell them to give you the curriculum." - Participant 9*

> *"We need a multi-faceted approach to tackle the digital divide, involving policymakers, communities, and businesses." - Participant 3*

> *"Fostering collaboration between the entities and providing affordable internet access to communities." - Participant 12*

A focus on digital literacy programs, curriculum integration, and skills development emerges as a common strategy among interviewees.

> *"There are no programs that actually are trying to equip them. They might be there that I don't know of, but the way I look, It seems like there's actually nothing…" – Participant 10*

"Let's give them robust maths, science, English... so that when they do encounter the computer, they've got the logic, the creative thinking." - Participant 9:

Several interviewees advocate for direct government intervention, increased funding, and policy implementation to bridge the digital divide.

"Government needs to make sure all these different interventions of government are working in a coordinated way." - Participant 7

"We need to stop planning in mid-range and actually find other ways to collaborate with other people somewhere else." - Participant 5:

Ensuring access to technology, connectivity, and devices is a common thread in strategies to bridge the digital divide.

"So, what we have done naturally, our mandate is mainly that, to ensure that there's adequate skills that are available... For example, a quick win that we've all identified is to ensure that, as an example, we look at the issue of creating the learning labs..." – Participant 1

Participant 10 further emphasised that, creation of establishing training centers in local municipalities is required to ensure that those in rural areas and remote geographical areas are empowered.

"We need to actually have centers within those areas... so as this young people, they can actually walk to the center instead of taking a taxi to the center because they don't have money to do that" – Participant 10

"Make sure working there, you probably have local chiefs and... Government needs to make sure all these different interventions of government are working in a coordinated way." - Participant 7

*"We need to provide resources for both teachers and learners." – Participant 2*Many interviewees stress the importance of community involvement, smart community initiatives, and understanding the specific needs of marginalized areas.

"Connect the local communities, the under-serviced areas... and create smart communities there." - Participant 1

"Let's go into these areas and say, within this area, what is the economic opportunities that we can actually spark through the centers?" - Participant 10:

> *"… it needs direct government intervention in those areas, in partnership with the Department of Basic Education, whereby these departments are able to ensure that at all levels, starting at pre-school level, there's access to devices". – Participant 7*

> *"Find other ways to collaborate with other people somewhere else." - Participant 5*

Participant 7 emphasizes the involvement of local leaders in addressing the digital divide.

> *"You probably have local chiefs and… Government needs to make sure all these different interventions of government are working in a coordinated way." - Participant 7*

Notably, there were not commonly shared strategies.

Participant 11 suggests using immersive technologies like the metaverse and robotics to enhance online learning, making it more experiential.

> *"We are tactical… get people who are aware…support them to get the first set of results." - Participant 11*

Participant 10 specifically calls for a revaluation of government strategies in addressing the digital education divide.

> *"We need to re-look at our strategies, especially as government." - Participant 10*

The views shared by the interviewees reflect a consensus on the need for collaboration, government intervention, digital literacy programs, and infrastructure development. Partnerships with various stakeholders, including the private sector, are seen as crucial for effective implementation. Additionally, there's a common recognition of the importance of integrating digital skills into the education system and addressing the digital divide at its root through curriculum changes.

On the other hand, some unique strategies, such as the use of immersive technologies, revaluation of government strategies, and involvement of local leaders, highlight the diverse perspectives on how to tackle the digital divide. These unique strategies suggest a nuanced understanding of the challenges involved and a recognition that one-size-fits-all approaches may not be effective. Overall, the multifaceted nature of the strategies proposed underscores the complexity of the digital divide issue and the need for comprehensive, tailored approaches to bridge the gap effectively.

4.5 Linking themes to the research questions

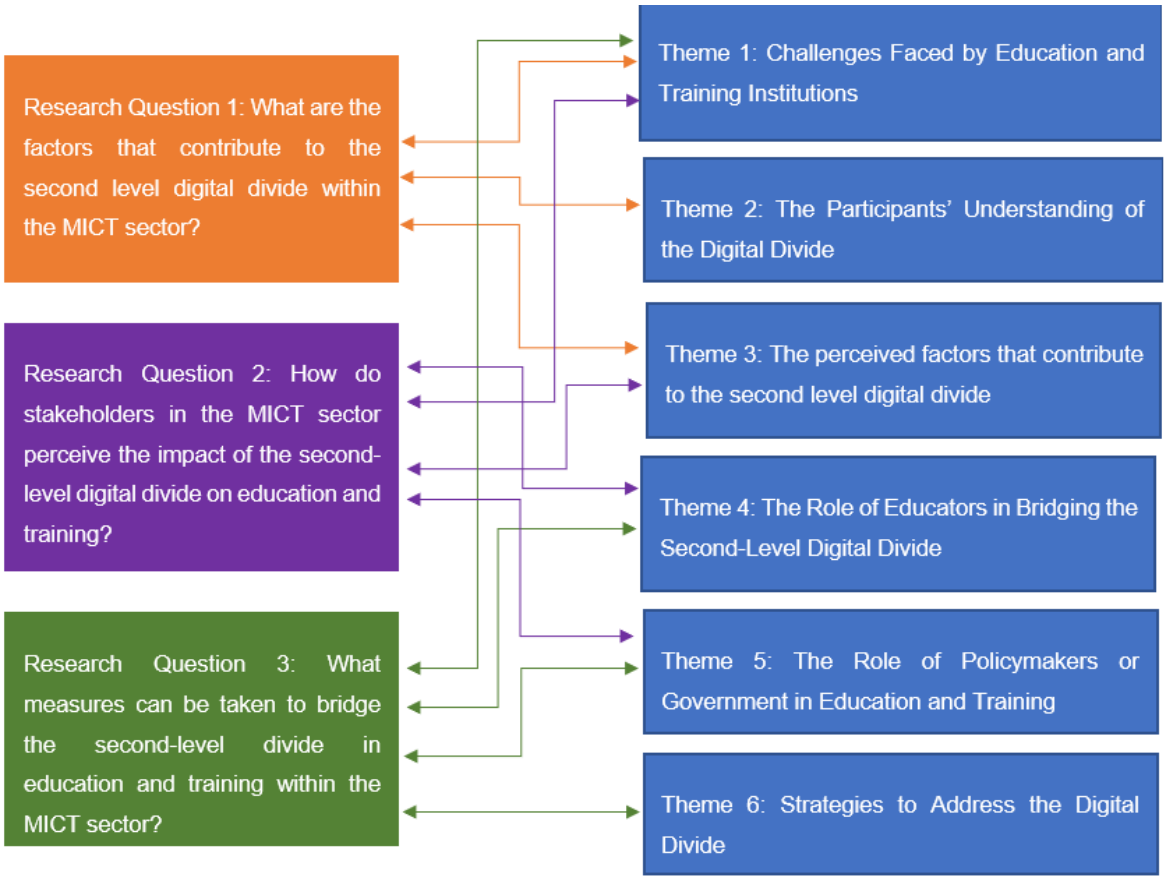


Figure 4 Linkage of Research Questions and Themes

Theme 1: Challenges Faced by Education and Training Institutions

This theme explores challenges within education and training institutions in the MICT sector. The identified factors contributing to the second-level digital divide include high

unemployment rates, limited access to technology and infrastructure, challenges for educators in adapting to technology, digital skills disparities, and funding constraints. These factors collectively highlight systemic issues that hinder equitable access and participation within the sector, contributing to the digital divide.

Theme 3: The Perceived factors that contribute to the Second-Level Digital Divide

This theme delves into the perceived factors contributing to the second-level digital divide. The identified factors include access to infrastructure, internet and connectivity issues, digital skills and literacy challenges, economic factors, policy and coordination issues, socioeconomic disparities, cultural and societal factors, challenges in training and education, digital literacy for educators, and generational and gender differences. These insights provide a comprehensive view of how various factors influence the second-level digital divide within the MICT sector.

Research Question II: What is the perceived impact of the second-level digital divide on education and training in the Media, Information and Communication Technology sector?

Theme 3: The Perceived factors that contribute to the Second-Level Digital Divide

This theme focuses on the perceived impact of the second-level digital divide. Participants highlight how disparities in access to infrastructure, internet connectivity, digital skills, economic opportunities, and policies contribute to a divide between the haves and have-nots within the sector. The impact extends to limitations in educational and career opportunities, hindering the overall progress and advancement of individuals within the MICT sector.

Theme 4: The Role of Educators in Bridging the Second-Level Digital Divide

Here, the emphasis is on educators' role in addressing the second-level digital divide. Insights reveal the importance of collaboration, challenges in educator training programs, the significance of competent educators, addressing age and skills gaps, and advocating for work readiness programs. Educators are positioned as crucial agents in bridging the divide by imparting digital literacy, adapting to technological changes, and preparing learners for the evolving demands of the MICT sector.

Research Question III: What measures can be taken to close the gap in digital access and literacy within the Media, Information and Communication Technology sector at the second level?

Theme 5: The Role of Policymakers or Government in Education and Training

This theme explores the role of policymakers or government in addressing the second-level digital divide. Participants advocate for a unified government approach, understanding ground-level challenges, results-driven policies, curriculum development, policy coordination, and empowering policies for educators and learners. The insights underscore the need for strategic and equitable policies to address digital access and literacy within the MICT sector.

Theme 6: Strategies to Address the Digital Divide

Finally, Theme 6 outlines strategies to address the digital divide. These strategies include partnerships and collaborations, digital literacy programs and curriculum integration, government intervention and policy implementation, ensuring access to infrastructure, and community engagement. Unique strategies such as immersive technologies and revaluation of government strategies are also highlighted. These insights collectively offer a roadmap for closing the gap in digital access and literacy within the MICT sector at the second level.

4.6 Conclusion

This chapter delves into the findings derived from participant interviews, exploring the multifaceted landscape of the second-level digital divide within the MICT sector. The rich insights gathered from the discussions are intricately linked to the three core research questions, providing a comprehensive understanding of the challenges, perceptions, and potential solutions.

This chapter lays the groundwork for the subsequent chapters, offering a nuanced understanding of the second-level digital divide. The findings underscore the imperative for collective and concerted efforts to enact meaningful and inclusive changes within the MICT sector.

CHAPTER 5. DISCUSSION OF THE FINDINGS

5.1 Introduction

The contemporary educational landscape is intricately intertwined with the dynamic fabric of technology, which shapes learning paradigms and professional trajectories. Amid this transformation, the concept of the digital divide has evolved from its early focus on access to a more nuanced examination of skills, usage patterns, and outcomes—a dimension commonly referred to as the second-level digital divide. This chapter embarks on an in-depth exploration of the findings derived from qualitative research within the realm of Media, Information, and Communication Technology (MICT) sector education and training. As society increasingly relies on technology, understanding the factors contributing to digital disparities becomes crucial, particularly within sectors essential for information dissemination and communication. This chapter focuses its investigation on the MICT sector, delving into the complexities that define the second-level digital divide. The research aims to address three fundamental questions:

I. What are the factors that contribute to the second-level digital divide within the MICT sector?

II. What is the perceived impact of the second-level digital divide on education and training in the MICT sector?

III. What measures can be taken to close the second-level digital divide gaps in education and training within the MICT sector?

To systematically address these questions, the study organizes its findings around six thematic areas, aligning each with the overarching research questions. Additionally, four propositions, rooted in literature and participant insights, offer an analytical framework:

Proposition 1. Socioeconomic Impact: Examining how socioeconomic status influences the acquisition of advanced digital skills within the ICT sector.

Proposition 2. Digital Literacy Programs: Assessing the role of integrating digital literacy programs in formal education to mitigate the second-level digital divide.

Proposition 3. Generational Variances: Understanding the influence of generational differences on digital skill development within the ICT sector.

Proposition 4. Cultural Diversity: Exploring how cultural diversity affects the development of digital skills and proposing strategies to tailor education accordingly.

In addition to presenting participant findings, this chapter critically evaluates areas of agreement and disagreement with existing literature. This comparative analysis aims to reveal unique insights, industry-specific nuances, and potential gaps in understanding the second-level digital divide within the MICT sector context. By traversing participant narratives, thematic analyses, and engaging with relevant literature, this chapter aims to offer a comprehensive perspective. Through synthesizing findings and literature, subsequent sections untangle the complexities inherent in addressing the second-level digital divide, making a substantive contribution to the ongoing discourse on technology equity and inclusion.

5.2 Discussion on Propositions

5.2.1 Proposition 1: The Impact of Socioeconomic Factors on Digital Skill Attainment

Proposition 1 posits that socioeconomic status significantly impacts the development of advanced digital skills among students within educational environments. It underscores that individuals from higher socioeconomic backgrounds possess greater opportunities and resources for enhancing these skills. The insights garnered from interviews conducted with participants in the MICT sector broadly support the assertion made in Proposition 1. Participants from more privileged socioeconomic backgrounds generally demonstrated a higher level of proficiency in advanced digital skills. This observation is consistent with existing literature that frequently associates socioeconomic status with proficiency in digital

skills (Van Dijk, 2006; Hargittai & Hinnant, 2008).

Nonetheless, a nuanced examination reveals a more intricate relationship between socioeconomic status and digital skill acquisition. While there is a prevalent trend, instances were identified in which individuals from less privileged socioeconomic backgrounds displayed notable digital proficiency. This implies that while socioeconomic factors are influential, they are not the sole determinants of digital skill acquisition. Some literature, notably on the concept of the "second-level divide," bolsters this nuanced perspective, highlighting that digital inequalities are shaped by various factors beyond mere access and socioeconomic status (Hargittai, 2002).

The discrepancy lies in the assumption that a higher socioeconomic standing is an absolute prerequisite for advanced digital skills. The findings suggest that individual agency, motivation, and contextual elements can enable individuals from disadvantaged socioeconomic backgrounds to surmount obstacles and develop competence. This challenges the deterministic nature implied by the proposition. The nuances underscore the intricacy of the association between socioeconomic factors and digital skill development.

A thorough examination indicates that while Proposition 1 captures a prevailing trend corroborated by existing literature, it oversimplifies the correlation between socioeconomic status and digital skill acquisition. The concept of the second-level digital divide advocates for a more nuanced comprehension, stressing the importance of considering multiple contributing factors. Policymakers and educators should factor in these complexities when devising interventions to address the multifaceted nature of the second-level digital divide. This nuanced perspective provides valuable insights into Research Question I, underscoring the significance of considering individual agency and contextual factors. A comprehensive approach is necessary to address the second-level digital divide effectively, recognizing the diverse pathways individuals may follow to acquire advanced digital skills. In conclusion, while Proposition 1 serves as a foundational point, it is imperative to acknowledge its constraints. Although socioeconomic status has a role to play, it is not the exclusive determinant. Effective interventions to bridge the second-level

digital divide must account for individual agency, motivation, and contextual factors.

5.2.2 Proposition 2: Effective Integration of Digital Literacy Programs in Formal Education

Proposition 2 argues that the integration of digital literacy programs into formal educational curricula, alongside thorough teacher training, is essential for narrowing the second-level digital gap. The success of such programs hinges on their structure, accessibility, and alignment with educational objectives. The analysis of participant interviews supports Proposition 2, highlighting the crucial role of formal education in tackling the second-level digital divide. Participants emphasized the significance of digital literacy programs as an integral component of formal education. This observation aligns with existing literature emphasizing the role of education in cultivating digital skills (Warschauer, 2003; van Dijk & Selwyn, 2004).

Nevertheless, the findings reveal nuances that point to challenges in implementing digital literacy programs within formal education settings. While the importance of these programs is recognized, practical considerations such as program design, accessibility, and alignment with educational objectives present obstacles. This finding echoes existing literature that acknowledges the complexities of integrating technology into educational environments (Selwyn, 2010). A notable discrepancy arises from assuming that mere integration of digital literacy programs ensures success. The findings underscore that program design and implementation significantly influence their effectiveness. Moreover, challenges related to accessibility, encompassing infrastructure and inclusivity issues, pose hurdles. Existing literature supports these observations by stressing the need for thoughtful strategies in implementing educational technology initiatives (Warschauer, 2003).

Proposition 2 underscores the necessity of adopting a sophisticated approach toward incorporating digital literacy programs. Policymakers and educators are urged to consider the aspect of inclusivity and the significance of maintaining high standards and relevance within these programs. Moreover, the pivotal role of teacher training is highlighted as a crucial element in fostering the effective development of digital skills. This study sheds light on Research Question III by stressing the significance of initiatives aimed at narrowing the digital divide and enhancing literacy levels within the Media, Information, and Communication Technology sector at the secondary level. The effective implementation of digital literacy programs within formal education is recognized as a critical strategic measure.

To sum up, Proposition 2 establishes a valuable framework; however, the intricacies within the results underscore the importance of meticulous planning and implementation. Successful integration necessitates careful consideration of program structure, accessibility, and teacher training. Policymakers and educators must address these intricacies to guarantee the effective integration of digital literacy programs into formal education.

5.2.3 Proposition 3: Generational Variances in Digital Competence

Proposition 3 posits that intergenerational variances significantly influence the development of digital skills. Younger cohorts exhibit heightened levels of digital proficiency stemming from early exposure and familiarity with technology. Comprehending these generational dynamics proves essential in crafting targeted interventions.

The data gleaned from participant interviews and scholarly literature corroborate Proposition 3, underscoring the impact of generational distinctions on digital competence. Younger respondents conveyed a greater ease and adeptness with digital technologies, ascribing this attribute to their early acclimatization. This discovery aligns with existing scholarship recognizing the role of generational elements in technology assimilation and utilization (Prensky, 2001; Tapscott, 1998). Despite the observable generational influence, the results reveal nuances. Not all younger participants demonstrated uniform digital proficiency, indicating that individual backgrounds and access levels within a generation can diverge. This intricacy complicates the proposition, proposing that merely classifying

generations might oversimplify the landscape of digital skill cultivation.

A potential discrepancy arises from assuming a direct and linear correlation between age and digital competence. The scholarship acknowledges that variables like socioeconomic standing, educational opportunities, and personal drive can impact digital skills irrespective of age (Livingstone & Helsper, 2007). The findings substantiate this perspective by showcasing variances within age cohorts. Grasping generational discrepancies remains pivotal for intervention design, yet the findings underscore the necessity for tailored and individualized strategies. Interventions should account not only for age but also for the varied exposures and experiences within generations. This refined methodology guarantees that interventions cater to individuals' actual requirements. Proposition 3 enriches the exploration of Research Question I, which delves into the factors contributing to the secondary-level digital gap within the Media, Information, and Communication Technology domain. Generational disparities emerge as a key element, but the examination emphasizes the significance of a nuanced comprehension surpassing broad age delineations.

To conclude, Proposition 3 furnishes a valuable framework for understanding digital competence across diverse age cohorts. While generational distinctions are apparent, the results accentuate the necessity of nuanced interventions that acknowledge individual backgrounds and access levels within generations.

5.2.4 Proposition 4: Influence of Cultural Diversity on Digital Competence

Proposition 4 suggests that cultural and linguistic elements have a notable influence on the development of digital skills. Educational methodologies that incorporate and celebrate cultural diversity significantly impact diminishing the secondary digital division. The research delves into how cultural context shapes digital proficiency and how teaching strategies can be adjusted accordingly.

The outcomes of participant interviews and scholarly sources align to support Proposition 4. Cultural variety emerged as a pivotal aspect affecting digital prowess, with participants underscoring the influence of cultural context on shaping their digital encounters. These findings are in line with academic literature emphasizing the importance of considering

cultural aspects in the adoption and utilization of technology (Nielsen-Winkelman, 2018). The study reveals intricate connections between cultural diversity and digital proficiency. While cultural elements influence digital entry and usage tendencies, participants also demonstrated autonomy in navigating and negotiating their digital interactions in diverse cultural settings. This independence underscores the fluid nature of the correlation between culture and digital proficiency. An important discrepancy lies in steering clear of cultural determinism, recognizing that individuals from the same cultural background can possess diverse experiences and inclinations. Academic literature advises against stereotyping and stresses the significance of an individualized comprehension of how cultural elements intertwine with digital proficiency (Warschauer & Matuchniak, 2010).

Proposition 4 underscores the necessity for culturally aware interventions that recognize the myriad ways individuals interact with digital technologies. Educational tactics should surpass a uniform approach and consider the numerous cultural influences on digital proficiency. This calls for acknowledging autonomy and advocating for inclusive methods. The examination of Proposition 4 correlates with tackling Research Question III, which investigates strategies for narrowing the gap in digital access and literacy within the Media, Information, and Communication Technology domain at the secondary level. Culturally sensitive measures aid in fostering digital inclusivity. To conclude, Proposition 4 illuminates the intricate interplay between cultural diversity and digital proficiency. While cultural elements mould digital encounters, the findings stress the importance of evading cultural determinism and adopting personalized, culturally attuned approaches to bridge the secondary digital divide.

5.3 Findings to the Research Questions

5.3.1 Research Question 1: Factors Contributing to the Second-Level Digital Divide

a. Introduction:

The study addresses the first research question by examining factors contributing to the second-level digital divide within the Media, Information, and Communication Technology (MICT) sector. The research explores six thematic areas and evaluates four propositions to analyze participant insights and existing literature.

b. Discussion on Propositions:

Proposition 1: The Impact of Socioeconomic Factors on Digital Skill Attainment

Findings: While participants generally support the link between higher socioeconomic status and advanced digital skills, nuances reveal individual agency, motivation, and contextual factors playing a role.

Link to Research Question 1: The proposition offers insights into socioeconomic influences but underscores the need for a more nuanced understanding, emphasizing the importance of considering individual agency and contextual factors.

Proposition 2: Effective Integration of Digital Literacy Programs in Formal Education

Findings: Participants emphasize the role of formal education in addressing the second-level digital divide but highlight challenges in program design, accessibility, and alignment with educational objectives.

Link to Research Question 1: The proposition aligns with the significance of education but underscores the need for careful consideration of program structure, accessibility, and teacher training.

Proposition 3: Generational Variances in Digital Competence

Findings: Younger generations generally exhibit higher digital proficiency, but the results highlight variances within age cohorts, emphasizing the need for tailored and individualized strategies.

Link to Research Question 1: The proposition contributes to understanding generational influences, emphasizing the importance of nuanced interventions that consider individual backgrounds within generations.

Proposition 4: Influence of Cultural Diversity on Digital Competence

Findings: Cultural diversity significantly influences digital proficiency, but participants demonstrate autonomy in navigating digital interactions within diverse cultural settings.

Link to Research Question 1: The proposition acknowledges cultural influences and emphasizes the need for culturally aware interventions while cautioning against cultural determinism.

c. Summary:

The section provides a comprehensive analysis of factors contributing to the second-level digital divide within the MICT sector. While socioeconomic status, generational differences, and cultural diversity play roles, the nuanced findings highlight the need for tailored interventions that consider individual agency, program structure, and cultural influences. This contributes to a more holistic understanding of the digital divide, aligning with Research Question 1.

5.3.2 Research Question 2: Perceived Impact of the Second-Level Digital Divide on Education and Training

a. Introduction:

This section delves into the perceived impact of the second-level digital divide within the Media, Information, and Communication Technology (MICT) sector, aligning findings with the second research question. Insights are derived from participant interviews across six thematic areas, further analysed through four propositions grounded in literature.

b. Discussion on Propositions:

Proposition 1: The Socioeconomic Impact

Findings: Higher socioeconomic status correlates with greater digital proficiency, influencing the quality of education and training.

Link to Research Question 2: The socioeconomic impact is significant, affecting the educational experience and training quality within the MICT sector.

Proposition 2: Digital Literacy Programs in Formal Education

Findings: Integrating digital literacy programs into formal education is crucial, but challenges in design and accessibility affect the perceived impact.

Link to Research Question 2: Despite recognizing the importance, barriers in program implementation impact the effectiveness of education and training programs.

Proposition 3: Generational Variances in Digital Competence

Findings: Younger generations show higher digital proficiency, influencing the learning dynamics within the MICT sector.

Link to Research Question 2: The generational impact is evident in shaping the educational landscape, with implications for teaching methods and curriculum development.

Proposition 4: Influence of Cultural Diversity on Digital Competence

Findings: Cultural diversity shapes digital proficiency, impacting the inclusivity and relevance of education and training initiatives.

Link to Research Question 2: Cultural influences contribute to varied learning experiences, necessitating culturally sensitive approaches for effective education and training.

c. Summary:

This section provides a nuanced understanding of the perceived impact of the second-level digital divide on education and training within the MICT sector. Socioeconomic status, digital literacy programs, generational variances, and cultural diversity collectively

influence the quality, inclusivity, and relevance of educational experiences. These findings align with the second research question, shedding light on the multifaceted consequences of the second-level digital divide on education and training.

5.3.3 Research Question 3: Measures to Bridge the Second-Level Digital Divide in Education and Training

a. Introduction:

This section explores potential measures to bridge the second-level digital divide within the Media, Information, and Communication Technology (MICT) sector. The discussion is organized around four propositions derived from participant interviews, considering socioeconomic impact, digital literacy programs, generational variances, and cultural diversity.

b. Discussion on Propositions:

Proposition 1: The Socioeconomic Impact

Findings: Recognizing the impact of socioeconomic status on digital proficiency, interventions should go beyond oversimplified categorizations.

Implications for Bridging Divide: Tailored interventions acknowledging individual agency, motivation, and contextual factors are crucial. Policymakers must address socioeconomic disparities to ensure equitable access to education and training.

Proposition 2: Digital Literacy Programs in Formal Education

Findings: Integration of digital literacy programs into formal education is essential, but challenges exist in program design and accessibility.

Implications for Bridging Divide: Policymakers and educators should focus on high-quality, relevant, and accessible digital literacy programs. Teacher training plays a pivotal role in ensuring effective implementation.

Proposition 3: Generational Variances in Digital Competence

Findings: Generational differences impact digital skills, but a nuanced approach is needed as not all individuals within a generation exhibit uniform proficiency.

Implications for Bridging Divide: Tailored strategies for different age groups considering varied exposures and experiences within generations are necessary. Interventions should not rely solely on broad age categorizations.

Proposition 4: Influence of Cultural Diversity on Digital Competence

Findings: Cultural diversity influences digital proficiency, emphasizing the need for education strategies that embrace diversity.

Implications for Bridging Divide: Culturally sensitive measures recognizing diverse ways individuals interact with technology are essential. Inclusive educational tactics, and avoiding cultural determinism, can contribute to bridging the second-level digital divide.

c. Summary:

This section elucidates measures to bridge the second-level digital divide within the MICT sector. By addressing socioeconomic impact, enhancing digital literacy programs, adopting targeted approaches for generational variances, and implementing culturally aware interventions, stakeholders can work towards fostering digital inclusion and equity in education and training.

5.4 Conclusion

This chapter elucidates measures to bridge the second-level digital divide within the MICT sector. By addressing socioeconomic impact, enhancing digital literacy programs, adopting targeted approaches for generational variances, and implementing culturally aware interventions, stakeholders can work towards fostering digital inclusion and equity in education and training.

Research Question 1: What are the factors that contribute to the second-level digital divide in education and training?

The investigation reveals that socioeconomic factors play a significant role in digital skill acquisition within the MICT sector, aligning with existing literature. However, the chapter

underscores the nuanced nature of this relationship. While socioeconomic status is influential, individual agency, motivation, and contextual factors must be considered. This highlights the need for interventions that recognize diverse pathways individuals may take to acquire advanced digital skills.

Research Question 2: How does the second-level digital divide impact education and training within the MICT sector?

The exploration of the impact of the second-level digital divide underscores the pivotal role of digital literacy programs in formal education. While confirming their importance, the study reveals challenges in program design, accessibility, and alignment with educational objectives. This nuanced perspective informs interventions aimed at narrowing the digital divide and enhancing literacy levels. While Proposition 2 establishes a valuable framework, the section stresses the intricacies within the results, highlighting the importance of careful planning and implementation to guarantee the effective integration of digital literacy programs into formal education.

Research Question 3: What measures can be implemented to bridge second-level digital divide in education and training within the MICT sector?

The inquiry into measures to narrow the gap in digital access and literacy emphasizes the need for targeted strategies within the MICT sector. Generational differences and cultural diversity emerge as key considerations. The study reveals the importance of tailored and individualized strategies, considering not only age but also varied exposures and experiences within generations.

Propositions 3 and 4 contribute to strategies for narrowing the gap in digital access and literacy within the MICT sector. Tailored interventions considering generational dynamics and cultural diversity are crucial for addressing the complexities of the second-level digital divide.

Overall Conclusion:

The chapter's comprehensive examination provides valuable insights into the nuanced aspects of the second-level digital divide within the MICT sector. By considering individual

experiences, access levels, and contextual factors, stakeholders can develop effective interventions that cater to the diverse pathways individuals follow to develop advanced digital skills. The study contributes to the ongoing dialogue on technology equity and inclusion, underscoring the requirement for tailored approaches that acknowledge the inherent complexities in addressing digital disparities. The findings establish a valuable framework for policymakers, educators, and researchers striving to bridge the second-level digital divide and promote digital inclusion within the MICT sector.

CHAPTER 6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This research has provided a comprehensive exploration of the second-level digital divide in education and training within the MICT sector. Through a qualitative approach involving interviews with MICT sector professionals and an extensive literature review, the study aimed to identify contributing factors, understand implications, and propose interventions for closing the digital gap across generations.

6.2 Limitations and challenges of the study

The limitations of the study may originate from two major factors: the method used and the study population (Cresswell, John W.; Poth, 2016). These limitations may have a major effect on the credibility of the study if not managed effectively. This study may be affected by the following challenges and limitations:

- Population sampling bias
- Researcher's personal bias on the subject studied.
- Constrained in time and availability of participants.

6.3 Key Findings:

Socioeconomic status, educational opportunities, and access to resources emerged as critical factors influencing the acquisition of digital skills within the MICT sector. These disparities contribute to a persistent second-level digital divide, particularly affecting different generational cohorts.

a. *Impact on Education and Training:*

The digital divide poses significant challenges to the effective implementation of digital literacy initiatives, limiting the sector's ability to harness its workforce's potential fully. Generational distinctions play a pivotal role in digital competency, influencing skills acquisition and educational outcomes.

b. *Measures for Closing the Gap:*

Strategic initiatives outlined in key government departments' strategic documents underscore the importance of infrastructure development, skills augmentation, and inclusive policies. Collaboration among governmental entities, private institutions, and educational stakeholders is deemed imperative for bridging the second-level digital divide in the MICT sector.

This research highlights the urgency of targeted interventions and collaborative efforts to address the complex web of factors contributing to the digital divide. By recognizing and acting upon the insights provided by MICT professionals and strategic documents, the sector can move towards a more equitable and digitally inclusive future. The path forward requires a collective commitment to fostering equal opportunities and leveraging technology to empower every generation within the MICT landscape.

6.4 Recommendations

The subsequent recommendations are put forth to bridge the second-level digital divide and advance digital inclusion in education and training within the MICT sector:

6.4.1 Develop Tailored Training Programs:

Formulate training and educational schemes that cater to the diverse digital literacy levels and learning requirements of individuals in the MICT sector. These schemes should be tailored to target specific skill gaps and advocate for continuous learning and upskilling. Adapt digital training content to address cultural nuances and make learning materials more relatable for diverse groups. Tailoring training content to reflect local languages, examples, and cultural contexts enhances engagement and comprehension.

Establish and implement comprehensive teacher training programs focused on digital literacy to equip teachers with the necessary skills for effectively integrating digital literacy into teaching methodologies.

The recommendation to formulate training programs tailored to diverse digital literacy levels aligns with the emphasis on targeting under-serviced areas and prioritising digital literacy in the strategic plans of public entities. The focus on teacher training programs for

effective integration of digital literacy resonates with the strategic emphasis on upskilling educators in the DHET Strategic. The alignment with the DHET Strategic Plan indicates coherence with the broader educational goals.

6.4.2 Promote Diversity and Inclusion:

Initiate programs that nurture diversity and inclusion within the sector, ensuring equitable access to opportunities for individuals from varied socioeconomic backgrounds, age groups, and cultural identities. Fostering diversity can lead to a more innovative and dynamic MICT sector. Incorporate cultural sensitivity training into digital skills programs to increase awareness among employees and trainers. This fosters an inclusive learning environment where individuals from varied backgrounds feel valued and understood. Ensure digital literacy programs are designed with consideration for diverse learners and are easily accessible to promote inclusivity and enhance learning outcomes.

The DBE Strategic Plan emphasises the need for initiatives to nurture diversity and inclusion and ensure equitable access to opportunities for individuals from varied backgrounds. Incorporating cultural sensitivity training into digital skills programs align with the goal of fostering inclusivity and enhancing learning outcomes in the MICTSETA Sector-Skills-Plan

6.4.3 Enhance Collaboration and Partnerships:

Cultivate collaboration among educational institutions, industry stakeholders, and governmental bodies to establish a supportive environment for digital skills enhancement. Through collaborative efforts, these entities can pool resources and expertise to deliver comprehensive training and mentorship programs. Cultivate partnerships with technology companies for resource provision and skill development initiatives to leverage additional resources and expertise for infrastructure development, device provision, and training programs. The recommendation to cultivate collaboration among educational institutions and industry stakeholders is in line with the strategic focus on partnerships and collaborations in the MICT SETA Strategic Plan (MICT SETA, 2020b).

Leveraging partnerships with technology companies for resource provision aligns with the emphasis on collaboration for infrastructure development in the DCDT Strategic Plan (DCDT, 2020b) .

6.4.4 Financial Support Mechanisms:

Establish financial support mechanisms, such as subsidies or grants, for students from lower socioeconomic backgrounds to alleviate economic disparities and ensure access to essential resources for digital skill development. Establishing financial support mechanisms for students from lower socioeconomic backgrounds is supported by the focus on addressing economic disparities in the Post-School Education and Training Monitor (DHET, 2021).

Ensuring access to essential resources for digital skill development aligns with the goal of enhancing access to education and training in the NDP Ten-Year Review report (National Planning Commission, 2023) .

6.4.5 Invest in Digital Infrastructure:

Secure substantial investment in digital infrastructure and technological resources to enhance access to digital tools and platforms for all individuals in the MICT sector. This encompasses providing affordable internet connectivity, access to updated software, and hardware resources. Providing affordable internet connectivity and hardware resources resonates with the emphasis on enhancing infrastructure access in the KZN inclusive education research findings (Ivala, 2016).

The recommendation to secure investment in digital infrastructure aligns with the strategic focus on improving access to digital tools and platforms in the National Digital and Future Skills Strategy (DCDT, 2020a).

6.4.6 Continuous Monitoring and Evaluation:

Set up procedures for continuing monitoring and assessment of digital skill improvement efforts to assess their impact and efficacy. Regular feedback and data analysis can assist in identifying improvement opportunities and drive future digital inclusion plans. The

Department of Planning, Monitoring, and Evaluation (DPME) must guarantee that other departments' efforts and activities, such as DHET, DCDT, and others, function in harmony and that no resources are wasted.

This is further emphasized by the MTTR on 4IR which it points out a need for ensuring coordination among departments to avoid resource wastage with a focus on harmonizing efforts across entities (DHET, 2020a). The DPME strategic plan does point out the need to set up procedures for monitoring digital skill improvement efforts, with an emphasis on monitoring and evaluation.

6.4.7 Recommendations Execution Model

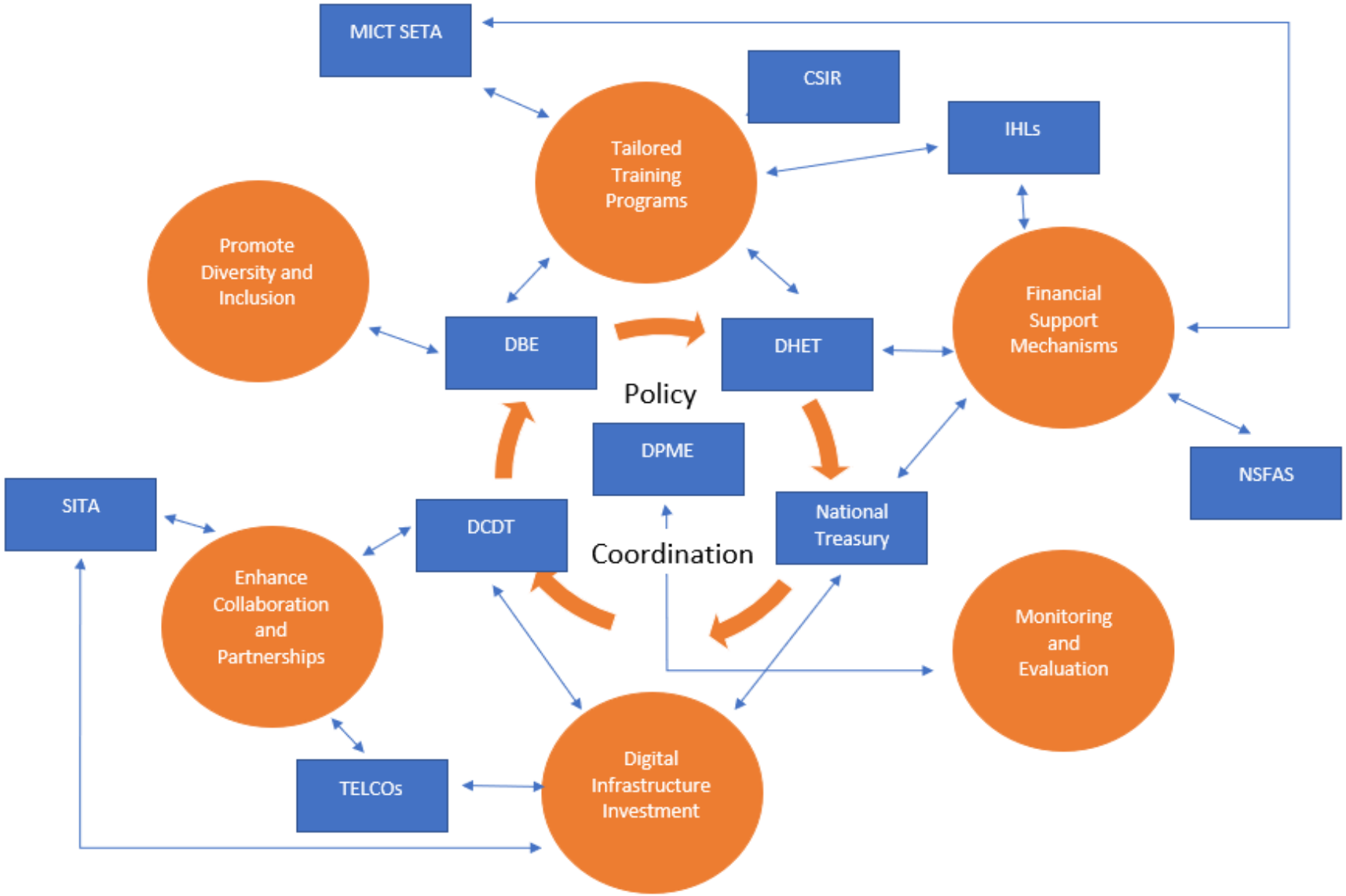


Figure 9 Recommendations Execution Model (Source: Author's Construct)

Recommendation 6.2.1: Develop Tailored Training Programs

- DHET should continue to assume the responsibility for education and training policy formulation, as well as the development of customized training programs. To achieve this, DHET must collaborate with educational institutions and industry stakeholders to design curricula that cater to varying levels of digital literacy.

- MICT SETA has the opportunity to work in conjunction with DHET to align skills development programs with sector needs. MICT SETA should provide insights on industry-specific skill requirements and ensure that industry professionals play a crucial role in advising on skills demand for both current and future needs.

- Institutions of higher learning (IHLs) can contribute by implementing tailored training programs. This can be accomplished by incorporating industry-relevant content and practical skills training into their curricula.

- Local Municipalities can support the implementation of these tailored training programs by providing access to local resources, facilities, and community engagement opportunities. These initiatives will enable students to gain practical learning experiences.

- The Council for Scientific and Industrial Research (CSIR) could significantly contribute by conducting in-depth research on technological innovations. The findings of this research can inform curriculum development initiatives.

Recommendation 6.2.2: Promote Diversity and Inclusion

- Organizations in the MICT sector can implement programs aimed at fostering diversity and inclusion. These programs should focus on providing equal opportunities for individuals from various socioeconomic backgrounds, age groups, and cultural identities.

- Human Resource departments in education and training institutions should adopt policies and practices that actively promote diversity and inclusion in the

workplace, especially among educators. This will help create a work culture that values respect and equal opportunities for all individuals.

- Training providers in the MICT sector should incorporate cultural sensitivity training into digital skills programs. This will increase awareness among employees and trainers, creating an inclusive learning environment where individuals from diverse backgrounds feel respected and understood.

- Collaborative efforts between community organizations, municipalities, and MICT sector organizations play a crucial role in promoting diversity and inclusion initiatives. Through these partnerships, digital literacy programs can be tailored to meet the needs of diverse learners, ensuring accessibility and inclusivity to enhance learning outcomes.

- The Department of Basic Education (DBE) plays a significant role in achieving this objective. By integrating cultural diversity imperatives into early childhood development programs and the basic education curriculum, the DBE can actively contribute to promoting diversity and inclusion in education.

Recommendation 6.2.3: Enhance Collaboration and Partnerships

- The Department of Higher Education and Training (DHET) and the Department of Basic Education (DBE) can collaborate to ensure a smooth transition and alignment of skills development from basic education to higher education and training in the MICT sector.

- The MICT Sector Education and Training Authority (SETA) can foster collaboration among educational institutions, industry stakeholders, and governmental bodies to establish a supportive environment for enhancing digital skills.

- Municipalities can facilitate partnerships between local educational institutions, industry stakeholders, and community organizations to promote the development of digital skills and inclusivity within the local community.

- Educational institutions, industry stakeholders, and governmental bodies can cultivate collaboration to establish a supportive environment for enhancing digital skills. By pooling resources and expertise, they can deliver comprehensive training and mentorship programs to address the digital divide in education and training in the MICT sector.

- Technology companies can partner with educational institutions and industry stakeholders to provide resources and expertise for infrastructure development, device provision, and training programs.

- Municipalities can facilitate partnerships between local educational institutions, industry stakeholders, and community organizations to promote the development of digital skills and inclusivity within the local community. They can also support collaborative efforts by providing local insights and resources for effective partnership building.

Recommendation 6.2.4: Establish Financial Support Mechanisms

- The Department of Higher Education and Training (DHET) should expedite the establishment of financial support mechanisms, such as subsidies or grants, for students from lower socioeconomic backgrounds. This will ensure their access to essential resources for the development of digital skills. Additionally, connectivity for online education and training programs should be made zero-rated. This can be done in cooperation with the Department of Communications and Digital Technologies (DCDT).

- The National Student Financial Aid Scheme (NSFAS) should continue to provide financial aid to undergraduate students pursuing studies in the MICT sector. This will ensure that financial constraints do not hinder their access to education and training. Efforts should also be made to support and assist the institution in improving efficiency and cost-effectiveness in executing its mandate.

- Municipalities can collaborate with DHET and NSFAS to identify and support students from lower socioeconomic backgrounds who are interested in pursuing digital skills development programs.

Recommendation 6.2.5: Invest in Digital Infrastructure

- The Department of Communications and Digital Technologies (DCDT) should secure significant investment in digital infrastructure and technological resources to enhance access to digital tools and platforms for all individuals in the MICT sector.

- Broadband Infraco (BBI) and Telecommunications Companies (Telcos) possess the expertise to improve affordable internet connectivity and provide access to digital resources. The DCDT should play a crucial role in coordinating national digital infrastructure planning and implementation, ensuring alignment with the strategic plans of institutions such as the DHET and the DBE. This strategy will prevent fragmented and duplicated initiatives. Additionally, the DCDT must develop a strategy that ensures the long-term sustainability of infrastructure investments.

- Municipalities can support the development of local digital infrastructure by collaborating with the DCDT, BBI, and Telcos to ensure connectivity and access to digital tools within communities. This collaboration must be carried out in consideration of the DBE schools' infrastructure development plan to ensure alignment and prevent duplicated and uncoordinated efforts.

Recommendation 6.2.6: Continuous Monitoring and Evaluation

- DPME should establish procedures for continuous monitoring and assessment of efforts to improve digital skills in order to evaluate their impact and effectiveness. It is important to ensure that policy formulation and execution efforts across departments, such as DBE, DHET, DCDT, and others, work together harmoniously to avoid wasting resources.

- DHET and DCDT should collaborate with DPME to provide data and insights on the progress of digital infrastructure and skills improvement efforts and align their activities with the monitoring and evaluation framework.

- MICT SETA should contribute by providing feedback and data analysis to identify opportunities for improvement and drive future plans for digital inclusion based on the results of monitoring and evaluation.

- By involving these entities in a coordinated effort, South Africa can effectively address the digital divide in education and training in the MICT sector and promote digital inclusion through tailored training programs, financial support mechanisms, investment in digital infrastructure, and collaborative partnerships. Municipalities play a crucial role in supporting these initiatives by ensuring local service delivery and community engagement to enhance digital skill development and inclusivity.

6.5 Future Research

6.5.1 Longitudinal Studies for the Evolving Landscape

Future studies should focus on the changing environment of digital skills, with longitudinal studies used to evaluate the long-term impact of policies and initiatives. The National Digital and Future Skills Strategy and the Report of the Ministerial Task Team on the Implications of the 4th Industrial Revolution both underline the importance of ongoing adaptation, thus requiring ongoing and in-depth study.

6.5.2 Innovative Approaches for Rural Areas

Future research should prioritize the examination of the ever-changing characteristics of digital skills, employing longitudinal studies to evaluate the enduring consequences of policies and initiatives. The National Digital and Future Skills Strategy, along with the Report of the Ministerial Task Team on the Implications of the 4th Industrial Revolution, underscores the significance of ongoing adjustment, thereby accentuating the requirement for sustained and comprehensive investigation.

6.6 Chapter Summary

In conclusion, this research underscores the importance of urgently addressing the multifaceted nature of the digital divide and advocates for inclusive practices in the education and training sector. Through coordinated efforts and targeted interventions, it is possible to establish a digitally inclusive environment that equips individuals with essential skills and opportunities for success in the digital age. By implementing the recommended strategies and following the established framework, stakeholders have the potential to make significant progress in bridging the second-level digital divide. This will ultimately cultivate a fair and inclusive digital landscape for all participants in education and training.

The research identifies two key players in South Africa's digital skills development and policy implementation landscape—the Department of Planning, Monitoring, and Evaluation (DPME) and the Media, Information, and Communication Technology Sector Education and Training Authority (MICT SETA). The DPME functions as a central coordinating body, ensuring collaboration among stakeholders, monitoring policy impact, and optimizing resource allocation. On the other hand, MICT SETA focuses on practical skills development, industry collaboration, and inclusivity within the MICT sector.

The synergy between DPME and MICT SETA is highlighted as crucial in creating an effective framework for digital skills development. DPME's role in policy implementation, monitoring, and resource allocation complements MICT SETA's emphasis on practical skills, industry collaboration, and inclusivity. These entities' collaborative efforts aim to address the challenges posed by the digital divide, fostering a skilled, diverse, and inclusive workforce within the MICT sector.

In summary, the combined efforts of DPME and MICT SETA, supported by the recommended strategies, provide a comprehensive and dynamic approach to tackling challenges related to the digital divide. This ultimately contributes to a more equitable and inclusive digital landscape for South Africa's education and training sector.

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APPENDIX A (Interview Questions)



Questions

1. Can you tell me more about your role in your organization?
2. What is the mandate/role of your organization in education and training?
3. What are the positives experienced by your organization in execution of this mandate/role?
4. What are the challenges experienced by your organization in execution of this mandate/role?
5. How can these challenges be addressed?
6. What is your understanding of the digital divide?
7. In your view, what are the experiences of learners and educators from disadvantaged backgrounds regarding the second-level digital divide in education and training?
8. What strategies can be employed to address the second-level digital divide in education and training, particularly for marginalized communities?
9. What are the challenges faced by educators and trainers in addressing the second-level digital divide in education and training, and how can these challenges be overcome?
10. How does the second-level digital divide affect the delivery of online learning and teaching?
11. What impact does the second-level digital divide have on the development of digital literacy skills among learners from different socio-economic backgrounds?
12. What role can policymakers play in addressing the second-level digital divide in education and training?

APPENDIX B (Permission Request Letter)

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Wits Business School
2 St Davids Pl &, St Andrew Rd,
Parktown,
Johannesburg, 2193

15 June 2022

Mr. Matome Madibana (Chief Executive Officer)
MICT SETA
19 Richards Dr,
Halfway House,
Midrand, 1685

Dear Sir,

Re: Permission to conduct research at MICT SETA

I am studying Master of Management in Digital Business at the University of the Witwatersrand. I am seeking permission to conduct research at MICT SETA.

The research is titled "**The effects of the second level (skills and usage) digital divide in sector education and training: a case of Media Information and Communication Technology (MICT) Sector**". This research seeks to understand how the digital divide phenomenon affects education and training in the PSET system. The aim is to contribute to the body of knowledge that provides solutions to how the country can respond to challenges posed by the digital divide as well as how opportunities available could be exploited. The research will focus on the MICT sector. I chose this sector because I believe it plays a critical role and contributing immensely to advancement of digital transformation in the country.

The research will entail collecting data from officials and some stakeholders (Training Providers and Employers) of the MICT SETA. I will invite individuals from your organisation to participate in this study. If they agree, they will be asked to participate in an interview that would be used to collect the research data. Each interview will be conducted at a place and time convenient to the participant and the interview will take

a maximum of two (2) hours. I have attached the interview questions and interviewees target for your more information.

Participants will be asked to give their written or verbal consent before the being interviewed. Their responses will be treated confidentially, and identities (their names and the name of the organisation) will be anonymous unless otherwise expressly indicated. Individual privacy will be maintained in all published and written data resulting from the study.

The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study.

I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's letterhead, signed and dated, and specifically addressed to myself by name and the title of my study.

Please let me know, or the supervisory, if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,



Mr. Siyabonga Dyosiba
079 853 5715 or 061 511 5470
siyabongadyosiba1@students.wits.ac.za

Supervisor:
Ms. Ayanda Magida
011 717 3953
ayanda.magida@wits.ac.za

APPENDIX C (Supervisor Endorsement)

WITS UNIVERSITY

Siyabonga Dyosiba <1565412@students.wits.ac.za>

Research Panel Presentations

Ayanda Magida <ayanda.magida@wits.ac.za> 30 June 2022 at 12:50
To: Siyabonga Dyosiba <1565412@students.wits.ac.za>



Hi Siya,

I have slotted you for Thursday.

I have reviewed your document an gave some suggestions, unfortunately, I have a power outage all my devices are dead.

As a result I cannot send you the official letter, it will follow once my power has been restored.

This is to confirm that I as your supervisor endorse your submission.

You may use and attach this email to your submission.

Regards,

Ayanda Magida
Lecturer | Wits Business School

E : ayanda.magida@wits.ac.za
T : +27 11 717 3953
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2 St Davids Place, Parktown,
Johannesburg

APPENDIX D (Research Permission Approval)

MICTSETA | Media, Information And Communication Technologies Sector Education And Training Authority

SHAPING SKILLS, PIONEERING INDUSTRIES, EMPOWERING FUTURES

06 October 2022

To : Mr Siyabonga Dyosiba

siyabongadyosiba1@students.wits.ac.za

Cc : ayanda.magida@wits.ac.za

Dear Siyabonga Dyosiba

RE : PERMISSION TO CONDUCT RESEARCH WITHIN THE MICT SETA ON TOPIC THE EFFECTS OF THE SECOND LEVEL (SKILLS AND USAGE) DIGITAL DIVIDE IN SECTOR EDUCATION TRAINING: A CASE OF MEDIA INFORMATION AND COMMUNICATION TECHNOLOGY (MICT) SECTOR.

a) The above refers

b) The SETA acknowledges your letter dated 15 June 2022 requesting permission to conduct research within the MICT SETA with the following questions:

1. What is the mandate/role of your organization in education and training?
2. What are the positives that are experienced by your organization in execution of this mandate/role?
3. What are the challenges that your organization is experiencing in execution of this mandate/role?
4. How can these challenges be addressed?
5. Who are the stakeholders of your organization within the context of education and training?
6. What are the positives and challenges that these stakeholders are experiencing in the process of executing education and training?
7. How can these challenges be addressed?
8. How has the COVID-19 pandemic affected the sector in execution of education and training?
9. What are the factors that are contributing to the digital divide in the sector?
10. How are the stakeholders affected by these factors?

11. How can the digital divide be bridged in the sector?
12. What is your organization doing to contribute to bridging the digital divide in the sector?
13. What are the positives you can share with us in this contribution?
14. What challenges is this contribution faced with?
15. What more, if any, should be done to fast track the bridging of the digital divide in the sector?
16. Is SA government doing enough to assist the sector in addressing the digital divide issues? If yes, how so? If not, what more could the government do?
17. Is there any other additional information or material you would like to share that could be helpful to this research?

c) To the following target audience of the MICT SETA:

1. Chief Executive Officer
2. Chief Information Officer
3. Senior Manager: 4IR
4. Senior Manager: Learning Programmes
5. Senior Manager: Research and Planning

The SETA wishes you well.

Warm Regards



Mr Matome Madibana
Chief Executive Officer