Cape Peninsula University of Technology

ENHANCING COMPUTER LITERACY TEACHING IN TVET THROUGH THE DIGITAL CAPABILITIES FRAMEWORK

by

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DECLARATION

I, Andrea Anita Papier, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

APapier — 17 July 2025

Signed **Date**

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DEDICATION

I dedicate my research paper to my dear husband, Mr Darren Papier. We started our Master's journey as friends and completed it together as Husband and Wife. You have been my motivation on days I gave up, my peer to proofread and assist with corrections. Trying to complete our thesis papers at the same time was extremely challenging as our papers were the complete opposite but together, we managed to achieve the goal we set. Teamwork has and will always be our greatest strength and my prayer for our marriage is to tackle life the way we tackled our thesis papers – together, with motivation and determination, having God at the centre.

ABSTRACT

The study background is the educational change brought about by the introduction of the National Certificate Vocational (NCV) at South African Technical and Vocational Education and Training (TVET) colleges. The NCV curriculum includes foundational subjects, such as Life Orientation which includes a Computer Literacy module, offered from NQF Level 2 to NQF Level 4. South African TVET lecturers have diverse histories, social backgrounds and educational qualifications. Most lecturers have TVET-related qualifications, but are not all professionally qualified teachers. This study investigated Computer Literacy lecturers' skills and qualifications for teaching the Computer Literacy module and ways to enhance computer literacy education in South Africa's TVET sector. The focus is the shortage of competent lecturers in computer literacy and explores current teaching and learning practices in TVET colleges with the intention of enhancing TVET computer and digital literacy education. The study is guided by the research question: How can TVET computer and digital literacy teaching be strengthened? The study is guided by "Digital Capabilities Framework" (JISC, 2020) which extends both the "Pedagogical Content Knowledge" (PCK) framework (Shulman & Sparks, 1992) and the Technological Pedagogical and Content Knowledge (TPACK) framework (Koehler & Mishra, 2009). The research design was a case study of a multisite TVET college and included both a document/curriculum study and in-depth interviews with computer literacy lecturers. A sample of six lecturers, who were representative of TVET lecturer diversity in terms of language, "race", gender and educational levels, was selected for the study. The study examined how effectively the curriculum correlated with essential digital skills and indicated areas in which lecturers lacked digital literacy. Both curricular and interview data were theoretically analysed, drawing on the Digital Capabilities Framework. In light of the key role of computer literacy in work and in education, it is important that the subject is of high quality, and that lecturers are well-prepared to facilitate student learning in this area. This research study addresses this issue. The study found that the enhancement and development of computer and digital literacy at TVET colleges requires a systemic intervention including policy development, curriculum renewal, lecturer professional development, upgrading of facilities, equipment, and software, and alignment with student needs and with the needs of specific technical and vocational fields. Furthermore, this study expands the knowledge of digital literacy in TVET colleges and encourages collaboration among lecturers, institutions and curriculum advisors to provide students and lecturers with the expertise to succeed in the digital world. Future curriculum development should consider student input and analyse the impact of professional development on lecturing efficiency.

KEYWORDS: Computer literacy, Digital literacy, Digital Capabilities Framework, Professional development

LIST OF ACRONYMS AND ABBREVIATIONS

AG	Assessment Guide
AI	Artificial Intelligence
CEO	Chief Executive Officer
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
DoE	Department of Education
FET	Further Education and Training
ICASS	Internal Continuous Assessment
ICASS	Internal Continuous Assessment guidelines for NCV qualifications (2021)
ICT	Information and Communication Technology
IG	ICASS Guideline
IQMS	Integrated Quality Management Systems
ISAT	Integrated Summative Assessment Task
LMS	Learner Management System
LO	Life Orientation
NCV	National Certificate Vocational
NQF	National Qualifications Framework
OD	Office Department
PAT	Practical Assessment Task
PATs	Practical Assessment Tasks
PCK	Pedagogical Content Knowledge
POPIA	Protection of Personal Information Act
QDA	Qualitative Document Analysis
RSI	Repetitive Strain Injury
SADTU	South African Democratic Teachers Union
SG	Subject Guide
SKVA	Skills Values and Attitudes
STEM	Science, Technology, Engineering and Mathematics
TPACK	Technical Pedagogical and Content Knowledge Framework
TVET	Technical Vocational Education and Training

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CHAPTER ONE: COMPUTER LITERACY IN TVET COLLEGES

1.1 Introduction: A shortage of qualified, skilled computer literacy educators

A challenge facing the South African education system is that there are insufficient knowledgeable teachers to provide quality teaching for all school subjects and phases (Hofmeyer, 2015). A similar shortage of skilled lecturers in the technical and vocational education and training (TVET) sector has been pointed out in several studies (e.g., McGrath, 2005; Buthelezi, 2018) and is particularly acute in the Science, Technology, Engineering, and Mathematics (STEM) disciplines and fields, and in Information and Communication Technology (ICT) in particular (Makgato, 2020:114). In their study of TVET educators, Zinn et al. found that "a discrepancy exists on the level of the lecturers and the central need for further training regarding modern technologies" (2019:175). ICT is currently the prime scarce skill in South Africa (Capazario & Venter, 2020), therefore it not surprising that many TVET lecturers who teach computer literacy lack formal qualifications in this subject area, while skilled computer literacy teachers are leaving the TVET sector to take up positions elsewhere (Wedekind, 2016). Teachers who do not possess the required skills for facilitating learning in a particular subject have a negative impact on students' academic achievements (McConney & Price, 2009). There are, however, possibilities for interventions and support mechanisms to improve lecturers' competencies (Mukeredzi, 2016). The need for skilled computer literacy teachers to support students' academic success and employability outcomes is the identified problem that the proposed research study will address.

1.2 Background: Computer Literacy in TVET

The background to the study is the educational change brought about by the introduction of the National Certificate Vocational (NCV) at TVET colleges. The NCV is equivalent to Grades 10, 11 and 12 in general education (i.e., the FET phase) and is offered at Levels 2, 3 and 4 of the National Qualifications Framework (NQF). The NCV includes foundational subjects, such as Computer Literacy, which is a module of the subject, Life Orientation. Computer Literacy is offered from NQF Level 2 to NQF Level 4 in the NCV. Thus, it could be understood that there is a basic introduction at Level 2, then the subject complexity progresses across Level 3, with advanced computer literacy taught at Level 4.

TVET lecturers in South Africa are diverse in terms of their histories, their social backgrounds and their educational qualifications (Wedekind & Watson, 2016). The majority of lecturers have TVET-related qualifications, but not all of them are professionally qualified teachers (Buthelezi, 2018). Wedekind (2016) found that many lecturers were inadequately prepared to teach the Computer Literacy module of the Life Orientation subject. Paul and Elder's (2019) study, which focuses on Computer Literacy at Level 2, similarly revealed that lecturers did not possess

qualifications that equipped them to teach basic computer skills. According to the Level 2 Subject Guidelines for Life Orientation, “ICT lecturers must be computer literate and have an advanced knowledge of the following programmes: Word processing, Spreadsheets, Presentation and knowledge of the Internet and email” (DoE, 2013b:13). If TVET lectures do not have these basic competencies to teach Level 2 Computer Literacy, it is likely that the problem are exacerbated at Levels 3 and 4.

1.3 The rationale for the proposed research

In light of the key role that computer literacy plays in work and in education, it is important that the curriculum is of high quality, and that teachers are well-prepared to facilitate student learning (Martin & Dunsworth, 2007). The Department of Basic Education (DBE) has established a “Professional Development Framework for Digital Learning” which clearly sets out competency requirements for teachers of computer and digital literacy (DBE, 2018:15-19). The framework is very useful, but there is no similar framework document for the TVET sector, which falls under the South African Department of Higher Education and Training (DHET,2018). Firstly, lecturers appointed at TVET colleges do not require the same educational qualifications as teachers in the school system; and secondly, the Computer Literacy curriculum within the Life Orientation subject is different from that of the school curriculum, as it is more vocationally oriented. The reality in the TVET sector is that “lecturers at colleges require reskilling and upskilling to keep abreast with the latest technological developments” (Makgato, 2020:156). The focus of the proposed research study is therefore the enhancement of TVET computer literacy lecturers’ “pedagogical content knowledge” (Shulman & Sparks, 1992).

1.4 The research focus

The particular focus and research problem of this study, because of the shortage of teachers in ICT-related fields, is to determine whether TVET lecturers have the necessary pedagogical content knowledge (i.e., the requisite ICT knowledge and the pedagogical competencies) to teach the computer literacy component of the Life Orientation subject (Zinn et al., 2019:186; Makgato, 2020:156). Thus, this study responds to the following main research question and sub-questions:

1.4.1 Guiding research question

How can TVET computer and digital literacy teaching be strengthened?

1.4.2 Research sub-questions

1.4.2.1 What are TVET Computer Literacy lecturers' teaching practices, experiences, and challenges?

1.4.2.2 What training and support do computer literacy lecturers require to achieve a high quality of teaching?

1.5 Research aims and objectives

1.5.1 Aim

The aim of the proposed research study is the enhancement of computer literacy education in TVET.

1.5.2 Objectives/sub-aims

1.5.2.1 To describe TVET computer literacy lecturers' journeys, experiences and practices.

1.5.2.2 To identify the training and support needs of TVET computer literacy lecturers to facilitate high-quality teaching.

In the next chapter, the literature review is discussed, along with the theoretical and conceptual framework.

CHAPTER TWO: A LITERATURE REVIEW: COMPUTER LITERACY EDUCATION

2.1 Introduction to Chapter Two

In the first section of the literature review (2.1), I address the literature on computer and digital literacy, teaching computer literacy, computer literacy in TVET, and the challenges of under-qualified computer literacy educators. In the second part (2.2), I introduce the theoretical framework that underpins this study of supporting TVET lecturers' pedagogical content knowledge for teaching computer and digital literacy.

2.1.1 Computer and digital literacy: Debates in the field

Most scholars in the field of computer literacy agree that the application of advanced technologies, automation and the increasing digitization of work and learning points to the growing importance of computer literacy education for success in educational and work contexts (Tsai, Wang & Hsu, 2019; Makhmudov et al., 2020). There are, however, debates on the nature of computer literacy (i.e., what a computer literacy curriculum should contain at different levels and for what purposes) and how it should be taught. Scholars point out the importance of distinguishing between computer and digital "skills" and computer and digital "literacies" (Belshaw, 2014). For example, teaching digital skills would include showing students how to download images from the Internet and insert them into PowerPoint slides or webpages. Digital literacy would focus on helping students choose appropriate images, recognize copyright licensing, how to cite an image or get permissions, in addition to reminding students to use supporting text for images to support those with visual disabilities (Bers, 2010). Thus, digital skills focus on training students on a variety of digital tools (e.g., Twitter) and how to use it (e.g., how to tweet, retweet, use TweetDeck), while digital literacy would include in-depth questions: When would you use Twitter instead of a more private forum? Why would you use it for advocacy? Who puts themselves at risk when they do so? In practice, computer and digital skills and literacies are often taught together, although educators feel that the focus has tended to be on skills rather than on literacies (Iordache et al., 2017).

2.1.2. Defining computer literacy

A simple definition of computer literacy entails having a clear understanding of what computers are and how they can be used as a resource (Elias, 2019). Tsai, who emphasises the "literacy" issues, defines computer literacy as "the basic knowledge, skills, and attitudes needed by all citizens to be able to deal with computer technology in their daily life" (Tsai, 2021:69). Although computer literacy is often linked with digital literacy, there are differences. Digital literacy is the ability to communicate or find information on digital platforms, while computer literacy measures the ability to use computers and to maintain a basic understanding of how they

operate (Poynton, 2005). The DBE's guide, "Professional Development Framework for Digital Learning", found the term "computer literacy" to be dated, and preferred the term "digital literacies" as a "collective term referring to the various types of literacy associated with learning in a digital society. These include digital or ICT literacy, information literacy, media literacy and digital citizenship" (DBE, 2018:6). UNESCO defines digital literacy as follows:

> Digital literacy is the ability to define, access, manage, integrate, communicate, evaluate and create information safely and appropriately through digital technologies and networked devices for participation in economic and social life. It includes competencies that are variously referred to as computer literacy, ICT literacy, information literacy, data literacy and media literacy (UNESCO, 2018).

The DBE's definition is aligned with UNESCO's (2018) definition but includes the more critical dimension of "digital citizenship".

Computer and digital literacies are often taught together, partly because of tendencies to replace computers with tablets and touch screen technologies (Neumann & Neumann, 2013). Many students in the 21st century have learned their basic digital skill set on a smart phone by taking photographs or making videos, or voice activation on social media sites such as Facebook, Instagram and WhatsApp (Bennett & Maton, 2010). What students need is the understanding of how to communicate and achieve their learning objectives using these digital tools and technologies. Students who gain a strong foundation in digital literacy have a competitive advantage in the workplace, because digital literacy has become so important for students' academic and future job success, as well as their capacity to engage in modern society (Khan et al., 2022:46).

Definitions of computer literacy have been extended beyond basic computer skills and applications, for example, the inclusion of computational thinking. Computational thinking is described by García-Peñalvo and Mendes as necessary to "develop a reflexive and critical education in order to help children to solve problems using the technology with which they will live daily", which is an essential pre-university education to enable "possibilities regarding coding, robots, mobiles devices … game-based learning and so on" (2018:407). In addition to computational thinking, computer programming has been gradually emphasised in recent computer literacy education and regarded as a requirement for all middle school students in some countries (Tsai, Wang & Hsu, 2019:1345). Some computer literacy courses might cover very basic skills, such as "computer hardware terminology, operating system, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Internet Explorer and Microsoft Mail" (Moussallem et al., 2017) or learning how to utilise other software programs correctly (Makhmudov et al., 2020), while some courses might be more focused on basic coding or programming (Popat &

Starkey, 2019). In the South African context, and partly because many learners do not have access to computers, computer literacy is often understood as a basic course that introduces the fundamentals of computer usage, such as how to save and open files, the use of software such as word processing and presentation programs, sending and receiving e-mails, exploring the internet, and so on (Adeyinka & Mutala, 2008).

2.1.3 Teaching computer/digital skills and literacies

Computers and digital devices have become essential in the classroom to enable modern quality teaching and learning (Paul & Elder, 2019). Pedagogies for teaching computer and digital literacies tends to vary, depending on whether skills or literacies is the focus of the educational provision. In a skills-based approach, the emphasis is usually on fostering the development of four key '21st century skills', namely: "creativity, communication, collaboration, critical thinking" (Mirra, 2019:264). When a computer/digital literacy approach is taken, the skills-based approach is extended to raise awareness and includes "cultural, cognitive, constructive and confidence" issues (Belshaw, 2014). Teaching basic skills usually involves a practical focus, while literacies often include project-based learning and discussion groups. When teaching more advanced and more specialised applications, the recommended pedagogy is not to teach computer literacy as a stand-alone subject, but to integrate computer literacy education with "experiences that are interest-driven, peer-supported, and academically oriented" (Ito et al., 2013). It is generally recommended that teachers use "technology to teach" and that students use "technology to learn" (Steiner & Mendelovitch, 2017). Thus, teaching computer literacy with computers (rather than with chalk-and-talk) is a key pedagogy, and requires computer literacy teachers to be proficient in the use of educational technologies.

2.1.4 Teaching Computer Literacy in Vocational and Technical Education

Over the last two decades, substantial increases in the usage of computers and computer-based technologies have had an impact on educational curricula and pedagogies internationally, while computer technology knowledge and skills have become increasingly significant as educational tools in TVET colleges (Saud et al., 2010). Computer literacy is needed in almost all work environments (Chen et al., 2018; Salin et al., 2020). Computer applications are thus a fundamental technology of work, which is evolving at the same rate as the digital technologies that are redefining work and employability (Salin et al., 2020). Consequently, computer and digital literacy, together with more advanced computer knowledge, has become necessary for employability in the 21st century (Galbreath, 1999).

Because of the association between computer and digital knowledge and employability, TVET students tend to be highly motivated in computer literacy classes (Anggun et al., 2018).

2.1.5 The challenges of under-qualified lecturers

As we enter the era of the fourth industrial revolution, computer and digital knowledge and skills have become basic requirements for entering the workplace after completing the NCV qualification. Therefore, the quality of teaching and learning performed by lecturers in the TVET sector should be of high quality (Mabanza, 2020). During the Covid-19 pandemic, schools, TVET colleges and universities were forced to go online (Tejedor et al., 2020); the TVET sector, which did not have sufficient computer and digitally literate staff and students, had to shut down, with a significant impact on education (Nash, 2020). Since then, it appears that the world has entered a “new normal” of online teaching and learning.

During the 2020 pandemic, online teaching was the new phenomenon to assist educators to continue teaching and learning. However, it has been shown that many educators are still not ready for true online teaching and learning (Makhmudov et al., 2020). Lecturers and students who were able to pivot to online digital learning, were clearly at a considerable advantage (Belluigi et al., 2020). That said, knowing how to use a computer and digital tools is only one aspect of digital literacy.

Unsurprisingly, key barriers to the achievement of high-quality computer literacy teaching include these: lecturers possess low content knowledge; negative attitudes; and/ore lacking training and support. The current generation of students has a relative advantage regarding computer literacy due to their familiarity with the digital environment; but many educators, who were not brought up with computers, find themselves having to learn rapidly and teach the relevant subject to the current generation. A lecturer who teaches computer literacy should be highly knowledgeable in these programs: spreadsheets, word processing, PowerPoint presentations, as well as Access. Yet, across the spectrum, educators are seen as the driving force behind the success of the education system and educators are expected to perform accordingly.

Twenty-first century teacher education faces the significant challenge of providing quality teaching and learning for the future generation. Interestingly once teachers become qualified in computer studies, within five years of starting their teaching career, 50% will leave the South African education system, often going abroad to seek other opportunities (Holmqvist, 2019). Paul and Elder (2019) indicate that the growth in learner enrolment and lecturer attrition rate are among the main reasons for lecturers teaching outside their area of expertise. It follows that curriculum changes oblige lecturers to lecture subjects or phases in which they are not skilled nor qualified. As educational reforms become more complex, they become increasingly difficult to control (Dimmock et al., 2021). According to the South African Democratic Teachers Union (SADTU), students are therefore not obtaining the level of quality teaching and learning that they should be receiving.

2.1.6 Critical reflection on the literature

The literature highlights the increasing importance of computer and digital literacy in educational and work contexts due to advancements in technology and digitization (Thelma et al., 2024). However, a critical point of reflection lies in the ongoing debate surrounding the nature of computer literacy and its curriculum, specifically the distinction between "skills" and "literacies" (Tsai, Liang & Hsu, 2021). While digital skills focus on the technical operation of tools, digital literacy encompasses a deeper understanding of when and why to use these tools, considering aspects like copyright, accessibility, and digital citizenship. The review suggests that, in practice, the focus has often been on skills rather than the broader concept of literacies. This raises a critical question about whether current computer literacy education adequately prepares students for the nuanced demands of a digital society, or if it primarily prepares them with functional abilities, without fostering critical engagement. Furthermore, the evolution of definitions of computer literacy, from a basic understanding of computer usage to the inclusion of computational thinking and programming – and more recently generative artificial intelligence (Sperling et al., 2024) indicates a recognition of the growing complexity required in the digital age. However, in contexts like South Africa, access to computers remains a challenge, often limiting understanding of computer literacy to basic usage (Kalimullina et al., 2021). This disparity highlights a critical gap between the evolving demands of the 21st century and the foundational understanding and access available in certain regions of the country.

The literature also emphasises the necessity of integrating computer literacy education with relevant experiences rather than teaching it as a standalone subject (Timotheou et al., 2023), and the importance of teachers being proficient in educational technologies. This points to a critical need for adequate lecturer training and support in pedagogical approaches that effectively blend skills and literacies, enabling students to use technology with critical awareness as a tool for learning.

Finally, the review raises the challenges posed by under-qualified TVET lecturers in teaching computer literacy. As mentioned, the rapid shift to online teaching during the pandemic exposed a lack of preparedness among both staff and students (Casal-Otero et al., 2023). This has been compounded when lecturers have low content knowledge, negative attitudes, and insufficient training and support. The high attrition rate among qualified computer studies teachers in South Africa further exacerbates this problem, leading to lecturers teaching outside their areas of expertise and potentially compromising the quality of education. This situation presents a significant challenge that needs to be addressed to ensure TVET students receive the necessary high-quality computer literacy education for employability in the 21st century. The critical reflection here lies in the systemic issues that hinder effective computer literacy

instruction in TVET colleges, requiring comprehensive strategies to support lecturer development and retention.

2.2 Justification of the conceptual and theoretical frameworks for teaching computer literacy

Using both a conceptual and theoretical framework in the study strengthens the research design: the conceptual framework provides a clear structure for understanding the phenomenon under investigation, while the theoretical framework is the lens through which it is examined.

The conceptual framework for this study emerged from the literature review on computer and digital literacies. The literature identifies and relates key concepts relevant to teaching computer literacy, such as different levels of computer literacy skills and competencies, various forms of knowledge (from theory-based to practical and specialised), and associated pedagogies. This conceptual framework, summarised in Table 2.1, helps to map out the domain of computer literacy teaching and provides a structure for organising the study focus and variables. It essentially outlines “what” is being studied by bringing together the key ideas and their relationships, as identified in the literature.

The theoretical framework for this study is the Digital Capabilities Framework (JISC, 2020). This framework was chosen because it extends existing models like Pedagogical Content Knowledge (PCK) and Technological Pedagogical and Content Knowledge (TPACK) and is particularly appropriate for the teaching of computer and digital skills and literacies, especially in vocational education contexts like TVET colleges. The Digital Capabilities Framework provides a lens through which to understand the different dimensions of digital competencies that are necessary for both individuals and organisations in the digital era. This framework explains ‘how’ the phenomenon (TVET lecturers' competencies) will be viewed and analysed in the study, providing an established theoretical basis for assessing digital capabilities in a vocational setting.

The collective use of both a conceptual and theoretical framework provides the necessary structure and lens to address the research questions effectively. The conceptual framework clearly delineates the core concepts related to computer and digital literacy teaching, including the different levels of skills and competencies, forms of knowledge, and relevant pedagogies. This is crucial for answering the sub-question regarding TVET Computer Literacy lecturers' teaching practices, experiences, and challenges, as it provides a specific domain and terminology for examining these aspects. Complementing this, the theoretical framework, the Digital Capabilities Framework, offers a robust model for understanding and assessing the multifaceted nature of digital competence. Its six components provide a detailed lens through which to analyse lecturers' current capabilities and identify specific areas where training and support

are required to enhance the quality of their teaching, directly addressing the second sub-question. Furthermore, by providing a comprehensive understanding of the current state of lecturers' competencies and the areas needing development, both frameworks contribute significantly to answering the overarching guiding question on how TVET computer and digital literacy teaching can be strengthened. The applicability of the Digital Capabilities Framework's in vocational education and teacher development further ensures its relevance to the study's context.

2.2.1 The conceptual framework

The key concepts that emerge from the literature on computer and digital literacies include, firstly, computer literacy skills and competencies. These can be described as being at different levels, from basic to advanced. Secondly, there are different forms of knowledge that range from theory-based knowledge to practical knowledge, and specialised knowledge that integrates both theory and practice. In addition, computer knowledge can be integrated with subject content, while theory and practice can also be integrated in modalities such as problem-based learning. Thirdly, there are different pedagogies associated with facilitating learning, such as classroom-based exercises for learning computational thinking, practical tasks to facilitate computer skills development, co-teaching with computer experts and subject experts for specialised applications, and problem-based learning for advanced computer literacy, such as programming or coding. Table 1 summarises the conceptual framework.

Table 2.1: Conceptual Framework for Teaching Computer Literacy

Basic ↓ *Advanced*	**Computer literacy competencies**	**Knowledge base**	**Pedagogies**
	Computer programming	Logic	Problem- and project-based learning
	Advanced computer applications	Integrated theory and practice	Specialised/ Co-teaching
	Basic computer application (skills and competencies)	Practical Skills	Laboratory based
	Computational thinking	Theoretical	Classroom-based, group discussion

2.2.2 Theoretical framework

The theoretical framework for this study is the Digital Capabilities Framework (JISC, 2020). The TPACK model proposes that educational technologies have become a part of pedagogical knowledge (Jang & Tsai, 2013), while the Digital Capabilities Framework is more appropriate to the teaching of computer and digital skills and literacies (Johnston, 2020). The Digital Capabilities Framework includes information and skills, computer, network and media literacies (Balyk et al., 2020). The model arose from the need to use modern digital technologies effectively and safely in work and study, as well as for professional and personal development. The concept of 'digital literacy' is constantly transforming (Johnston, 2020). It has adapted to accommodate the global pandemic, and has addressed the growing need for "digital well-being" (JISC, 2020). The Digital Capabilities framework is thus a model showing how to build digital capabilities. Digital Capabilities are thus seen as a necessary expansion of computer literacy in the digital era.

The model attempts to provide a framework for the development of digital capabilities to ensure that students are able to flourish in their studies and in their future workplaces. The model explains that students follow a line of progress, from basic competencies to the self-actualising potential of a digital identity and well-being. The model is also inspired by Maslow's hierarchy of needs (Maslow, 1943).

In the study of digital literacy for digital competence, Falloon (2020) found that it is up to each person to define what it means to be digitally capable. Individual needs, subject matter specialization, career preferences, as well as personal and other variables, all play a role. Digital capabilities are likely to become more important for employability in the largely digital environments of Industry 4.0. The Digital Capabilities Framework, in which individual and organisational capability is distinguished, is a tool for educational and employment success in this digital

world; and it proposes a way of thinking about how teachers and students could thrive in a digitally connected world.

The Digital Capabilities Framework has six components (Balyk et al., 2020):

- ICT Proficiency (digital and computer skills)
- Information, data and media literacies (critical use)
- Digital creation, problem solving and innovation (creative production)
- Digital communication, collaboration and partnership (participation)
- Digital learning and development (development)
- Digital identity and well-being (self-actualising).

The Digital Capabilities Framework develops a set of positional profiles that examine six aspects of digital competence in the context of various job functions (Balyk et al., 2020). This makes the framework particularly appropriate for the TVET context. The lecturers in a TVET college should attain these elements of digital competence. Each profile shows how new practices evolve and how lecturers teaching computer literacy can apply their digital skills to various aspects of their professional roles.

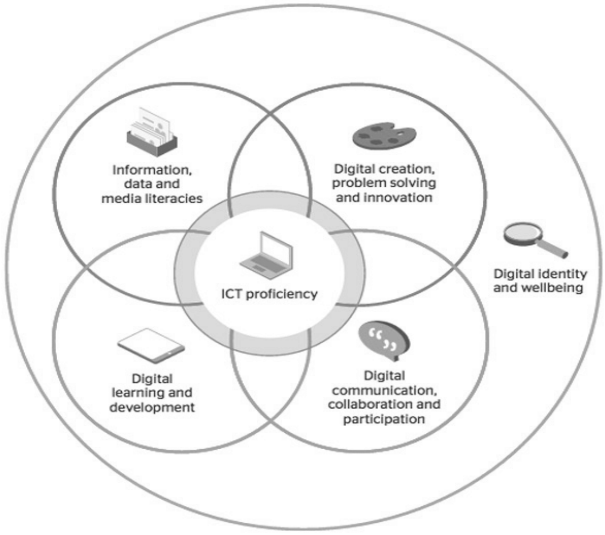

Figure 2.1: Digital Capabilities Framework
(JISC, 2020)

In the context of rural colleges in the UK, White et al. (2021) suggest that the framework is aspirational, given "additional challenges involving connectivity and digital resistance". This has implications for the South African TVET context in which resources for teaching digital literacies are very limited. While the framework might be aspirational in the South African context, it is sufficiently open-ended to enable users to determine identify the practical steps to drive digital transformation. However, because of "rapidly developing digital transformation"

(Wall et al., 2023:711), the JISC framework consist of additional tools, such as generative artificial intelligence.

Although there are limitations, the Digital Capabilities Framework was particularly useful for this study as it could be applied in workplaces and in vocational education (e.g., Feerrar, 2019; Falloon, 2020). It has also been adapted for “disciplinary digital capabilities through signature pedagogies” (Varga-Atkins, 2020:1), thus can be used for general and vocational education, with adaptations. The framework has also been used for teacher development (e.g., Balyk et al., 2020), educational policy development (Clark, 2021) and staff development in libraries (Jacobs & Nixon, 2021). Scholars across the globe have used the framework, including Australia (Ahmed & Roche, 2021), Saudi Arabia (Almaiah et al., 2020, the UK (Johnston, 2020), the US (Feerrar, 2019) and Ukraine (Balyk et al., 2020). The framework is a new one, but is based on the highly reputable PCK and TPACK frameworks. The framework is also a post-pandemic framework, which takes account of emerging digital literacies and the increasing importance played by online forms of learning which are likely to continue post-pandemic (Almaiah et al., 2020; Clark, 2021). For all the reasons cited above, the Digital Capabilities Framework was considered to be appropriate for the study. In the next chapter, the methodology of the study is discussed.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 An overview of Chapter 3

In this chapter, the research design, methods and ethical considerations are outlined to explore and enhance the practice of TVET college Computer Literacy lecturers. This study is guided by an interpretative paradigm that explores lecturers' experiences and perceptions of teaching computer literacy. A qualitative approach was implemented to gather contextual data using semi-structured interviews and document analysis.

3.2 Research design

An interpretative paradigm was applied. The justification for selecting this paradigm was that the focus would be on the importance of the lecturers' experiences, perceptions, and the meanings that they ascribe to their roles as computer literacy educators. A qualitative approach was used in this study because the research problem – that is, enhancing computer literacy lecturers' practice – required "inquiring into the meaning individuals or groups ascribe to a social or human problem" (Creswell & Poth, 2016:37).

Because of the focus on lecturers' experiences and practices within the TVET context, a case study design was chosen. The justification for a case study research design was its context-specificity; case studies provide a rich and detailed understanding of a phenomenon within its real-world context – in this case, the specific environment of a multi-site TVET college in South Africa. The case study designed enabled an exploration of the complexities of the teaching environment and the factors influencing it, leading to insights into how teaching can be strengthened within that specific context. Through a curriculum study and in-depth interviews, the case study design enabled in-depth exploration of lecturers' experiences, challenges, and perspectives. The focus on understanding meaning from the participants' perspectives and the acknowledgment of the socially constructed nature of their experiences fit well with the interpretive paradigm.

3.3 Research methods

3.3.1 Site selection

All TVET colleges offer the module, Computer Literacy, as it is part of Life Orientation, a foundational course for all subjects. Because Computer Literacy is located within a generic skills course, its focus is on using software applications – as opposed to a specialised computer programme subject which is about building or adapting applications. It was therefore important to select a department that offers generic Information and Communication Technologies (ICTs). The Office Department (OD) was therefore selected. To protect the confidentiality of

this department, its name has been changed, but its generic name is broadly representative of the programmes offered. The OD offers courses designed for students interested in obtaining a certificate in office-based activities; and students receive both practical and theoretical experience. Job opportunities include these positions: administrative officer, company secretary, hospital administrator, legal or personal assistant. As these students prepare for the world of work, the TVET lecturer expansion programme is a key element of this new delivery structure and, in the process, hopes to ensure that lecturers in the TVET colleges are prepared to deal with new technologies when training students for work. A justification for the selection of the site is therefore that the OD teaches generic applications, such as word processing, spreadsheets, social media, data management, desk-top publishing, online collaboration and email.

3.3.2 Participant selection

3.3.2.1 TVET lecturers

A full sample, that is the totality of all lecturers teaching Computer Literacy in 'Office Departments' on all the multiple-campus sites, were invited to be research participants on the study. The reason for a full sample is that such a sample would include a wide variety of computer literacy lecturers: more and less experienced lecturers; lecturers with and without ICT qualifications; and lecturers with and without an educational qualification.

Inclusion criteria

1. All participants should be TVET lecturers in 'Office Departments';
2. Participants should have different educational qualifications;
3. Participants should have different levels of experience in teaching computer literacy; and
4. Participants should be broadly representative of South African society.

Exclusion criteria

1. Temporary lecturing staff.

Six computer literacy lecturers agreed to be included in the study. This sample of six lecturers met the selection criteria and offered TVET lecturer diversity in terms of language, 'race', gender and educational levels. Computer literacy lecturers are at the heart of this study, thus it was important that their perspectives and experiences were given prominence.

3.3.2.2 A justification for the absence of TVET student research participants

The exclusion of students from the study is justified on the grounds that the focus, and heart of the study, is the lecturers and their experiences. TVET lecturers are an under-researched group in vocational and technical educational research (Oosthuizen & Van der Bijl, 2019), as

the majority of research studies in TVET focus on curriculum alignment with industry and the experiences and competencies of the students (Likisa, 2018). A focus on TVET lecturers, and particularly on the professional development and in-service training of TVET lecturers, represents a gap in the literature and is the focus of this study.

3.3.3 Data collection

3.3.3.1 Documentary data

Documents are “any written material other than a record that was not prepared explicitly in response to some requests from the investigator” (Ahmed, 2010). In this case, the documents are curricular documents, in particular, the Internal Continuous Assessment (ICASS) guidelines for the NC(V) qualifications (2021), as well as the Life Orientation (Computer Literacy) subject and assessment guides. The study of these documents enabled me, as the researcher, to understand the scope and requirements of the Computer Literacy lecturers’ practice and served as triangulation for the semi-structured interviews (Natow, 2020).

3.3.3.2 Semi-structured interviews with Computer Literacy lecturers

Semi-structured interviews have to achieve “reciprocity” and “reflexivity” (Galletta, 2013:76). To achieve reciprocity and reflexivity, it is necessary to engage participants in “clarification, meaning-making, and critical reflection” (Galletta, 2013:78). Galletta (2013) advises that reciprocity and reflection should be structured into the interviews, and that the interviews should be structured over a period as this “creates space for you and your participant to think more deeply about responses to interview questions [and] to revisit points from a previous session” (Galletta, 2013:78). The main data source for the study was the semi-structured interviews with the Computer Literacy lecturers.

It was important that the privacy and dignity of the lecturers be ensured, thus I conducted the individual interviews in the lecturers’ own offices where possible, or via MS Teams, depending on the restrictions in place. Since Microsoft Office is the official operating system at all public TVET colleges in the Western Cape due to the COVID-19 pandemic, when necessary (with regard to the social distancing regulations), I conducted semi-structured interviews on Microsoft Teams with the lecturers. I followed best practices for the use of video-conferencing software in semi-structured interviews (Archibald et al., 2019). The interviews were conducted during working hours in lunch breaks to avoid interference with classes, as well as to ensure that participants had access to Wi-Fi. The participants responded to questions that I had prepared to address the research sub-questions (see Appendix A). Three interviews (of approximately 40 minutes each) were conducted with each lecturer (see Appendix A). The interviews were audio-recorded and transcribed by a professional transcriber. The transcriptions were

then ‘cleaned’, that is, all statements that might identify them interviewees, students, other lecturers, and so on, were removed or anonymised. Member checks were conducted individually, that is, the participants and researcher individually discussed each individual lecturer’s cleaned transcript and checked it for accuracy. The only changes requested to a transcript occurred if the transcriber had not understood a particular term. In other words, only minor changes were made to the transcripts prior to the analysis.

3.4 Data analysis

3.4.1 Analysis of curriculum documents

Qualitative document analysis (QDA) is “a research method for rigorously and systematically analysing the contents of written documents. The approach is used … to facilitate impartial and consistent analysis of written policies” (Ward & Ward, 2013:1). QDA was used to analyse the lecturer development policy and computer literacy curriculum documents. QDA requires two rounds of analysis: the first addressed the underpinning principles of lecturers’ practice and training provision/requirement (in this case, digital literacy practices and training across the documents included in the study); and the second compared the principles and practices across the documents to establish levels of coherence. Thus, curriculum documents were studied to identify and understand the scope of the computer literacy lecturers’ expected practice, including the explicit and implied competencies and qualifications.

Table 3.1: Matrix for QDA

	Documents Selected for Analysis	**Categories of Analysis**
1	Internal Continuous Assessment (ICASS) guidelines for NCV qualifications (2021)	Learning outcomes Assessment criteria Teacher competencies
2	Subject Guide Life Orientation (Computer Literacy Section)	List of learning outcomes Teacher competencies
3	Assessment Guide Life Orientation (Computer Literacy Section)	Assessment criteria

3.4.2 Analysis of lecturers’ semi-structured interviews

The semi-structured interviews produced a large amount of rich, subjective and contextual data. The analysis of interview data followed Roulston’s three steps: “1) data reduction, 2) data reorganization, and 3) data representation” (Roulston, 2014: 301).

Data reduction involved cleaning and anonymising the data; reorganising largely comprised data coding, followed Boyatiz’s five-part coding system: “1) labelling the data, 3) defining the

characteristics of the data, 3) clustering the data into categories and themes, 4) qualifying themes and exclusions to the themes, and 5) selecting positive and negative examples of the themes" (Boyatzis 1998, x-xi). In the third phase, data representation, Roulston's approach was adopted: "researchers consider assertions and propositions in light of prior research and theory in order to develop arguments" (Roulston, 2014:307).

At this stage, I was ready to present the findings and to discuss the findings of the study. I recorded the process of data analysis in order to increase the trustworthiness of the findings. Table 3.2 provides a summary of the research design:

Table 3.2: Summary of research design

Research Sub-questions	**Data Source**	**Data Collection Methods**	**Unit of Analysis**	**Data Analysis Methods**
1. What are TVET Computer Literacy lecturers' teaching practices, experiences and challenges?	Curriculum documents	Collection of relevant Subject and Assessment Guides	Lecturer requirements (explicit and implied)	Qualitative document analysis (Ward & Ward, 2013).
	Lecturers	Individual semi-structured interviews	Lecturers' journeys to computer literacy lecturer	Three phases of data analysis: 1) data reduction, 2) data reorganization, and 3) data representation (Roulston, 2014).
2. What training and support do computer literacy lecturers require to achieve a high quality of teaching?	Lecturers	Individual semi-structured interviews	Teaching practice in computer literacy	

3.5 Trustworthiness

The term 'trustworthiness' refers to the "value of fact" and the "transparency of the study" (Iwu, 2019). The rigour of qualitative research is dependent on the elements of trustworthiness, namely: credibility, confirmability, transferability, and dependability. This applies to considerations regarding the trustworthiness of interview data, in particular, the credibility and confirmability of participants' interviews, and the transferability and dependability of the researcher's

analysis of the data (Polkinghorne, 2007:471). The elements of trustworthiness are discussed in the following sub-sections.

3.5.1 Credibility

To address the credibility of participants' narratives, I included curriculum documents in the study that were used to understand the scope of the Computer Literacy lecturers' expected practice, as well as to triangulate issues that arose in the interviews with the required topics and assessment criteria, as stated in these documents. This is an approach recommended by Galletta (2013) who supports the inclusion of artefacts (e.g., PowerPoint slides) and documents (e.g., lesson plans) in the analysis of semi-structured interview data as it provides an opportunity to understand and assess what a participant intended to do through his or her actions. I established that the findings of the research were credible and accurately represented the participants' perspectives. Credibility was enhanced by including curriculum documents to triangulate issues that arose during the interviews concerning expected practices, topics, and assessment criteria. This triangulation method, supported by Galletta (2013), helped to verify and validate the participants' narratives by comparing them against external sources. Additionally, member checking – where participants reviewed transcripts to correct errors – directly enhanced credibility by allowing participants to confirm the accuracy of their own accounts and my analysis.

3.5.2 Confirmability

I ensured that the findings were as objective as possible, and that the analysis of the data was clearly linked to the findings (Polkinghorne, 2007:471). Once the interviews had been transcribed, they were subjected to member checking; that is, participants were provided with the opportunity to correct errors and challenge what were perceived as incorrect interpretations. Confirmability was also addressed through the process of establishing a trail that allowed others to see how the analysis and interpretations were supported by different sources of evidence.

3.5.2 Transferability

Transferability in qualitative research is not about generalisability in the quantitative sense, but about providing rich, detailed descriptions that allow readers to judge the applicability of the findings to their own contexts (Creswell & Poth, 2016:37). I demonstrated the extent to which the findings could be applied to other contexts or settings through thick description of the research context, the participants, and the findings. The curriculum documents provided some context for the study, which indirectly contributes to transferability by allowing readers to understand the setting in which the data were collected (Ward & Ward, 2013).

3.5.3 Dependability

To ensure dependability, I showed that the research process was logical, traceable, and clearly documented. I enhanced dependability by systematically including curriculum documents to understand the scope of practice and triangulating issues from interviews. This methodical approach to data collection and analysis provided consistency. The use of member checking, while primarily for credibility, also contributes to dependability by ensuring the consistency of the data analysis. A detailed account of the research methods, including the data collection and analysis procedures, further enhanced dependability. The findings are thus consistent and could be repeated under similar conditions (Polkinghorne, 2007:471).

3.5.1 Conflict of interest

Since I am a lecturer at the TVET college, the site of data collection, I am placed as an insider which could possibly be seen as an added advantage. Fortunately, I am at the same post level as the participants selected for the narrative interviews, therefore I have no authority over them. As I am their colleague, the interviewees were provided with some degree of comfort in sharing their journeys when answering the interview questions. This could be seen as an advantage.

3.5.2 The researcher's position

As a lecturer at a TVET college, I am an insider, in the sense that I have experience and understanding of the TVET sector more broadly, and expertise in computer literacy more specifically. My position was not that of a participant researcher. I was the interviewer in gathering data from TVET college lecturers. My role was that I met and built a trusting relationship with the lecturers who taught generic computer literacy, without necessarily having formal qualifications as a computer literacy lecturer. Further to my positionality, I hold technical and vocational education in high esteem, I respect all my colleagues, and I have empathy for those who are required to teach outside their area of specialisation. As the interviewer, I asked the participants questions, and also used prompts as part of the interpretive approach (Galletta, 2013:75).

3.6 Research ethics

In preparing for and conducting the research, I paid close attention to ethical considerations, especially since I am an insider as a lecturer at the TVET college. I paid special attention to obtaining informed consent and using labels such as Lecturer 1, Lecturer 2, and so on, to safeguard the institution's and interviewees' identities. For this research, the narrative interviews took place at an appropriate date and time selected by the participants. The research data needed to be collected in a setting that was comfortable for the participants, and with sufficient time allocated for them to recount their journeys.

3.6.1 Access and permission

Firstly, ethical approval was obtained from the Cape Peninsula University of Technology's Faculty of Education, Mowbray Campus. The supervisor and postgraduate candidate received a letter of authorisation from the DHET, TVET division to conduct research at a public TVET college. According to Bell and Waters (2014), ethical consideration is seen as having important role in ensuring that no badly designed or harmful research is permitted. Once approval had been confirmed, I wrote to the CEO and campus management to request permission to conduct the research at the TVET college; and permission was granted.

3.6.2 Confidentiality

I informed the interviewees that I would be using labels such as Lecturer 1, Lecturer 2, etc. for each of them, and that the names of the department and the selected TVET college would be replaced with a generic name. The participants agreed to this. I also explained that I would securely save all interview recordings/notes, as well as contact information. Hard copies were kept in a locked filing cabinet at home, and I had sole access to the key and cabinet. Electronic copies were stored on my personal laptop and password-protected. No one else is permitted to use my laptop. I followed the recommendations stated by the Protection of Personal Information Act which took effect from 1 July 2021.

3.6.3 Informed consent

As the researcher, I addressed ethical issues, firstly, by explaining the purpose of the study to all participants. I explained that my research was conducted for the purpose of obtaining my Master's degree, as well as because of my interest in enhancing TVET educational provision. I gave each participant a consent form to sign and explained that participation in the study was entirely voluntary. Singh (2020) claims that "informed consent involves autonomy, and it stems from the participants' right to freedom and self-determination". Participants were also told that they had the right to withdraw from the study at any time, that they could ask questions at any time, and that they would obtain a copy of the informed consent form. The Protection of Personal Information Act (POPIA), No. 4 of 2013, took effect on 1 July 1 2021. To ensure that consent was handled in accordance with the POPIA, I closely followed recommendations for informed consent.

Upon ethics clearance, this research was determined as "low risk" to the participants involved.

In the next chapter, the findings from the document analysis are discussed.

CHAPTER FOUR: FINDINGS FROM THE DOCUMENT ANALYSIS

4.1 Overview of Chapter Four

In this chapter, research findings from the curriculum data are presented. The data on which the chapter is based comprise the Internal Continuous Assessment (ICASS) guidelines for NC(V) qualifications (2021), along with the Subject Guide (SG) Life Orientation (Computer Literacy section) and the Assessment Guide (AG) for Life Orientation (Computer Literacy Section). The curricular data were analysed using the JISC Digital Capability Framework (2020). The analysis of the curriculum against the Jisc Digital Capability framework is described, highlighting areas of strength as well as weakness in the areas of information literacy, digital well-being, and digital competence. In the next chapter, the implications for how TVET computer literacy lecturers' teaching practices and how the curricular documents provided to them for instruction could be improved are discussed.

4.2 Internal Continuous Assessment (ICASS) guidelines for NCV qualifications (2021) for Life Orientation in ICASS document

In South Africa, the Life Orientation (LO) subject was created following a curriculum review process. LO offers a holistic approach to shape the minds of students for various aspects of life within and beyond the classroom. In the TVET sector, LO is divided into two components, namely, Life Skills and Computer Literacy. Computer Literacy is the focus of this study. In the curriculum document – the Subject Guide (SG) – computer literacy is defined as “the fundamental knowledge, abilities, and attitudes required of all persons to deal with computer technology in their everyday lives” (SG, 2013:6). This definition aligns with similar definitions in the literature, for example, that computer literacy entails having a clear understanding of what computers are and how they can be used as a resource (Elias, 2019); or that computer literacy is “the basic knowledge, skills, and attitudes needed by all citizens to be able to deal with computer technology in their daily life” (Tsai, 2002:69). The NC(V) considers LO to be a fundamental subject, that is, it is a required subject because it is fundamental to all aspects of the curriculum. The marks of two components with five formative assessments are required for an NC(V) student to receive the complete subject result for fundamental subjects: Examination and ICASS.

> The lecturer only has five formative assessment opportunities in vocational subjects and seven for fundamental subjects to assess the students’ knowledge and competencies during the academic year (ICASS, 2021:20).

In the prescribed assessment procedure, the ICASS is a required section of assessment. The students' results will be incomplete if any section is not completed. Other than the examination procedure, ICASS process allows lecturers to assess the students on an ongoing basis in the classroom.

> Tasks done through class tests or quizzes, observations, discussions, practical demonstrations, informal classroom interactions to name a few are used for daily monitoring of students' progress. Such tasks are administered to support the teaching and learning process. They are used to provide feedback to the students and to inform planning for teaching (ICASS, 2021:7).

Assessments plays a crucial role in the teaching and learning process. Both the student and the subject specialisation lecturer can assess student progress and determine whether remedial actions are necessary (ICASS, 2021:2). Consequently, effective administration, conduct, and reporting of students' performance in the ICASS component is required for the NC(V) qualification to be delivered successfully and with integrity (ICASS, 2021:2). Furthermore, the NC(V) legislation, which is related to the ICASS, specifies a sub-minimum for internal and external assessments.

According to Van Rensburg (2019), in previous years, the lecturers teaching the various subjects were required to implement practical assessments, as stipulated in the ICASS. The DHET decided to standardise the practical assessments of vocational courses for the ICASS after discovering that the quality of these assessments differed among programmes and across institutions. These were renamed by the DHET as "Practical assessment tasks", or PATs, starting in 2016 (Lutaaya, 2015). Practical evaluations are essential to the vocational aspect of NC(V) qualifications since they involve the combination of theory and practice. The ICASS PATs, like the ISATs, demand that students demonstrate that they can apply theoretical knowledge to practical scenarios that mirror real-life situations, and hence these assessments can be used to determine a graduate's work preparedness (Van Rensburg, 2019). The needed percentage of achievement is 40% for Life Orientation (including both components, Life Skills and Computer Literacy).

In all the NC(V) curricula, Life Orientation is a compulsory subject which prepares students for meaningful and effective living in a real world of rapid change and transforming society. The subject intends to cover what the curriculum aspires to achieve in the hearts and minds of all students. As a result, LO is regarded as an essential subject in the TVET sector, alongside subjects like languages and mathematics, which are seen as fundamental in the NC(V) curriculum:

> … all vocationally orientated qualifications that allow the student to progress into further learning along a vocational pathway in various fields. Life Orientation is one of three fundamental subjects that enhances students' possibilities to achieve success in their vocational studies as well as in life (SG, 2013:2).

Table 4.1 provides an overview of the Computer Literacy curriculum. Note that the Life Skills course has five topics, as well as the Computer Literacy course has five topics. As the topics in the LO guides follow numerically, the Computer Literacy course is covered in Topics 5 to Topic 9.

Table 4.1 Topics of Computer Literacy levels 2, 3, 4

Assessment Guidelines (2015) and Year planner (2021/2022)

Level 2	Level 3	Level 4
The student should have covered the following topics by the end of Computer Literacy in Life Orientation, level 2.	The student should have covered the following topics by the end of Computer Literacy in Life Orientation, level 3.	The student should have covered the following topics by the end of Computer Literacy in Life Orientation, level 4.
Topic 5: *Concepts of Information and Communication Technology (ICT)* *Topic 6:* *Basic features of Microsoft Word (Word-processing programme)* *Topic 7:* *Basic features of Microsoft Excel (Spreadsheet programme)* *Topic 8:* *Basic features of Microsoft PowerPoint Presentations* *Topic 9:* *Introduction to E-Mail and Internet*	*Topic 5:* *Concepts of Information and Communication Technology (ICT)* *Topic 6:* *Advanced features of Microsoft Word (Word-processing programme)* *Topic 7:* *Advanced features of Microsoft Excel (Spreadsheet programme)* *Topic 8:* *Advanced features of Microsoft PowerPoint (Presentations)* *Topic 9:* *Introduction to Internet Research*	*Topic 5:* *Introductory Theory of Information and Communication Technology (ICT)* *Topic 6:* *Integrated features of Microsoft Word (Word-processing program)* *Topic 7:* *Integrated features of Microsoft Excel (Spreadsheet program)* *Topic 8:* *Basic features of Microsoft Access (Database)* *Topic 9: The Internet as communication medium*

4.2.1 The curriculum topics

The computer Literacy curriculum comprises five topics on ICT, Microsoft Office, and the Internet. Across NQF Levels 2 to 4, the topics become more advanced or "integrated". Topics on the Internet progress from email to information finding and social media. Students enrolled in the Computer Literacy course would be expected to emerge from three years of training with some knowledge of information and communication technology, with advanced level skills on all the Microsoft Office applications, as well as with skills on the use of the internet. As Table 4.1 shows, the course is a computer *skills* course, rather than a computer *literacy* course. Thus, the Computer Literacy section of the Life Orientation programme does not align with the curriculum's own definition of computer literacy, nor does it align with the understandings of computer literacy in the literature (e.g., Tsai, 2002; Belshaw, 2014; Elias, 2019). The skills-based nature of the course is more evident when the individual outcomes associated with each of the topics is studied more closely, as presented in Table 4.2.

Table 4.2 Learning outcomes of Computer Literacy, levels 2, 3 and 4
Assessment Guidelines (2015) and Year planner (2021/2022)

Topic 5: Concepts of Information and Communication Technology (ICT) *Student should be able to:* • *Identify the basic components of a computer* • *Identify the purpose and use of the basic components of a computer* • *Understand what the purpose of an Operating System is* • *Identify and name components of the Windows desktop* • *Open different windows*	*Topic 5: Concepts of Information and Communication Technology (ICT)* *Student should be able to:* • *Identify the impact of Information and Communication Technology (ICT) on own physical environment and work* • *Identify the latest technological Information and Communication Technology (ICT) devices and discuss their impact* • *Understand ergonomics in terms of computer workspace. Range: Sitting posture, distance from computer, relaxation exercises, height level of computer and enough light and air* • *Describe RSI and eye fatigue as consequences of bad ergonomics* • *Identify health and safety aspects in a computer environment*	*Topic 5: Introductory Theory of Information and Communication Technology (ICT)* *Student should be able to:* • *Discuss the impact of social networks and media. Range of social networks and media: Facebook, Twitter, blogs, Mxit, Skype, YouTube, etc.* • *Understand the protocols and precautionary measures when using these networks* • *Explore cases of internet fraud and Internet predators e.g. cyber bullying* • *Identify safety aspects when downloading items from the Internet* • *Understand the consequences of piracy and illegal downloads*
Topic 6: Basic features of Microsoft Word (Word-processing programme) *Student should be able to:* • *Identify and use a number of keys and explore their effects in a Word document. Range: Alphabetical keys, number keys/num lock, Caps Lock, Enter, Backspace, Delete, Spacebar, Shift, Tab, Ctrl + Alt, Delete and F keys. Practise using these keys to create*	*Topic 6: Advanced features of Microsoft Word (Word-processing programme)* *Student should be able to:* • *Set margins according to requirements* • *Select and use a page orientation for different purposes. Create and edit text using the Columns and column breaks functions* • *Insert a table, picture or clip art, header and footer, page number and page breaks in a text*	*Topic 6: Integrated features of Microsoft Word (Word-processing program)* *Student should be able to:* • *Use integrated features to format a Word document. Range: to format text, a picture and a table: Highlight text, typing text in bold, italics and underline, typing text in different styles and font sizes, using numbers and bullets first and second level, using the alignment functions - left, right, centre, using borders and shading and resizing*

and edit a text document, for example using the tab key for indenting • *Create and save a Word document* • *Use basic features to format a Word document. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use numbers and bullets on first and second levels and use the alignment functions - left, right, centre, insert headers and footers* • *Use basic features to edit a Word document. Range: Move around in the document, type in it (INS); add text; delete text; start a new paragraph; type in capital letters (upper case), lower case and title case and use UNDO and REDO functions Spell check; preview and print the document*	• *Format a table using the borders and shading function* • *Format a picture or clip art using the resizing function* • *Spell check; preview and print the document using advanced printing functions. Range of printing functions: A range of pages, back-to-back, current page*	• *Use integrated features to edit a Word document. Range: Move around in it, type in it (INS), delete text, start a new paragraph, type in capital letters, use UNDO and REDO functions, set margins, use a different page orientation, insert columns and breaks* • *Spell check, preview and print the document using different printing functions Range of printing functions: A range of pages, back-to-back, current page* • *Create, spell check and print the primary/main document for distribution and mailing. Range: Type document, start mail merge, type new list/use existing list to link records, insert merge fields* • *Use MS Word or MS Access to create and use MS Access to print a Data Source document containing the variables, that must be printed in the secondary document. Range for printing in MS Access: rename table name, change page layout/column widths, print on one page* • *Merge the Main document and Data Source file to print the Secondary document. Range: edit header/footer, print all or print only selected recipients*

Topic 7: Basic features of Microsoft Excel (Spreadsheet program) *Student should be able to:* • *Create and save a spreadsheet* • *Use basic features to format a spreadsheet. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use different alignment functions - left, right, centre, merge and centre; adjust the width of the columns and height of rows and insert borders (horizontal and vertical lines) insert headers and footers* • *Use basic features to edit and change information in a spreadsheet. Range of editing: Move around in the document; delete text; type in capitals letters (upper case), lower case and title case; insert rows and columns and use UNDO and REDO functions. Range of changes: Change the contents of a cell or part of the contents of a cell, change the formats of dates and currency, change number formats and decimal settings* • *Spell check; preview and print the document* • *Perform basic spreadsheet calculations. Range: Add, subtract, divide, multiply, autosum* • *Preview and print the document*	*Topic 7: Advanced features of Microsoft Excel (Spreadsheet program)* *Student should be able to:* • *Do advanced calculations using formulas* • *Display the formulas* • *Identify the different types of charts* • *Create a column, line and pie chart* • *Insert chart titles and legends* • *Edit the appearance of a chart by changing the fill colour* • *Spell check; preview and print the document*	*Topic 7: Integrated features of Microsoft Excel (Spreadsheet program)* *Student should be able to:* • *Use integrated features to format a spreadsheet. Range to format text: Highlight text, typing text in bold, italics and underline, typing text in different styles and font sizes, using the alignment functions - left, right, merge & centre, adjust the width of the columns and height of rows and insert borders (horizontal and vertical lines)* • *Use basic features to edit and change information in a spreadsheet. Range of editing: Move around in it, delete text, type in capitals letters, insert rows and columns and use UNDO and REDO functions. Range of changes: Change the contents of a cell or part of the contents of a cell, change the formats of dates and currency, change number formats and decimal settings* • *Spell check, preview and print the document* • *Do advanced calculations within different assignments/contexts. Range of calculations: Add, subtract, divide, multiply, auto sum, percentage, average, maximum, minimum, count and auto-fill, absolute cell reference Range of assignments (Link with Topics 1-4): For example, cost of having a baby, cost of raising a child* • *Display the formulas* • *Create a column, line and pie chart* • *Insert chart titles and legends*

		• *Edit the appearance of a chart by changing the fill colour and size* • *Spell check, preview and print the chart*
Topic 8: Basic features of Microsoft PowerPoint Presentations *Student should be able to:* • *Create and save slides using different slide layouts and format themes* • *Use basic features to format the slides. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use numbers and bullets on first level and use the alignment functions - left, right, centre, insert headers and footers* • *Spell check and save the presentation* • *Preview and print by selecting different printing options. Range: Slides, handouts and notes pages*	*Topic 8: Advanced features of Microsoft PowerPoint (Presentations)* *Student should be able to:* • *Design a presentation for specific content matter and select a slide layout and format Note: Use the content matter as covered in Topics 1 –4 of this subject for the presentation, for example a presentation about Citizenship* • *Insert a relevant clip art or picture in the presentation Select and apply appropriate animation effects for your presentation* • *Spell check and save the presentation* • *Preview and print by selecting different printing options*	*Topic 8: Basic features of Microsoft Access (Database)* *Student should be able to:* • *Create a database file* • *Identify and use the options on the Menu and Database toolbar* • *Explain the difference between a table, a record and a field* • *Change the data types and field properties of fields Range: Text field size, number field size as integer (only numbers between -32768 and 32767), yes/no, long date/short date and currency* • *Create and print a table structure Range: Print table definition is set to include for fields: Names, data types and sizes only* • *Enter data in a table and print the records in a table Range for printing: rename table name, change page layout/column widths, print on one page* • *Copy and rename a table* • *Select fields and records in a table* • *Edit records in a table. Range: Find, replace and sort information, add and delete records* • *Create a report using the report wizard tool to select layout, orientation and style*

		• *Modify the report design. Range: Change the heading, column headings and add text in a report footer* • *Do basic calculations and change the format in which the answers are displayed. Range of calculations: SUM, AVG. Range of formats: General number, currency and percentage* • *Save and print the report*
Topic 9: Introduction to E-Mail and Internet *Student should be able to:* • *Launch the Internet Explorer Browser* • *Find and explore different websites on the Internet* • *Create an e-mail address on the Internet* • *Draft and send e-mails to friends and fellow students* • *Retrieve e-mails and respond appropriately*	*Topic 9: Introduction to Internet Research* *Student should be able to:* • *Identify the purpose of search engines and explore different engines such as Google, Scirus, Bing, Google Scholar, etc.* • *Conduct elementary and advanced searches to collect information for academic purposes and assignments*	*Topic 9: The Internet as communication medium* *Student should be able to:* • *Use the Internet for a variety of study and work-related applications. Range of applications: To complete an online job application, post a CV, online CV building, analyse a contract and analyse online job adverts* • *Explore and use social electronic media and networks for various communication purposes. Range: Facebook, Twitter, blogs, Mxit, Skype YouTube etc. regarding Life skills content*

4.2.2 The learning outcomes

Like many NCV courses, the Computer Literacy curriculum comprises a very large amount of learning outcomes: 16 learning outcomes at Level 1; 21 at Level 2; and 35 at Level 3 – a total of 72 learning outcomes. An initial concern about computer skills courses with 72 outcomes is that the sheer number of outcomes could overwhelm students and lecturers. A second concern is that, if a lecturer is rushing to cover all outcomes, there might not be enough time for in-depth explanation, resulting in superficial learning.

An effective curriculum would be expected to progress from simpler to more complex outcomes, rather than from fewer to more outcomes. Using, as a guide, Bloom's revised taxonomy (Krathwohl et al., 1964), the outcomes would be expected to reflect: 1) Remembering, 2) Understanding, 3) Applying, 4) Analysing, 5) Evaluating, and 6) Creating. Instead, the focus is on Applying, with almost all other levels in the taxonomy ignored. The following is an example of a Level 4 outcome related to Microsoft Excel:

> Do advanced calculations within different assignments/contexts. Range of calculations: Add, Subtract, Divide, Multiply, auto sum, percentage, average, maximum, minimum, count and auto-fill, absolute cell reference. Range of assignments (Link with Topic 1-4): For example, cost of having a baby, cost of raising a child.

The above is intended as an integrated outcome including Excel calculations, Internet searches, and some of the Life Skills module context. Calculating the cost of a baby is an inappropriate choice, given the socio-economic differences among South Africans (Taylor & Yu, 2009:33). When concepts in information and Computer Literacy are introduced, they are not focused on “Understanding” but on “Remembering”, such as “Identifying the basic components of a computer” and “identify the purpose and use of the basic components of a computer”.

The Level 4 outcome related to the Internet is more appropriate, particularly in the TVET context:

> Use the Internet for a variety of study and work-related applications Range of applications: To complete an online job application, post a CV, online CV building, analyse a contract and analyse job adverts.

The above outcome is one of the 35 outcomes for Level 4. Time would be needed to guide students in finding reputable job-seeking websites, conducting an analysis of job advertisements, and building an appropriate CV. In addition, the guide assumes that the student would need to understand platforms such as LinkedIn on which to post a CV.

4.2.3 Observations across Levels 2 to 4

Although the Computer Literacy curriculum in Table 4.2 above looks extensive it refers to basic application programs. For Level 2, the basic features of Word, Excel and PowerPoint provide limited scope of ICT concepts:

> Identify the basic components of a computer and identify the purpose and use (Level 2 - Topic 6: Basic features of Microsoft Word).

While Level 2 students are being introduced to basics, the curricula lack emphasis on modern digital technological topics such as ethical internet usage and cybersecurity, both of which are relevant in today's digital world (Fox, 2020:282). As shown in Table 4.1 (Word, Excel, and PowerPoint), the emphasis on Microsoft applications indicates that it does not promote adaptability to other platforms or open-source alternatives. There is no mention of integrated project-based learning at this stage:

> Use basic features to format a Word document. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use numbers and bullets on first and second levels and use the alignment functions - left, right, centre, insert headers and footers (Level 2-Topic 6: Basic features of Microsoft Word).

> Use basic features to format a spreadsheet. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use different alignment functions - left, right, centre, merge and centre; adjust the width of the columns and height of rows and insert borders (horizontal and vertical lines) insert headers and footers (Level 2-Topic 7: Basic features of Microsoft Excel).

For Level 3, there is a repetition of "Concepts of ICT". The learning outcomes do not specify what new concepts are being introduced at the next level, while concepts of ICT, Cloud computing, and data security could be expanded:

> Identify the impact of Information and Communication Technology (ICT) on own physical environment and work and identify the latest technological Information and Communication Technology (ICT) devices and discuss their impact (Topic 5- Level 3: Concepts of Information and Communication Technology).

Although "advanced features" (Topic 6, 7, and 8 in Table 4.1) are beneficial at this level, there is a missed opportunity for practical application. Students must possess advanced knowledge of computer skills to obtain employment in the industry which, according to Hoven (2019), can

have an impact on students' broader educational experience. There is no mention of creating reports that import Excel data into Word:

> Topic 6: Advanced features of Microsoft Word (Word-processing programme)
> Topic 7: Advanced features of Microsoft Excel (Spreadsheet programme)
> Topic 8: Advanced features of Microsoft PowerPoint (Presentations)

For Level 4, there is a continued use of "introductory" in ICT. At this level, students should understand more advanced computer concepts. A glaring omission in the curriculum are digital competencies, such as an explanation of artificial intelligence (AI), and, more specifically, generative AI. A study compiled by Shidqiyah et al. in 2023, with respect to the development of the newest curriculum-based learning model aimed at improving students' digital literacy and critical thinking skills in the age of AI, indicates that one more way to upgrade the curriculum is to enhance the social content with building up soft skills, such as ethical literacy in the context of AI, and critical thinking.

Topic 8 introduces "Basic features of Microsoft Access (Database)". While databases are important, Access is specifically used for legacy databases that were created years ago (Eckstein & Schultz, 2018:36). Access lacks newer database management systems. Businesses today make use of web-based or cloud-based database solutions such as the "Google Cloud Platform" (Quadri, 2017:10). Students are required to:

> Create a database file, Identify and use the options on the Menu and Database toolbar. Explain the difference between a table, a record and a field (Topic 8-Level 4: Basic features of Microsoft Access (Database).

The last topic introduced at the exit level is "The internet as a communication medium". The internet is increasingly used for collaborative work, such as Microsoft Teams which is a digital communication tool (Anders, 2016:225). There are no mention of any digital collaboration tools in the curriculum while remote and hybrid work environments are increasing. Instead, Level 4 students are taught Mxit which is outdated along with Skype:

> Explore and use social electronic media and networks for various communication purposes Range: Facebook, Twitter, blogs, Mxit, Skype YouTube (Level 4-Topic 9: The Internet as communication medium).

The curriculum provides a foundation in Microsoft Office software but there is no modernisation to prepare students for the future of modern technology.

4.2.4 Assessment criteria

Along with the Subject Guidelines, the Computer Literacy curriculum includes the Assessment Guideline (DoE, 2013) that contain the NVC assessment criteria for the NCV programme (Republic of South Africa, 2006). Therefore, for each level, an assessment criterion is formed to measure progress, and formal assessments in the form of tests, practical tasks, and assignments are given throughout the year. The assessment criteria claim to be relevant to the current needs, in particular, “to be dynamic and responsive to national development needs” (DoE, 2013b:13:2). As there are 72 outcomes stated (DoE, 2013b:13), it might be difficult to create a comprehensive assessment that covers all 72 outcomes. In the same way NQF Levels 2-4, the Assessment Guide claims to be progressive, in particular, “to ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system” (DoE, 2013b:13:3). Looking back over the learning outcomes, though, there is considerable repetition of concepts.

Assessment criteria should include authenticity, that is, tasks to be performed in situations typical for workplaces. Instead of testing based on theoretical input, for example, assessment tasks could be undertaken in which students develop documents or presentations relevant to certain vocational contexts. Such authentic tasks are not provided or recommended in the Assessment Guidelines. According to Villarroel et al. (2018), authentic assessment reinforces retention and understanding since students learn to apply what they learn in realistic situations.

Four categories of assessments are listed in the Assessment Guideline: formative assessment, summative assessment, diagnostic assessment, and baseline assessment (DoE, 2013b:13:5). Nonetheless, summative assessment is limited to summative examinations and summative continuous evaluation in the Assessment Framework, as follows: Internal continuous assessment (ICASS) in terms of projects, tests, assignments, investigations, role-plays, and case studies, are several of the assessment tools used to evaluate knowledge, skills, values, and attitudes (SKVAs) throughout the year. Assessments should be built upon current industry needs. Jones (2018), indeed, recognises that, with rapid movements in technology development, curricula should always be revised to maintain new tools and practices. In this light, the digital economy is looking for employees who are proficient in coding, digital problem-solving, as well as advanced applications skills that the Assessment Guidelines neglect to address. The assessment criteria emphasise fundamental abilities like ‘Word Processing’ and ‘Spreadsheets’ which are important; however, could these be enough to provide students with advanced digital skills? (Jones, 2018).

According to the Assessment Guidelines, internal continuous assessment is summative rather than formative; and this means that the projects, exams, assignments, investigations, and other activities are measured when determining a student's final grade. The document makes the rather perplexing claim that, both internally and externally, internal continuous assessment is moderated and quality assured. Lecturer assessment, self-assessment, peer assessment, and group assessment are among the techniques utilized for internal continuous assessment (DoE, 2013b:5).

According to DoE (2013), the Guidelines suggest using a range of techniques and tools to gather evidence, including observation-based (less structured), task-based (structured), and text-based (more structured) methodologies. The Assessment Guidelines are vague about which internal continuous assessment forms (such as self, peer, and group assessments) and which evidence collection techniques (such as observation) are meant to be formative, or to give students feedback rather than be used to determine evaluations, and which are meant to be summative. However, a section on the requirements for internal continuous assessment is included in the Assessment Guidelines where it states that the only things that count toward marks are practical exams, practical assignments, and internal examinations. At the same time, the lecturers who assess these assessments are required to be subject specialists:

> … assessors must be subject specialists and should ideally already be certified competent in the unit standard ASSMT 01 (DoE, 2013b:4).

In most cases, assessors who lecture and assess students on this subject are teaching outside of their area of expertise (Du Plessis, 2019).

4.3 Assessing the Computer Literacy curriculum against the Digital Capabilities Framework

The curriculum for Computer Literacy across Levels 2-4 is only partially aligned with the Digital Capabilities Framework (see Figure 2.1) which emphasizes the development of a wide set of digital skills needed in today's digital world, but lacks the approach needed to foster each element. An ICT Proficiency Curriculum covers essential Word, Excel and PowerPoint topics in the most comprehensive manner that allows students to build their basic ICT skills. These include document creation, formatting, and editing; word processing core functions; spreadsheet software core functions; and practical abilities vital for ICT proficiency, such as creating documents, formatting them and saving them. The curriculum incorporates both basic and advanced features, it lacks content on troubleshooting and the underlying technical concepts and elements that are essential for achieving advanced ICT proficiency.

Information, Data and Media Literacy queries on internet usage, along with email use though media literacy, is not explicitly referred to. This necessitates student use of web browsers (Google Scholar) for search engines (Google Scholar and Bing), and navigation and email (creating, sending, managing emails). However, it does not specifically address crucial media literacy skills, such as assessing the reliability of sources and understanding the ethical implications of creating and consuming digital media.

The Digital Creation, Problem Solving and Innovation curriculum instructs students on using digital tools like Excel for data management and computation, as well as utilizing the help feature in various software programs to solve issues so that their computer literacy is improved. Nevertheless, its focus is shifted from encouraging innovation and creating new digital solutions such as app development, coding or advanced data analysis techniques.

The Digital Communication, Collaboration, and Participation guide allows learners to make use of digital tools for communication, such as typing emails, sending them out and participating in online discussions on computer literacy. However, it does not give much weight to the collaborative technologies that are needed in today's digital work environments, including online project management software and real-time collaboration platforms.

The curriculum on Digital Learning and Development promotes lifelong learning and growth by encouraging the use of ICT tools for both professional and personal advancement and highlighting the importance of computer literacy in the context of continuous digital learning. However, it does not specifically mention online learning environments or self-directed learning tools, which are essential for sustained digital learning and development throughout one's life.

The curriculum on Digital Identity and Well-being focuses on holistic development by integrating ICT and life skills to address overall well-being. This includes promoting self-improvement and self-control through ergonomic practices and safeguarding against online risks such as repetitive strain injury (RSI) and eye strain, along with other health and safety concerns related to computer use. However, topics related to digital identity, such as managing one's digital footprint, understanding privacy settings, and the impact of social media on personal well-being, are either barely mentioned or completely ignored.

In Table 4.3, the JISC curriculum mapping tool is applied to the Computer Literacy curriculum to assess its effectiveness in a systematic way.

Table 4.3 JISC Curriculum mapping tool

Element	Curriculum considerations	How do students do this in the Computer Literacy course (or how could they)?	How will students gain practice and feedback/assessment on this?
Digital proficiency and productivity (1)	Use specialised digital tools or practices of the subject area (e.g., design, data capture and analysis, monitoring, reporting, coding)	○ Change the data types and field properties of fields. Range: Text field size, number field size as integer (only numbers between 32768 and 32767), yes/no, long date/short date and currency ○ Edit records in a table. Range: Find, replace and sort information, add and delete records ○ Create a report using the report wizard tool to select layout, orientation and style ○ Modify the report design. Range: Change the heading, column headings and add text in a report footer (Topic 8, Level 4)	Students complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Digital proficiency and productivity (2)	Use generic digital tools to achieve subject-related goals (e.g., devices, browsers, online services, productivity tools, media editors)	○ Launch the Internet Explorer Browser ○ Find and explore different websites on the Internet ○ Create an e-mail address on the Internet ○ Draft and send e-mails to friends and fellow students ○ Retrieve e-mails and respond appropriately (Topic 9, Level 2)	Students complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.

Information literacy	Find, evaluate and manage digital information relevant to the topics of study	○ Identify the purpose of search engines and explore different engines such as Google, Bing, Google Scholar, etc. ○ Conduct elementary and advanced searches to collect information for academic purposes and assignments (Topic 9, Level 3)	Students complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Data literacy	Find, analyse and use digital data in subject specialist ways, and with attention to the ethics of data use	○ Identify the basic components of a computer ○ Identify the purpose and use of the basic components of a computer ○ (Topic 5, Level 2)	Students complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Media literacy	Use digital media to learn and communicate ideas, and to present the outcomes of learning (e.g., videos, presentations, wikis)	○ Use the Internet for a variety of study and work-related applications. Range of applications: To complete an online job application, post a CV, online CV building, analyse a contract and analyse online job adverts ○ Explore and use social electronic media and networks for various communication purposes. Range: Facebook, Twitter, blogs, Mxit, Skype, YouTube, etc. regarding Life skills content (Topic 9, level 4)	Students complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.

Digital creativity	Create digital artifacts in a variety of forms and with attention to different users/audiences	○ Create and save slides using different slide layouts and format themes ○ Use basic features to format the slides. Range to format text: Highlight text; type text in bold, italics and underline; type text in different font types and font sizes; use numbers and bullets on first level and use the alignment functions - left, right, centre, insert headers and footers (Topic 8, Level 2)	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Problem solving	Use digital tools to gather and assess evidence, make informed decisions and solve problems	○ Use integrated features to format a spreadsheet. Range to format text: Highlight text; type text in bold; italics and underline; typr text in different styles and font sizes; usr the alignment functions - left, right, merge & centre; adjust the width of the columns and height of rows and insert borders (horizontal and vertical lines) ○ Do advanced calculations within different assignments/contexts. Range of calculations: Add, subtract, divide, multiply, auto sum, percentage, average, maximum, minimum, count and auto-fill, absolute cell reference. Range of assignments (Link with Topics 1-4): For example, cost of having a baby, cost of raising a child ○ Display the formulas ○ Create a column, line and pie chart ○ Insert chart titles and legends	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.

		○ Edit the appearance of a chart by changing the fill colour and size (Topic 7, Level 4).	
Innovation	Take part in innovative digital scholarship or professional practice	Not in the Computer Literacy curriculum	
Communication	Communicate digitally with others, including in public digital spaces	○ Discuss the impact of social networks and media. Range of social networks and media: Facebook, Twitter, blogs, Mxit, Skype YouTube, etc. (Topic 5, Level 4)	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Collaboration	Collaborate digitally, including with learners in other settings	Not in the Computer Literacy curriculum	
Digital learning	Develop digital learning skills and habits (e.g., note-making, referencing, tagging, curation, revision and review)	○ Set margins according to requirements ○ Select and use a page orientation for different purposes; create and edit text using the Columns and column breaks functions ○ Insert a table, picture or clip art, header and footer, page number and page breaks in a text ○ Format a table using the borders and shading function ○ Format a picture or clip art using the resizing function (Topic 6, Level 3)	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.

Development	Support, mentor, coach or develop others with their digital skills, or use digital resources and tools to develop others	Not in the Computer Literacy curriculum.	
Digital identity	Develop, manage and express their digital identity	○ Understand the protocols and precautionary measures when using these networks ○ Explore cases of Internet fraud and predators, e.g., cyber-bullying ○ Identify safety aspects when downloading items from the Internet ○ Understand the consequences of piracy and illegal downloads (Topic 5, Level 4)	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.
Digital well-being	Consider their digital safety, privacy, responsibility, health and well-being	○ Understand ergonomics in terms of computer workspace. Range: Sitting posture, distance from computer, relaxation exercises, height level of computer and enough light and air ○ Describe RSI and eye fatigue as consequences of bad ergonomics ○ Identify health and safety aspects in a computer environment (Topic 5, Level 3)	Students' complete assignments in Computer Literacy; students then perform specific instructions and submit their work for review. Weekly class tests for peer review; peer reviews provide additional perspectives with feedback.

Adapted from JISC (2021) Curriculum mapping tool

4.4 Digital capabilities curriculum mapping

The JISC mapping tool compromises various elements of digital literacy skills within the content of a Computer Literacy course while describing curriculum considerations, specific tasks that students need to complete, and approaches for practice and feedback. Students engage with assignments to build their skills in a variety of digital competencies. Assessments and feedback occur primarily through weekly class tests and during peer review.

Identifying digital proficiency and productivity involves specialised digital tools and practices. For example, students use Report Wizard to alter data types, create and edit records (Level 4, Topic 8). Students practise these skills through peer review feedback and class tests which help them to consolidate their knowledge. The other dimension of digital proficiency and productivity includes generic tools focusing on opening browsers, exploring websites and sending/receiving emails. Similar to the first competency area, students complete tasks and later receive feedback from peer reviews.

Through Information Literacy, students are taught to locate and assess information using search engines (Topic 9). Students also learn to conduct basic searches on academic-oriented search engines such as Google Scholar; this is followed by an assignment and peer review for feedback.

Data Literacy is primarily concerned with locating, analysing and employing digital data. Students learn computer components and their purpose (Topic 5, Level 2) and practise exercises and peer assessments.

Media Literacy enables the students to explore digital media for communication; they learn through social media and content platforms; and they learn about online job applications (Topic 9, level 4). Students then submit their work for feedback based on completed tasks.

Digital creativity in the Computer Literacy curriculum is narrowed to only using PowerPoint presentation basics to apply digital artifacts using formatting skills like creating and saving slides, using different slide layouts and format themes (Topic 8, Level 2).

In Problem Solving, students are exposed to the application, Microsoft Excel; in Levels 2 to 4, students solves problems using spreadsheet software (Topic 7), from basic to advanced calculations, creating charts and formatting data. All three levels get assessed on this in the internal and external examination (DoE, 2013b:12).

Innovation and Collaboration is unfortunately not part of the Computer Literacy curriculum.

In Communication, there are discussions about the use and effects of social network. Students then participate in assignments requiring them to explore social platforms such as Facebook, Twitter and YouTube (Topic 5, Level 4). As in other areas, peer review and class tests facilitate student feedback.

In Digital Learning, students are taught the basics of Microsoft, although the repetition of Word processing aspects, such as formatting text, tables and page layouts. These aspects are tested in every internal and external assessment (DoE, 2013b:3).

The Development component indicating where the student would mentor others is not part of the Computer Literacy curriculum. However, digital safety is taught. This includes internet safety, fraud and piracy awareness.

Lastly, Digital Well-being incorporates issues dealing with safety, ergonomics and health in connection with computer use. In the Computer Literacy curriculum, before Microsoft is taught, students are introduced to the importance of good posture, the consequences of poor ergonomics and basic safety in digital spaces (Topic 5, Level 3).

4.5 Implications for lecturer competencies

The ability for a teacher to exercise certain qualities as part of their “tool kit” as is very important. An emphasis on developing student skills, professional growth levels, pedagogical cultures, innovations, and 21st-century teaching abilities is needed. This study examines the competencies of Computer Literacy lecturers with the goal of equipping students with the creativity, critical thinking, teamwork, and communication skills they will need in the 21st century. In addition, with colleges increasingly emphasising life skills which allow students to develop original ideas and collaborate with others, the quality of education has drastically changed. Consequently, there are now knowledge, abilities, and values that a student teacher must exhibit to complete a teacher education programme successfully and become a competent teacher or college lecturer. Equal parts of knowledge, skill, and attitude are competencies; however, some competencies may focus more on knowledge than on skill or attitude, while others may be more performance- or skill-based. Thinking and problem-solving, self-direction and learning, teamwork, knowledge, research, organization and planning, and goal setting are critical skills for effective communication and personal growth. Teachers can better prepare their students for the obstacles of the 21st century and for the future by having a thorough awareness of these competencies. To address complicated demands and improve the welfare of a nation, or globally, educators must possess certain teaching competencies. These include

the capacity to carry out educational tasks, work with younger people, be caring, have good mental and physical health, be steady and tolerant. A competent teacher must acquire a pedagogical culture, which comprises values, knowledge and skill components. Global attention has been drawn to educational innovation, which is suggested in the notion of integrating ICT into the teaching and learning process. The goals of innovation are to enhance student learning, enhance the teaching process, and enhance student motivation. In the next chapter, the analysis from interviews with Computer Literacy lecturers and findings are discussed.

CHAPTER FIVE: ANALYSIS OF INTERVIEWS WITH COMPUTER LITERACY LECTURERS AND FINDINGS DISCUSSED

5.1 Overview of Chapter Five

Chapter Five presents the findings from the interviews with lecturers in terms of their past experiences of Computer and Digital literacy (Section 5.1), their journeys as Computer Literacy lecturers (Section 5.2), as well as their continuous professional development in Computer Literacy (Section 5.3). The findings below are summarized in terms of the lecturers' perspectives and elaboration of their daily experiences. It is separated into emerging themes, and the researcher explains each theme in detail. Lastly, the interviews with Computer Literacy lecturers are assessed against the Digital Capabilities Framework and the Conceptual framework for teaching Computer Literacy.

5.2 Theme 1: Past experiences of computer and digital literacy

5.2.1 First memory of computer usage

Lecturers' first encounters with computers varied. Some, like Lecturer 1, faced initial challenges at college, needing guidance for simple procedures like switching on the computer:

> My first time I used a computer I was at college. I didn't know where to switch it on. And my sister had to show me where to switch on a computer and where to find a Word document. It was very scary not to know how to use this new piece of technology (Lecturer 1).

Others, like Lecturers 2 and 4, transitioned from typewriters to computers with more ease due to their prior typing experience, as Lecturer 2 explained that she had:

> … attended a training course and then after that I was employed at the primary school as a clerk, and then I used a typewriting machine. And then [Company] sponsored us with a computer (Lecturer 2).

From Lecturer 2's quotation, it is clear that she had extensive experience with typing. Lecturer 5 similarly had used a computer during her post-school training and later when employed at a primary school. Both had the assistance of workplace sponsorship and both experienced the benefits of their typing experience. Lecturer 4 similarly recalled the benefits of prior typing experience:

> I went to go study at the institution where I was introduced to computers. I think that was in 1990. That was my first time. So it was difficult for me but not as difficult because it comes from typing, experience from the typing machine to a computer (Lecturer 4).

Lecturer 3 indicated that she had learned about computers through her father and school:

> My first encounter with using a computer would be through my father, as well as at school we encountered working with computers. But mostly through my father – that was my first main experience at home (Lecturer 3).

Lecturer 5 remembered their mother teaching them computer basics at home:

> It was through my mother and we had a computer at home and she's the one who basically taught us the basics of how to use a computer (Lecturer 5).

Lecturer 6 described a difficult first experience in Grade 12, struggling with typing tasks in a high school setting:

> Yes, it was actually at school. To be exact it was high school in Grade 12. That's the first memory – I think I've used a computer before then but my first memory was Grade 12 and it was like – the reason why I'm saying that is because it was a terrible experience for me. I was fearful. The specific teacher wasn't exactly accommodating and you know, guiding you correctly at that time (Lecturer 6).

5.2.2 Laptop/Desktop access

The lecturers highlighted the diverse ways in which they utilised laptops, spanning from professional tasks like research and lesson planning to personal activities such as entertainment and communication. Additionally, preferences for laptop use varied, based on factors like comfort and convenience.

Lecturers 1 and 3 primarily utilised laptops for work-related tasks, including research and lesson planning:

> Now I have my own laptop which I mostly use for my studies as well as doing assignments and research for my nieces' and nephews' homework. I also have a second laptop from work which I use for work purposes only (Lecturer 1).

> I own my own laptop which I mostly use for work purposes and for research or for my lessons and planning (Lecturer 3).

Lecturer 2 used a laptop for personal activities, while Lecturer 4 used a laptop mainly for work but also for entertainment and communication:

> Yes, I do have a laptop at home and I'm using it for my personal activities (Lecturer 2).

> Mostly I use my laptop for work, for work purposes and sometimes I will watch a movie on Netflix and I use it for WhatsApp as well (Lecturer 4).

Lecturer 5's laptop was primarily for personal use. Lecturer 6 preferred using their laptop for comfort and convenience, mainly for email responses, report writing, and work-related tasks:

> I have a laptop at home and it's mostly for personal use (Lecturer 5).

> I have a desktop as well as a laptop but mostly use my laptop because it's just more – in terms of comfort because you can lie in bed and access whatever you need to do via emails, quick responses to whatever and work-related tasks, like setting up papers and things like that. So basically, what I use it for is most of the time, is for responding on emails, writing reports (Lecturer 6).

5.2.3 Smartphone usage

The lecturers reflected on their experiences with their first cellphone and how it was utilised – Lecturer 1 reminisced about her journey with mobile devices, starting with the iconic cellphone of the time and later transitioning to a modern smartphone:

> I was in my thirties I think when I got my first cellphone. Everyone had a Nokia 3310 and that was my first cellphone. My first Smartphone was a Blackberry. Everyone had one and it was cool back then (Lecturer 1).

Lecturer 3 remembered their introduction to a cellphone as a student – initially utilising it for basic communication as well as photographs; however, with the progression of technology, the "smartphone" evolved into a multifunctional tool:

> My first Smartphone would probably be when I was at university. At that time it was mostly to communicate, photos, I wasn't so much familiar with emails at the time as a student other than your student portal (Lecturer 3).

The lecturer's journeys with smartphones reflects the device's adaptability – Lecturer 2 summarised the current use for all lecturers as follows:

> I use it for communication, online meetings and entertainment (Lecturer 2).

5.2.4 Tablet usage

Most lecturers wanted to own a tablet, but not all actually owned a tablet, such as Lecturer 4 who did not have a tablet, but "would love to have a Tablet". Lecturer 3 had a tablet and used it for work purposes – saying, "I do have a tablet as well – that is solely for work purposes".

Similar to Lecturer 3, although used for different reasons, Lecturer 6 also had a tablet; and although it was work-provided, it was currently used simply for leisure: "I received it from work and I'm currently using it to watch movies" (Lecturer 6).

5.2.5 Technology daily usage

The lecturers' expressions about technology reveal a mix of excitement, and challenges. Some lecturers shared that they found technology exciting and helpful but also challenging as it continually evolves, which could be overwhelming. Lecturer 1, for example, said:

> … as I get older it becomes more difficult to understand. Today everyone gets excited about a new era of technology but somewhere along the line all will get overwhelmed as we age (Lecturer 1).

Lecturer 5 felt overwhelmed by constant connectivity, finding relief in breaks from devices. Despite appreciating their utility, she describes the feeling of being pressured:

> … very overwhelmed with technology in the sense of phone constantly ringing or when you're using a laptop, it's because of work. So, whatever I get a chance to not have my phone or being in front of a laptop I'm very happy because I feel like the phone constantly goes off and you need to respond (Lecturer 5).

By contrast, Lecturer 3 described her daily technological use as "exciting", finding that it makes life easier and more convenient when one is needing to provide daily effective teaching and learning in the classroom and at the same time be "passionate" about using technology every day:

> I love using it, technology is ever expanding, so it's good also to gain that knowledge and to utilise them – especially being a lecturer in the computer dispensation. I can apply those skills within my classroom as well. So I feel very passionate about using technology every day (Lecturer 3).

While Lecturer 3 expressed hope for the future for those with the skills to enter the “more advanced digital world”, Lecturer 6 saw the disadvantage for past generations not having access to computers and other modern communication technologies:

> If I think about going back and not having a laptop, imagine having to write all that information with your hand. And I actually feel sorry for the past, our parents and their parents because I mean technology makes it so much easier now. Faster and efficient, your accuracy skills in terms of that, you can (Lecturer 6).

In this subsection, the lecturers described their encounters with technology – with some learning basic computer skills at school, such as Lecturer 6, and only encountering computers in their post-school education. Some were “passionate” (Lecturer 3) about technology, while others found it “overwhelming” (Lecturer 5). Lecturers used technologies such as laptops and smartphones for different purposes, and some found that they could bring their user skills and experience into their “classroom” (Lecturer 3). Lecturers’ experience showed them that those without computer skills, such as the older generation, were at a disadvantage in the current socioeconomic context, while those who had the necessary skills for the digital age would have an advantage.

5.3 Theme 2: A Computer Literacy lecturer’s journey

This section goes into more detail to describe the lecturers’ journeys to attain computer skills.

5.3.1 Computer literacy journeys

Most of the lecturers, during their years as students, gained computer literacy knowledge as an additional subject and not as a “major” subject. Lecturer 1 explained that having a computer subject as a student set a “foundation” for her journey as “a management assistant student” and, subsequently, as a computer skills lecturer. Lecturer 3 undertook computer studies and further equipped herself by taking additional computer courses:

> I did extra, additional courses which has credits for it. So, I equipped myself and I also have a love for computer … so therefore I became more and more interested in it (Lecturer 3).

While Lecturer 2 and Lecturer 4 did a computer course, their initial intention was not to become a computer lecturer. For example, Lecturer 2 explained being an “admin clerk”, then furthering her studies and later being employed by the college:

> I was an admin clerk … but I ended up working at the college … as an Educare lecturer (Lecturer 2).

Lecturer 4 described her journey from being a student to teaching hairdressing:

> I did a computer course at [college], so that gave me insight of computers …. All my life I taught hairdressing (Lecturer 4).

Computer studies were entirely unfamiliar to Lecturer 5, who was a novice computer lecturer:

> I did not undertake Computer Studies. It's my first time teaching Computer Literacy (Lecturer 5).

Even though the majority of lecturers had a variety of backgrounds – from management degrees to hairdressing to rudimentary computer training – they all ended up as computer lecturers at a TVET college. According to Lecturer 6, the reason they obtained a position teaching computer literacy was related to their prior experience with computer studies:

> I had computers on my CV, it's the main reason why it grasped their attention and thinking that I would be able and capable of teaching the component of computer literacy (Lecturer 6).

5.3.2 Exploring pedagogical approaches in Computer Education

Each lecturer provided an overview of the topics covered at each level. Some explained their current topics and one lecturer mentioned what "will be covered next term" (Lecturer 6). Lecturer 1 found the topics in the SG for Level 2 "exciting", while Lecturer 3 felt it was "quite a lot":

> I find Level 2 very exciting to teach as this reminds me of myself and because of that I start with where to switch on the computer and I build from there (Lecturer 1).

As is evident from this quotation, Lecturer 1 expressed enthusiasm for teaching Level 2, beginning with basic computing concepts. Lecturer 3 summarised the subjects as "quite a lot that we do in our topics covered". Others, such as Lecturers 2 and 4, elaborated on the topics discussed in the following ways:

> So, I teach Publisher, Word, Excel and PowerPoint (Lecturer 2).

> I'm busy with Word and I'm teaching columns and breaks now with my Level 3's. With my Level 2's I'm just teaching Word (Lecturer 4).

Lecturer 5 recalled the difficulty of being a novice:

> I'm basically just familiar with what we have done so far, using the MS Word document because as teaching the students I'm teaching myself also - other things in there like shortcuts or other things that I'm also teaching myself for the first time (Lecturer 5).

In contrast to Lecturers 2 and 4, in addition to covering topics in Excel, Microsoft Word, and PowerPoint, Lecturer 6 offered advanced skills such as "mail merge" and calculations in Excel for Level 4. She was the only lecturer who stated that students were taught topics in advance:

> I slightly touched on Excel because that's what we're supposed to be starting with next term. Same with Level 3 and Level 4, we did Mail Merge and then we also slightly touched on Excel. But just to kind of introduce them what's to come (Lecturer 6).

5.3.3 Teaching methods and approaches

While some lecturers utilised "past papers" as a foundation to teach different sections, most took a more structured approach, breaking topics down into "step-by-step" processes. For example, a lecturer explained that she:

> … begins with explaining the session by doing it step-by-step on the projector (Lecturer 1).

Lecturer 2 and Lecturer 4 described their teaching methods as "demonstrating" and expecting students to follow:

> I use the Learn by Doing Method (Lecturer 2).

In contrast to the other lecturers, Lecturers 3 and 6 had greater experience. They explained that they taught certain parts based on the use of "past papers":

> I work through past papers and I develop my own material as well in order to assist the students and I make it relevant so that they can understand it more easier, because not everybody is exposed to computers when they come into our course as well (Lecturer 3).

In addition to using "past papers," Lecturer 6 emphasised that, because of time restrictions, stronger students could also be used to assist weaker ones:

> … what I do from those past papers, I take little questions and I try and create my own little activities and formatives from there and basically start them off – what I do also

> with weaker students, I use the stronger students to assist them because, as a computer lecturer, you can't be everywhere and they're always putting up their hands for your assistance (Lecturer 6).

5.3.4 Approach to assessments

When creating assessments and activities, most lecturers shared how they adhered to the year planner and assessment guide:

> I try and work through our year plan and assessment and moderation plan, and we stick to that. So, we develop accordingly the assessments and exercises for the students, so that they can be well prepared for our practicals and tests (Lecturer 3).

Some lecturers found the use of previous exam questions was "crucial" because it helped students to comprehend the structure and content of the questions. For example, Lecturer 1 explained:

> [The] use of old question papers from the start as this is the best way for me – I feel students learn how questions are asked in the question paper (Lecturer 1).

As a novice lecturer, Lecturer 5 was not yet at the stage of setting up any assessment tasks; she was therefore more reliant on assistance:

> I haven't set anything yet. My peers would assist me with regard to activities or any exercises (Lecturer 5).

5.3.5 Student insights on engagement and experiences with computer courses

Lectures felt encouraged when their students enjoyed Computer Literacy, which is illustrated by the following response from Lecturer 1:

> … it is very rewarding for me and especially the motivation part because a lot of students don't get that motivation at home. So, if you do get it in class you actually want to come back and experience it again, just hear that you are doing good and you are going to achieve success at the end (Lecturer 1).

Others, such as Lecturers 3 and 4, noted excitement among first-year (Level 2) students, despite the scarcity of resources on campus:

> … noticeably with our new students I can see the excitement in certain of their eyes – a lot of students can't wait for my class because they are always learning something new in class – even if campus resources are currently a bit limited (Lecturer 3).

The context in which lecturers taught, the crammed classrooms and inadequate computer resources, affected teaching and learning. Lecturer 6 emphasised the significance of establishing a comfortable learning environment:

> … it's the way you teach it. You can either make them comfortable about it or you can shout at them and, you know, make it a stressful environment – I create an atmosphere where you know it's comfortable. You shouldn't be afraid of the digital technology and as a lecturer, I feel that we should be there as guidance (Lecturer 6).

5.3.6 Challenges students face in computer courses

The lack of computers outside the classroom was mentioned by Lecturers 1, 2, and 6 as a significant obstacle, particularly for learning Excel:

> … definitely the fact that there is no computers at home. Excel is normally the challenging part … mostly the calculations for Level 2 and Level 3 (Lecturer 1).

Lecturer 3 characterised the initial weeks of the course as "ground-breaking," with an emphasis on students learning fundamental knowledge, while initially challenging terms become easier to comprehend with time:

> Term 1, I always tell my students not to expect wonderful marks your first term, because that is the foundation term, the ground-breaking term where we dig deep and actually try and instil those building blocks that they can move forward in the subject. So we build and we break and we mould in the first term (Lecturer 3).

While most lecturers pointed out that new computer users struggle with the basics, Lecturer 5 expressed frustration with the delays that more advanced students, who were ready to move on, experienced:

> It's also difficult for the other students who are waiting to move on to the next question or to the next activity or whatever awaits them (Lecturer 5).

5.3.7 Reflections on the experiences and challenges in teaching Computer Literacy

A few lecturers mentioned how difficult it was to teach "Mail Merge", "Access" and "Excel." Lecturer 1 believed that the first problem could have been caused by her outdated knowledge:

> I feel Microsoft Access will be a challenge for me to teach because I have done Access 18 years ago so for me it is a challenge and also I feel Mail Merge in the beginning was a challenge (Lecturer 1).

Lecturer 4 expressed a similar view:

> Excel was a nightmare for me last year. It was my first time. I've worked in Excel but I never taught it and that was – but then I had to practice and practice (Lecturer 4).

Lecturer 3 believes a lecturer had to be "experienced" enough to cover every facet of the subject. In her case, she explained:

> I have been experienced for many, many years in the subject – I don't have a problem with actually lecturing everything regarding that subject (Lecturer 3).

A novice lecturer shared the challenge of marking students' scripts against assessment criteria that were difficult to understand:

> … when it comes to the marking because it's quite different to just marking from the memo, marking is either right or wrong. Here's the first time I'm learning about accuracy and manipulation (Lecturer 5).

Lecturer 6, who had the most amount of experience among all participants, explained how teaching "Access" presented substantial hurdles because of insufficient assistance. However, those obstacles were overcome via self-education:

> I remember when I was told that I had to teach Level 4 for the first time, but I did not have knowledge of Microsoft Access at all … I asked my mentor for guidance. I was told blatantly: 'You shouldn't be here if you're not a competent computer lecturer. I don't know why they employed you then'. I started thinking to myself, I need to educate myself. I can't rely on others – and so I did (Lecturer 6).

In the subsection above, the lecturers described their diverse journeys of becoming Computer Literacy lecturers. For some, like Lecturer 1, foundational computer studies as students had laid the groundwork, while others, like Lecturer 5, had no prior training. Pedagogical approaches varied from some being "excited" (Lecturer 6), while some felt that it was "quite a lot". Despite the challenges of limited resources expressed by lecturers, they were committed to teaching Computer Literacy as well as they could. Some lecturers highlighted the importance of "motivation" (Lecturer 6) in creating a supportive environment.

5.4 Theme 3: Continuous professional development in Computer Literacy

In this section, I go into more detail to describe the lecturers' continuous professional development in computer literacy.

5.4.1 Perspectives on professional development and integration of technology in education

Lecturer 1 expressed a wish for "automated" assessment specialist training because it would relieve the burden of marking scripts, as well as prevent students from cheating:

> I feel automated assessment, this would make things easier for teachers and lecturers because the computer can mark the assessment. This will eliminate unfairness, results will be available quicker … may eliminate cheating (Lecturer 1).

Lecturer 2 and Lecturer 5 sought a "refresher" on using Office Suite to enhance and support different online teaching methodologies:

> I would like to catch up to refresh my memory about the Office Suite (Lecturer 2).

Lecturer 3 explained that she believed that, to be competent in their subject, Computer Literacy, refresher courses were necessary, due to evolving technology:

> When it comes to subject-related matters, I think I'm fairly on point. There is new applications and skills and workshops and certain specialities that our lecturers in general, even myself, need to go on to fit in line with what industry wants when it comes to professional development in technology (Lecturer 3).

While Lecturer 3 felt lecturers in general needed to "fit in line" with what industry wanted, Lecturer 6 further felt that specialised training should be required for all lecturers:

> … any AI-related courses because I mean this stuff that we're doing now is eventually going to become redundant in a sense that it's now not … people are going to be able to do the basics now but what about what's next? The world is changing and we also need to change with it and adapt (Lecturer 6).

Most lecturers described their requirements for upskilling themselves; but Lecturer 4 pointed out the lack of time to pursue professional development:

> I feel I don't have enough time to even do that, to upskill myself (Lecturer 4).

Additionally, Lecturer 3 described the need for online marking systems that can be beneficial to all Computer Literacy lecturers:

> … when it comes to our computer subjects, I would like us to mark online, or on a certain platform where we are not manually marking (Lecturer 3).

5.4.2 The need for training and updates in technology for teaching purposes

'Plagiarism detection' software and Moodle were recognised as necessities by the majority of lecturers, especially Lecturer 2:

> I could learn more about Moodle and also about plagiarism detection software (Lecturer 2).

While Moodle and Plagiarism detector software were mentioned by most lecturers, Lecturer 6 described the broad implementation of an online tool such as Turnitin for preventing dishonest practices:

> Turnitin - because we don't know our students copy and paste information all the time (Lecturer 6).

5.4.3 Specialised applications

Most lecturers shared an interest in specialised applications, especially towards integration of industry-relevant software; and most lecturers described the content taught from the textbook as "outdated":

> … outdated on all levels while lecturers are teaching outdated content which does not help us upgrade our technology knowledge (Lecturer 1).

Lecturer 3 shared the importance of implementing Pastel:

> We need to get more on point and yes, in a lot of industries and companies, they apply their own online system and so on, but the basics never changes when it comes to programs such as Pastel (Lecturer 3).

Several lecturers explained that there was a need for training in "cybersecurity" along with other applications. According to Lecturer 6,

> Cybersecurity, Cloud Computing those types of things like CISCO. actually want to become more familiar with CISCO but at the moment I really don't think it's aligned with the students that we're dealing with (Lecturer 6).

5.4.4 Professional development workshops to meet diverse needs

As lifelong learners, lecturers favoured varied formats for professional development with a preference for "short", manageable sessions or periodic retreats to maintain engagement and effectiveness:

> I like short breakaways because you know, to sit in a workshop a whole day, it's just your mind is in short time span. So, at the moment you want to box everything up in just one day when there's so much juicy, good information, you kind of want to you know, have a time to kind of like re-evaluate what was said today and work on that (Lecturer 6).

Some lecturers suggested "twice a year" training for a whole day, due to the busy term schedules:

> Maybe I won't say per term because you are so busy per term. Maybe twice a year, just a whole-day workshop (Lecturer 4).

5.4.5 Importance of lecturers' continuous professional development in technology and computer literacy

Collectively, the lecturers advocated for continuous professional development to ensure they remain knowledgeable and competent in a technologically-changing world so as to enhance the educational experience for their students:

> You need to know all the new things, and new technology that's coming in. You can't stay stagnant otherwise the student will know more than you (Lecturer 4).

Others like Lecturer 2 emphasised that all lecturers need to be "computer literate" to cater to different learning styles, especially in the context of the Fourth Industrial Revolution:

> I think all lecturers should be computer literate because now, we are in the Fourth Industrial Revolution, so, and like most of the time we need to cater for all the learning areas, visual or audio (Lecturer 2).

In the subsection above, the lecturers described their need for continuous professional development in computer literacy as it is important to stay updated with technological changes.

Auto-mated (Lecturer 1), Office suite (Lecturer 5), as well as AI-related (Lecturer 6) were the specialised applications mentioned by the lecturers. Turnitin (Lecturer 6) was emphasised to enhance effective teaching as well as academic integrity. While the TVET sector is vocation-based, some lectures expressed interest in additional specialised applications such as Pastel (Lecturer 3). Table 5.1 briefly summaries the findings:

Table 5.1 Linking research objectives and questions with research findings

Research Objective	Research Question	Findings
1. To describe TVET Computer Literacy lecturers' journeys, experiences and practices.	1. What are TVET Computer Literacy lecturers teaching practices, experiences and challenges?	Most lecturers first encountered computers in higher education institutions. Most lecturers are industry-based and self-trained to teach computers. There is a lack of training provided to improve computer competencies.
2. To discover how TVET Computer Literacy lecturers' teaching practice could be enhanced.	2. What training and support do Computer Literacy lecturers require to achieve a high quality of teaching?	The findings imply that all lecturers require advanced training to improve their teaching skills. Some lecturers suggested Moodle, Pastel, and AI training to improve their knowledge, as well as mentorship from peers.

5.5 Assessing interviews with Computer Literacy lecturers against the JISC Digital Capabilities Framework (2020)

Analysing the findings derived from interviews with the Computer Literacy lecturers against the Digital Capabilities Framework emphasises both the alignments and gaps in their experience with technology. The analysis is separated into themes and further discussed next.

5.5.1 Theme 1: Past experiences of computer and digital literacy

Proficiency in ICTs represents competencies that include the ability to use digital systems, hardware and software. ICT competencies levels were inconsistent among the lecturers who were interviewed. For example, Lecturer 1 was uncomfortable with basic computer functions

during their first exposure. However, Lecturer 2's experience with typewriters made it easier to adapt to computers. In the same way, Lecturers 4 and 6 indicated that their previous experience with typewriters had helped their transition and improvements in their ICT proficiency. The lecturer's previous experience reflects the progression of skills, from basic typing to advanced word processing. However, one lecturer still struggled to keep pace with advances in technology.

With regard to various required literacies (Information, Data and Media Literacy) that include the competencies to locate and evaluate data effectively, lecturers were similarly diverse. Lecturers 1 and 6 first encountered computers post-school and, without prior knowledge of computers, it was an overwhelming experience for them. Lecturer 1 specifically pointed out a personal lack of early information and digital literacy. This gap implies the need for fundamental digital literacy skills for lecturers of Computer Literacy.

Digital Creation, Problem Solving and Innovation (see 4.4) require using digital tools to create digital content and solve problems. The need for these competencies was echoed by many lecturers, like Lecturers 1, 3 and 6 who referred to working on a laptop or computer for setting up lesson plans, a practice which aligns with the problem-solving aspects of the Framework. Nevertheless, innovation was not a theme in lecturers' responses because most lecturers, such as Lecturers 1 and 5, still found technology challenging and overwhelming.

Digital Communication, Collaboration, and Participation represent digital technology for collaboration and communication. Most lecturers used digital tools such as smartphones and laptops for personal and professional use. For example, Lecturer 2 referred to making use of a laptop for virtual meetings and communication with others. However, there was no evidence of collaborative digital practices or participation in broader digital communities.

Digital Learning and Development represent continued learning and professional development of digital skills. Some lecturers, like Lecturer 3, expressed enthusiasm for learning about digital trends to incorporate into teaching and learning. On the other hand, Lecturers 1 and 5 expressed their feelings of being overwhelmed by technological advances that represented a challenge for their ongoing digital development.

Digital Identity and Well-being describe managing one's digital identity but at the same time understanding the impact of digital technologies on well-being. For some lecturers, there was a challenge of balancing the use of their technological tools and their well-being, especially when their professional environment requires integrating digital tools. Lecturer 5 expressed

feeling especially overwhelmed. By contrast, Lecturer 3 shared an attitude of excitement towards digital tools, besides the importance of integrating them into the work environment.

5.5.2 Theme 2: A Computer Literacy lecturer's journey

The computer literacy lecturers' journeys strongly resonated with the area of ICT Proficiency. The experiences of these lecturers in using computers ranged from initial encounters with basic functions (Lecturer 1) to learning selected software applications like Excel (Lecturer 4). Their progress was reflected in the gradual development of technical proficiencies. Also, Lecturer 5's experience as a novice indicates how proficiency in ICT developed in a way suggested by the Digital Literacies Framework, which emphasises keeping up to date with technological advancements.

Information and Data Literacy were evident in the lecturers' comments about their teaching methods (see specifically in 5.2.3 on Teaching methods and approaches; and 5.2.4 on Approach to assessments). Making use of past question papers and self-developed activities to assist students to interpret digital information was emphasised by Lecturers 3 and 6, though they perhaps over-relied on old examination papers. The application of the step-by-step method by Lecturer 1 was an attempt to enhance the students' digital literacy. According to the Jisc framework, students need to be able to locate, organise and identify digital information, Lecturer 6 supported the development of these skills by encouraging collaborative learning, where the stronger student would assist their peers, while creating opportunities for all learners to build digital competencies through peer guidance.

Digital Creation, Problem Solving and Innovation are engaged when lecturers create digital content for student activities. Lecturer 6 showed proactive learning of Access due to the lack of assistance from a mentor. Learning proactively aligns with a focus area of the JISC framework about developing higher-order problem-solving skills. Innovation was reflected in lecturers trying to be creative in their teaching methods and developing daily teaching material.

Digital Communication and Collaboration were demonstrated by Lecturer 1 through their strategic use of digital platforms to motivate students and foster a sense of classroom community. This approach especially aligns with the frameworks emphasis on exploiting digital tools to encourage interaction, peer support as well as active participation. Similarly, to Lecturer 2 describing "learn-by-doing" method to encourage collaborative learning using shared digital workspaces while promoting student engagement through construction of knowledge.

Digital Learning and Development were clearly shown when lecturers actively engaged in providing their own digital competencies. Lecturer 5, who was learning digital concepts alongside the students, demonstrated an adaptive approach to professional growth. Similarly, Lecturer 6 initiative in teaching themselves Microsoft Access illustrates self-directed learning and commitment to the development of their own digital skills.

Digital Identify and Well-being were highlighted by the emotional and cognitive challenges lecturers faced in managing their digital roles. Lecturer 5 expressed feeling overwhelmed by constant digital demands which reflects the strain of maintaining continuous online presence. Similarly, Lecturer 1 claimed that “It feels like I’m always struggling to get on top of it”, this indicated the impact of the challenge on personal well-being.

5.5.3 Theme 3: Continuous professional development in computer literacy

Lecturers 2 and 5 expressed their lack of confidence in their ICT proficiency by emphasising their need for a refresher course in basic ICT skills, specifically Office Suite which is required in the Computer Literacy curriculum across Levels 2 to 4.

Information, Data and Media Literacy were evident when Lecturers 2 and 6 indicated the lack of plagiarism detection software such as Turnitin to maintain the authenticity of students’ work and enable, rather than constrain, responsible academic behaviour. They further explained the need for further training in using these tools, indicating their role in managing information and data in the current digital age.

Digital Creation, Problem Solving and Innovation were not evident in the lecturers’ responses. However, the lecturers expressed a high interest in integrating advanced digital tools. namely Artificial Intelligence (Lecturer 6) and “automated assessments” (Lecturer 1).

Digital Communication, Collaboration and Participation focus on communication and collaboration through digital tools. The lecturers indicated the lack of the latter for example, Lecturer 6 requested short workshops on professional development, while, due to busy schedules, Lecturer 4 proposed a workshop twice a year for an opportunity for skill building and collaboration.

In the theme of Digital Learning and Development, the focus was on the personal development of the lecturer and the student. In this case, Lecturer 4 indicated the necessity of continuous professional development, particularly in the rapidly changing technological environment. Some lecturers shared that all lecturers should be required to be computer literate and ready

to address the diverse learning styles in the classroom, especially when faced with the “Fourth Industrial Revolution” (Lecturer 2).

There was no mention of Digital Identity and Well-being during the interviews with Computer Literacy lecturers. Specifically, when Lecturer 4 indicated a lack of time for professional development, this reflected a lack of work-life balance. The Framework focuses on maintaining well-being in a digital environment, while lecturers’ responses show there was a lack thereof.

5.6 Analysing the interviews with Computer Literacy lecturers against the Conceptual Framework

Derived from analysis of the interview data, the skills, experiences and pedagogical approaches of the Computer Literacy lecturers can be mapped onto the conceptual framework (see Table 2.1) by distinguishing their basic and advanced computer literacy competencies, knowledge base and pedagogies. The analysis is separated into themes and further discussed here.

5.6.1 Theme 1: Computer literacy competencies, knowledge base and pedagogical approach

Lecturers 1 and 6, who encountered challenges with computers – and even “struggle[d] to switch on the computer” – indicated that they were initially at a pre-basic level regarding the competencies of the Framework. Others, like Lecturers 2 and 4, who had been exposed to typewriters, transitioned more easily to using computers. Their prior experience enabled them to develop a computer-related skill set early in the learning process.

Lecturers had different ways of transitioning from basic to intermediate digital learning skills. More advanced competencies were shown by Lecturer 3 who, although not having experience with computers at a young age, used computers at school level and at home as a tool for learning. This was evidence of a more advanced trajectory and corresponded to the advanced level of the Conceptual Framework, including computational thinking and integrated theoretical-practical knowledge. Lecturer 3 showed ease in working with multifunctional aspects of technology; however, does not show advanced competencies in Computer Literacy but rather what is required as a Computer Literacy lecturer for NCV Levels 2 to 4, but not beyond.

Practical computer skills of different levels were described in many of the responses gained from the Computer Literacy lecturers. Lecturer 1, for example, required step-by-step assistance on how to turn a computer on and access basic software programs. This shows a ‘laboratory-based’ pedagogical approach to learning basic computer literacy skills. On the other

hand, Lecturer 3 was enthusiastic about technology in the classroom, demonstrating how practical skills can be combined with theory to create a more holistic approach to the role of technology in pedagogy.

Problem and project-based learning was demonstrated by Lecturers 3 and 6 when using technology intensively in the classroom, especially in the role of technology in enabling lecturers to design activities and assessments more efficiently. Co-teaching with specialists was suggested by Lecturer 3 when making use of technology in daily teaching and planning; and, although not explicitly described, Lecturer 3 could attain more subject-specific learning if collaborating with computer experts. Laboratory-based pedagogy was identified by Lecturers 4 and 6 when describing their early experiences of learning about computers in an educational setting like the school laboratory, which aligns with the laboratory-based approach described in the Framework. Classroom-based pedagogy was evident in Lecturer 6's experience of struggling to teach basic computer use without adequate support. This highlights how classroom-based teaching contributes in gaining foundational digital knowledge, even in challenging circumstances.

5.6.2 Theme 2: Computer literacy competencies, knowledge base and pedagogical approach

Lecturers 1, 2 and 4 taught basic Microsoft applications like Word and Publisher, including basic concepts like "turning on the computer" (Lecturer 1). The novice lecturer (Lecturer 5) also mentioned having a primary focus on Microsoft Word due to being unfamiliar with the application. When considering advanced competencies, Lecturers 3 and 6 focused on more advanced skills that included Mail Merge (Level 4), Excel calculations (Levels 3 and 4), as well concepts that would be introduced in future courses. Lecturer 6 incorporated intermediate competencies into practical applications.

The interviews reflected that the computer literacy that lecturers focused on were practical skills, particularly applications of Word and Excel. Most lecturers (Lecturers 1, 2, 4 and 5) focused on practical learning, or "learning by doing". They were at the level of practice-based learning as shown in the Framework. Despite this practical focus, they were aware of the importance of establishing a theoretical base, particularly in the first few months of their learning in computing, as suggested by Lecturer 3. Lecturer 3 described the first term as a "groundbreaking term" as it focuses on a strong theoretical foundation.

Several basic pedagogical approaches towards teaching Computer Literacy were identified during the interviews. Firstly, Lecturer 6 taught more advanced students (Level 4), and incorporated problem-solving techniques by making use of past question papers and breaking each section down to make the learning process more manageable for the students. This indicates that the lecturer incorporated higher order skills in the context of problem solving and project-based learning. Secondly, while the framework could imply co-teaching amongst computer literacy lecturers, none of the lecturers mentioned any form of co-teaching. Lecturer 6, however, mentioned (under Theme 1) a classroom approach which involved stronger students assisting those who were struggling in class. Lecturer 6 thus built a collaborative environment that included student peer assistance, which is, essentially, peer learning amongst students. Thirdly, although computer literacy is a laboratory-based course, there was no mention of a specific laboratory-based methodology from any computer literacy lecturer (apart from mentioning the shortage of equipment, software, and facilities). Lastly, Lecturers 1, 2 and 4 made use of a systematic step-by-step method of teaching basic applications in which the lecturer demonstrates, and the students follow each step. This approach incorporated both classroom-based learning and group discussions.

5.6.3 Theme 3: Computer literacy competencies, knowledge base and pedagogical approach

The third theme of the interviews focused on the lecturer's continuous professional development for teaching Computer Literacy. While basic computer literacy skills were described by the lecturers in Themes 1 and 2, they further elaborated on the need for training to develop their basic skills like those required for using MS Office and plagiarism detection tools, along with Moodle training (mentioned by Lecturers 2 and 5). Lecturer 6, who identified as a more advanced Computer Literacy lecturer compared to the others, explained that he had attended more advanced continuous professional development training workshops, such as Artificial Intelligence and Cyber Security. Lecturer 6 added that “the basic will become redundant and therefore [it is] vital to continue developing higher order skills”. Others described CISCO and Pastel training as being on their “wish list” for professional development. In all these, both theoretical knowledge and practical applications needed to be integrated.

Identifying the knowledge base of practical skills and tools for the conceptual framework, Lecturers 1 and 3 described the need for “automated assessment tools” and “online marking systems”. Integrated knowledge was reflected by Lecturer 3 in connection with mentioning that “updating subject knowledge is important”, especially in line with industry needs.

Lecturer 6 stood firm on the opinion that Artificial Intelligence and cybersecurity training could be aligned with the principles of problem-based learning. None of the lecturers made mention of any form of co-teaching, although the interviews revealed that lecturers engaged in group discussions about current technological trends, such as Moodle. However, some hinted at applying limited laboratory-based learning due to outdated content (Lecturer 1).

Lecturers 2 and 5 demonstrated a basic level of computer literacy with familiar MS applications but indicated gaps in newer technologies. Lecturers 1 and 3 demonstrated an intermediate level of competent knowledge when expressing their comfort with the content of the computer literacy subject but sought alignment with industry requirements. On the other hand, Lecturer 6 was the only computer lecturer who expressed a desire for advanced technological literacies. Thus, taken from the literature lecturers who teach Computer Literacy must be “subject specialists” (DoE, 2013b:4).

5.7 Digital capability checklist for curriculum developers

The digital capability checklist (see Table 5.2 below) was designed to assist curriculum developers to embed digital capabilities into a specific course or subject (Falloon, 2020:2449). In the table, the checklist for curriculum developers has been adapted from “learners” to “lecturers”. The checklist could be used by Computer Literacy lecturers to assess and design learning material experiences that integrate digital skills effectively into the curriculum. Furthermore, the checklist table allows lecturers to evaluate their digital learning needs while further reflecting on the tools and content for course delivery.

Table 5.2 Digital capability checklist for curriculum developers

Digitally capable lecturers should be able to…	What does this mean in the context of your course?	How in your course do lecturer's encounter, practise and get feedback on this?
Use digital tools appropriate to their subject area	The tools used are desktop computers, laptops, projectors and MS Office software – the internet.	Lecturers undergo performance management reviews; Integrated quality management systems (IQMS).
Use digital tools effectively to achieve subject-related goals	The basic tools are adequate; however, there are no advanced tools such as statistical software or industry-specific programmes. No artificial intelligence integration.	Basic Microsoft training programmes are offered to upskill lecturer skills; Microsoft teaching, Microsoft in education and Cisco.
Find, evaluate and manage digital information	TVET lecturers in NCV require basic digital information required in relevant industries.	Online workshops with Industry partners.
Use digital media to learn and to present the outcomes of learning	Lecturers use PowerPoint to integrate multimedia elements, such as videos, to enhance students' learning progress.	Peer assistance from lecturers in their respective departments.
Find, analyse and use digital data	Not relevant to TVET NCV	
Create digital artefacts	Not relevant to TVET NCV	
Use digital tools to gather and assess evidence, reach decisions and solve problems	Lecturers would need to be able to use standard search engines such as Google and MS Explore. However, AI tools such as Chat GPT and Gemini are increasingly being used.	Google scholar Chat GPT Gemini

Digitally capable lecturers should be able to …	What does this mean in the context of your course?	How in your course do lecturers encounter, practise and get feedback on this?
Take part in authentic digital research or professional practice	Lecturers should follow industry practices to ensure authentic forms of digital research.	Self-evaluation
Communicate digitally	Lecturers use Google classroom and Moodle to communicate with students.	Lecturers get feedback from students' responses on the platforms
Collaborate digitally, including with lecturers in other settings	Lecturers should be familiar with standard online collaboration tools, such as MS Teams, Zoom.	Training should be made available for these platforms.
Build and participate in digital networks	Networks and platforms such as Linked-In are increasingly important, both for networking, job-seeking, and training.	Self-seek and self-evaluation
Develop digital learning skills and habits, e.g., note-making, referencing, tagging, curation, review	Lecturers should model digital notetaking for students, such as voice-to-text technology apps (e.g., speech notes), online references (e.g., Reciteworks, Cite this for me).	Self-seek and self-evaluation
Support, mentor, coach or develop others using digital media or resources	Lecturers should model supporting, mentoring and coaching, such as introducing WhatsApp groups, quick meetings online. In a context where many students lack connectivity or data, there should be back-up with non-digital support groups.	Self-evaluation
Develop and manage their digital identity	Lecturers must be aware of how to create and manage their professional digital presence (e.g., Linked-in profiles).	Self-seek and self-evaluation
Consider their digital safety, privacy, health and well-being	It is essential that lecturers must understand issues of digital safety (e.g., changing their passwords often and taking regular tech breaks)	The TVET IT systems should enforce password changes.

5.8 Digital capability checklist

Table 5.2 highlights the digital capabilities that are expected to be demonstrated by the Computer Literacy lecturers in the TVET sector for curriculum development. The table separates the expectations, how each is applied to the course content and how practice opportunities are integrated.

The use of digital tools that are appropriate to the subject area means that lecturers are expected to utilise those digital tools that are relevant to Computer Literacy, including a basic desktop computer, laptops, projectors and Microsoft Office software. Lecturers practise this during their daily teaching and learning in class and feedback is provided through annual performance reviews known as Integrated Quality Management Systems (IQMS) (Paterson et al., 2024:9). The use of digital tools that are essential to achieving Computer Literacy goals include the expectation that the tools should support the Computer Literacy curriculum and assist lecturers to achieve the subject objectives.

Currently, only basic tools are utilised; advanced software, such as Artificial Intelligence, is not covered. Practice is required where lecturers would be given the opportunity to conduct Microsoft training programmes to enhance their digital skills. To find, evaluate and manage digital information involves lecturers finding and handling digital information relevant to the Computer Literacy curriculum. For NCV, lecturers require the basic digital skills (DoE, 2013b:5) tailored to industry requirements. Lecturers gain exposure to current industry practices through online workshops conducted collaboration with industry partners. Digital media to support learning includes the use of multimedia elements to enhance learning in the classroom. Some lecturers utilise Microsoft PowerPoint (Moussallem et al., 2017) to integrate multimedia to present videos for a knowledge-building experience. Individual practice is required daily, and feedback is presented through peer assistance within the Computer Literacy subject. Analysing and using digital data, along with creating digital artifacts, is not considered relevant for NCV Computer Literacy courses as its not required for the curriculum. Using digital tools to gather and assess evidence for problem-solving consists of emerging Artificial Intelligence tools and search engines for research. For practice, lecturers would need to be exposed to tools such as Google Scholar and ChatGPT as their use is increasing daily and students would benefit from being exposed to their lecturers' advanced digital knowledge.

Advanced digital capability includes lecturers' participation in authentic digital research and professional practice. This encompasses lecturers being expected to stay updated with industry norms and apply digital knowledge and skills in their research; however, at the TVET colleges, lecturers would need to find become acquainted with this on their own as there is no

mention in the course of assisting lecturers. Lecturers can use digital platforms like Google classroom and Moodle (Akhmedova & Rahmatova, 2024:85) to communicate with their students. These platforms provide for immediate responses to students for effective feedback.

To collaborate digitally involves lecturers being able to use digital tools effectively to collaborate with lecturers in other settings. Lecturers should be familiar with standard online platforms, such as Microsoft Teams, Zoom or Google Meet. Training on the use of collaborative digital platforms should be made available to all lecturers by the TVET college. To build and participate in digital networks includes the use of LinkedIn to enhance professional development and job opportunities. The importance of networking is recognised; however, how to go about networking practically is not implemented so lecturers need to acquire this knowledge themselves. Developing digital learning skills and habits involves an expectation that lecturers will be able to demonstrate skills such as voice-to-text (speech notes) and online referencing tools (Cite this for me). Providing digital support, mentorship or coaching utilising digital tools such as WhatsApp groups or online meetings requires knowledge of these gools.

The Computer Literacy course claims to recognise the need for digital support; however, in a context where students lack connectivity or data, there should be analogue back-up in the case of connectivity challenges.

To manage and develop a digital identity, lecturers are expected to establish professional digital identity/profile on a platform like LinkedIn. In all digital contexts, it is essential for lecturers to be aware of digital safety, privacy, health and well-being. Regular password changes should take place; and taking regular tech breaks is essential for well-being. There should be institutional support for all lecturers in the TVET college to enforce password changes for security concerns.

The digital capability checklist is advantageous to enable curriculum developers to ensure that Computer Literacy lecturers have a knowledgeable set of digital skills for teaching and learning, even while there are limitations in the TVET framework.

In the next chapter, the conclusions and recommendations of this study are discussed.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 What the study set out to achieve

The study aimed to shed light on the significant challenge of the shortage of competent Computer Literacy lecturers in the South African TVET NCV sector. Currently, ICT is a critical skill in the country and the study aimed to understand and address the gap to ensure quality teaching and learning in the Computer Literacy classroom. The structure of the National Certificate Vocational (NCV) in which the Life Orientation subject consists of a Computer Literacy component was explored. This study further sought to understand how the subject is currently being taught, as well as the qualifications of the lecturers. To evaluate the challenges faced by TVET lecturers, the study obtained the insights and understandings of Computer Literacy lecturers. The researcher noticed that many Computer Literacy lecturers lacked qualifications in the field and were therefore not fully equipped to teach the subject. As a result, identifying the kind of training and support Computer Literacy lecturers need is crucial to enhance the quality of lecturers in TVET colleges. To improve on the pedagogical content knowledge of these lecturers, the study focused on enhancing their pedagogical competencies and ICT knowledge.

The contribution to knowledge offered by the study is the groundwork which could lead to a structure for assessing professional development needs for improving the quality of teaching. The absence of such a professional development for TVET lecturers is evident. It is hoped that this study contributes towards the development of such a framework for the TVET sector.

6.2 How the research question was addressed

The research question, “How can TVET Computer Literacy teaching be strengthened?”, was addressed by utilising two strategies, namely Curriculum analysis and Lecturer interviews. The degree of alignment between the Computer Literacy curriculum was incorporated into the Digital Capabilities Framework. The focus was on the extent to which the curriculum examined key areas, such as digital literacy, digital creation, problem-solving and digital communication. Through the analysis, the study identified curricular gaps, such as a lack of focus on critical thinking, digital innovation and problem-solving. Such gaps also emphasised the need to understand the importance of digital identity, well-being and ethical considerations.

The interviews consisted of questions about lecturers’ teaching practices, experiences and the challenges they encountered in Computer Literacy. The interviews also addressed lecturers understanding on digital literacy, their perceived professional development needs and how their educational backgrounds and experiences shapes their understanding in their roles.

When identifying the training and support needs of Computer Literacy lecturers, the interviews revealed that lecturers required support and training, particularly in areas such as leading-edge technological tools, pedagogical approaches and assessment techniques.

By drawing on the two strategies, the research offered a thorough grasp of the strengths and weaknesses of current practices in teaching Computer Literacy in TVET institutions. The findings obtained from the curriculum analysis and interviews can be utilised when developing a targeted intervention to improve the gaps in teaching Computer Literacy, such as these: lecturer training which includes continuous professional development training opportunities to enhance pedagogical knowledge and digital literacy skills; partner collaboration which includes fostering collaborations with government organisations, industry and educational institutions to exchange best practices, while also improving Computer Literacy education; reforming the curriculum which includes modifying the curriculum that includes components such as advanced digital skills to provide critical thinking, digital creativity and problem-solving techniques; and allocation of resources which includes investing in adequate resources like technological software infrastructure to enhance efficient teaching and learning. By focusing on these gaps, the TVET sector can enhance quality Computer Literacy education in the 21st century.

6.3 Contribution to knowledge

This study contributed to the body of knowledge about supporting lecturers who teach fundamental technical and vocational education subjects, like Computer Literacy, without necessarily having all the required qualifications, specialisations or experience. The study thus contributes to the enhancement of TVET educational provision.

The theoretical contribution includes the integration of the JISC Digital Capabilities Framework (2020) when aligning the lecturers' competencies and their past experiences in Computer Literacy. The study highlights the value of understanding and evaluating the six domains of digital proficiency, such as ICT proficiency, digital communication, digital identity and well-being, as well as making a contribution to real-world application. The findings bridge the gap between theory and practice by mapping the lecturers' digital skills progression onto a conceptual framework for Computer Literacy teaching, thus offering a structured approach to the analysis of the transition from basic to advanced competencies. The practical contribution includes the different levels of digital literacy skills among the lecturers interviewed. Some challenges consisted of a lack of experience with advanced digital tools and artificial intelligence and the lack of professional development.

6.4 What we know now that we did not know before this research

This research provides valuable insights into the current state of Computer Literacy education and Computer Literacy lecturers' competencies. The findings identified from analysis of the curriculum documents and lecturer interviews identified the strengths and weaknesses in the curriculum and the need for professional development of lecturers.

The Computer Literacy curriculum covers the fundamentals. However, it shows gaps in digital capabilities; and the curriculum lacks a comprehensive approach to promote advanced digital skills and literacy. What is evident is a lack of emphasis on information and media literacy skills, such as evaluating sources of information and the ethical implications in the usage of digital media. While we face a world of artificial intelligence, the curriculum showed no advanced digital skill content, such as data analysis, digital creation and collaboration. Only basic computer skills were emphasised.

When evaluating the digital proficiency among Computer Literacy lecturers, it was evident that this ranged from basic to intermediate digital proficiency. Lecturers recognised their need to enhance their computer and digital literacy skills through ongoing professional development to keep up to date with technological and industry advancements. The findings further indicated that lecturers showed an eagerness to incorporate advanced technologies like AI and automated assessments, although implementation thereof would be a challenge. The curricular and lecturer practices showed a limited focus on awareness of digital well-being, such as online safety and the ethics of using technological devices.

6.5 Recommendations for practice and policy

The recommendations are separated into Computer Literacy lecturers, Practice and Policy. When looking at continuous professional development, it is expected that lecturers should prioritise professional development, given that we live in a new technological age of AI and cybersecurity which includes advanced software applications and increased knowledge of digital literacy skills. It involves innovative pedagogical approaches to enhance active learning and critical thinking, such as problem-based learning, project-based learning and collaborative learning. Using software applications is needed to incorporate digital online assessment strategies to encourage creative thinking and to enable advanced digital skills involving peer evaluation. Furthermore, interventions for student support, especially students who are not tech-savvy, can be assisted by using online resources.

Firstly, for practice, the curriculum needs to be aligned with the Digital Capabilities Framework to ensure a comprehensive and balanced approach to digital literacy. Secondly, there should be emphasis on practical, real-life applications of digital tools that would increase relevance and student engagement. Lastly, the idea of lifelong learning should be encouraged by asking the students to develop their digital skills further outside the formal education environment.

For policy, firstly, the college should invest in quality lecturer training programmes to enhance Computer Literacy lecturers' practice by helping them to develop the necessary digital skills and pedagogical knowledge required for Computer Literacy teaching. Secondly, adequate infrastructure and modern technological resources with advanced software tools for the classroom should be provided. Thirdly, an integrated digital literacy policy with goals and high standards for effective teaching and learning should be implemented. Lastly, building affiliations with industry establishments could ensure that the curriculum is current with industry needs. With these practices in place, Computer Literacy lecturers and students could become digitally literate in the 21st century.

6.6 The implications for further research

Although the objectives of the study have been met, some implications for further research on digital literacy education were identified by the study, including the following: future research could examine how Computer Literacy lecturers might develop advanced digital skills through Artificial Intelligence; and these skills could be utilised in the classroom along with cybersecurity applications and the use of plagiarism detection tools. The use of the Digital Capabilities Framework could be adapted for use across different subjects to gain an overview of its adaptability and limitations. Further research could probe in greater depth into how Computer Literacy lecturers might access continued professional development at TVET colleges and the impact this could have on their teaching and learning, as well as their exposure to technological tools and can enhance their confidence in applying digital technology skills. Lastly, the study did not include student voices, thus further research should take the opportunity to incorporate the student perspective of Computer Literacy as a subject and being taught the basics especially considering that many have already encountered AI through social media or broader societal influences.

6.7 Conclusion

In today's world, it is imperative to be computer literate because we use computers and other devices on a daily basis. This research offered insight into what digital capabilities Computer Literacy lecturers have against the JISC Digital Capabilities Framework (2020), as well as a

against a conceptual framework of competencies that includes knowledge and pedagogical approaches. The diverse experiences of lecturers ranged from struggling with basic ICT functions to seeking advanced ICT skills. These findings point out the complexity of embedding digital literacy within professional practice and exposed the gaps that required attention in training and collaboration.

The study emphasised continuous professional development for both basic and advanced digital competencies, especially when industry demands point to a Fourth Industrial Revolution. While mapping lecturers' experiences against established frameworks, the study found gaps; however, it recognised actionable approaches for development, such as digital well-being and collaborative learning models.

Despite being content-specific, the findings are consistent with global trends in the education landscape where continuous digital skill development is emphasised. Ultimately, this study call for a collaborative intervention of lecturers, TVET colleges and education policy designers to develop an environment that would empower lecturers in the technology development age. Once lecturers are fully trained and equipped for the advancement of digital technology, this will provide a modern state of education for students to be better equipped for the world of work and the future of digital technology.

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APPENDICES

APPENDIX A

Semi-structured interviews

Introduction

At the first interview, I will explain the purpose of the study and the participant will sign a consent form. At all sessions I will welcome the participant and thank him/her for participating.

Semi-structured interview 1: Theme: past experiences of computer and digital literacy

1. Do you have any memories of the first time you used a computer?
   Prompt: at school; post-school, through a family member/friend?
2. Do you have your own laptop/desktop at home?
   Prompt: if yes – what do you use it for?
3. When did you get your first smartphone?
   Prompt: what do you use your phone for? Photographs? Emails? Online meetings?
4. Do you have a tablet?
   Prompt: if yes, what do you use it for?
5. How do you feel about all these technologies that we use every day?
   Prompt: exciting? Indispensable? exhausting? Do you take tech-breaks?
6. Is there anything else you would like to share?

Semi-structured interview 2: Theme: your journey as a computer literacy lecturers

1. Could you tell me about your journey as a computer literacy lecturer?
   Prompt: what did you do or teach before? Did you undertake computer studies?
2. Could you tell me about the Computer Literacy Module that you teach?
   Prompt: topics in the study guide?
3. Could you describe how you teach different sections?
   Prompt: computational thinking, applications?
4. What assessment exercises have you set?
   Prompt: assessments in the assessment guide?
5. Do you think the students enjoyed the course?
   Prompt: Why?/Why not? Too much theory? Availability of computers?
6. Have the students found any sections challenging?
   Prompt: Lack of computers at home/accessing the computer lab? Theory?
7. Have there been sections of the module that you have found difficult to teach?
   Prompt: refer to subject/assessment guides
8. Is there anything else that you would like to share?

Semi-structured interview 3: Continuous Professional Development in Computer Literacy

1. Computer and digital technologies are changing all the time - are there any new applications or skills that you would like to have a workshop on/specialist training in?
   Prompt: have you received any information about computer-specific training courses from the college?
2. We are using online learning and educational technologies extensively these day – are there any educational technologies or platforms that you want to learn more about?
   Prompt: LMS, plagiarism detection software, etc.
3. Are there any more specialised applications relating to the programme(s) that you teach in that you would like to become more familiar with?
   Prompt: Office, security, patient data.
4. What kind of training programmes would suit you?
   Prompts: Short, lunchtime, breakaways, whole day workshops – frequency?
5. Do you believe that continuous professional development is something that computer literacy lecturers specifically need?
   Prompt: Why?/Why not?
6. Is there anything else that you would like to share?

Conclusion

At the end of each interview I will thank the participants and make arrangements to send them the interview transcript for their comments and corrections.

APPENDIX B

CAPE PENINSULA UNIVERSITY OF TECHNOLOGY

Informed Consent to participate in a Research Study (Lecturers at the TVET college)

ENHANCEMENT OF COMPUTER LITERACY TEACHING IN TVET

M Ed Candidate: Ms Andrea Anita Papier, Faculty of Education, Cape Peninsula University of Technology

M Ed Supervisor: Professor Christine Winberg, Professional Education Research Institute, Cape Peninsula University of Technology.

Dear [Name]

Overview and purpose

I am inviting you to be part of my research study on the enhancement of computer literacy teaching in TVET. I am trying to find ways to enhance TVET computer literacy provision, including curricular and pedagogical provision. This study is supported by the Department of Higher Education and Training's Technical and Vocational Education and Training Directorate and is part of the larger 'Evaluating TVET' project that has the purpose to improve provision at TVET more generally.

Description of your involvement

If you agree to be part of this study, I will ask you to tell me about your experiences as a Computer Literacy lecturer. I'd like to interview you three times over the course of a year. It will take roughly 30 minutes for each interview. I'd prefer to audio record the interview to ensure that our talk is accurately captured, but if you don't want to be recorded, you can still participate in the study.

Voluntary nature of the study

It is entirely up to you whether or not you choose to participate in this study. You have the right to change your mind and stop even if you say yes. You have the option of not responding to a question for whatever reason.

Benefits

You will benefit from the study by improving your skills in computer literacy curriculum and pedagogy. Your participation will help the college and the TVET sector to enhance TVET computer literacy lecturers' 'pedagogical content knowledge'. Even if you do not receive a direct benefit from participating, other lecturers who teach computer literacy as a beginner may benefit from the knowledge obtained in this study.

Risks and discomforts

If answering questions makes you feel uneasy you have the option of not answering a question or stopping at any point. Simply inform the interviewer that you wish to terminate the interview.

Compensation
There is no payment for participating in the study. The interview will either be held in your own office, or will be held via MS Teams, depending on the restrictions in place.

Confidentiality
My supervisor and I plan to publish the findings of this research, but we will not include any information that could be used to identify you. To protect your privacy, the audio recording of your interview will be stored on the CPUT website in a protected area where only I and my supervisor will be able to listen to it. The audio files will be destroyed once a written word-for-word record of the debate has been made. The data will be entered onto a secure university server by the researchers. Your real name will not be used in the written copy of the discussion to preserve your privacy.

We may utilize or share the results of your research in future studies. If we share your data with other researchers, it will be anonymized, which means it will not include your name or any other identifying information.

Contact information
If you have questions about this research, please contact me, Ms Andrea Anita Papier, at this email address: andreaoctober09@gmail.com, or telephone: (021) 930 3305

With thanks,

Andrea Anita Papier

Consent
You consent to participate in the study by signing this paper. I'll send you a copy of this document and keep a copy for my studies. Make sure we've addressed any of your concerns regarding the study and that you understand what you're being asked to undertake. If you have any further questions, please do not hesitate to contact me.

I agree to participate in this study.

_____ _____
Signature Date

_____
Printed Name

I agree to have my interviews audiotaped.

_____ _____
Signature Date

APPENDIX C

CAPE PENINSULA UNIVERSITY OF TECHNOLOGY ETHICS FORM

Cape Peninsula University of Technology

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FACULTY OF EDUCATION

On the 30th of September 2021 the Chairperson of the Faculty of Education Ethics Committee of the Cape Peninsula University of Technology granted ethics approval **(EFEC 3-9/2021)** to A. October for research activities related to a M. Ed degree.

Title:	Enhancement of Computer literacy teaching in TVET

Comments:

The EFEC unconditionally grants ethical clearance for this study. This clearance is valid until 31st December 2024. Permission is granted to conduct research within the Faculty of Education only. Research activities are restricted to those details in the research project as outlined by the Ethics application. Any changes wrought to the described study must be reported to the Ethics committee immediately.

Date: 30th of September 2021

Dr Candice Livingston

Chair of the Education Faculty Ethics committee and Research coordinator (Wellington)

Faculty of Education