Digital Competencies of Accounting Graduates in Malaysia: Educator, Employer, and Graduate Perspectives

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Norhasniza Hanum-Ishak

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Abstract

Digital technologies are transforming work practices, with emerging tools such as big data and data analytics, artificial intelligence (AI), blockchain, the Internet of Things (IoT), and robotics reshaping the accounting profession. Such changes demand the development of new digital competencies in the workplace. Scholarly and professional literature has identified digital competency gaps among accounting graduates, raising concerns about their preparedness for the profession. This study examines the digital competencies required of accounting graduates transitioning into early career roles from the perspectives of Malaysian educators, employers, and accounting graduates. While new or advanced technology can be classified in many ways, this study considers the broad spectrum of digital competencies that graduates must develop to navigate the diverse range of advanced or emerging technologies. Using a quantitative survey approach, the study assesses eight core digital competencies: information system, data visualisation, data analytics, data governance, communication, problem-solving, critical thinking, and creativity. The analysis is framed by human capital theory, stakeholder theory, and by Bui and Porter's (2010) expectation-performance gap model. It also explores four key dimensions of competency gaps: (a) the expectation gap between groups, (b) the performance gap between groups, (c) the constraints gap within the group of educators and graduates, due to factors that impede the development of graduates' digital competencies, and (d) the expectation-performance gap perceived by employers. Findings reveal that while educators, employers, and graduates have high expectations for digital competencies in accounting graduates, the competencies achieved by graduates fall slightly short of these expectations, resulting in discernible gaps. Key barriers to competency development include curriculum overload, a shortage of IT qualified accounting academics, inadequate infrastructure, and limited institutional support. This study contributes to the accounting education literature by introducing a digital competencies framework that integrates technical and generic competencies tailored for accounting graduates. It also extends Bui and Porter's expectation-performance gap framework by incorporating stakeholder perceptions, including those of graduates, as well as structural constraints. Importantly, the study highlights how alignment among educators, employers, and graduates can inform curriculum reform, policy development, and institutional strategy within Malaysia's higher education and accounting sectors.

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List of Abbreviations

AACSB	Association to Advance Collegiate Schools of Business
AAEW	ASEAN Accounting Education Workgroup
ACCA	Association of Chartered Certified Accountants
ACL	Audit Command Language
AFA	ASEAN Federation of Accountants
AI	Artificial Intelligence
AICPA	American Institute of Certified Public Accountants
AIS	Accounting Information Systems
ANOVA	Analysis of Variance
ASEAN	Association of Southeast Asian Nations
CA ANZ	Chartered Accountants Australia and New Zealand
CAT	Certified Accounting Technician
CGMA	Chartered Global Management Accountant
CIMA	Chartered Institute of Management Accountants
CPA	Certified Public Accountant
DC	Digital Competencies
DOSM	Department of Statistics Malaysia
EDU	Educator
EMP	Employer
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
GRAD	Graduate
HEI	Higher Education Institution
IAESB	International Accounting Education Standards Board
ICAEW	Institute of Chartered Accountants in England and Wales
ICT	Information and Communications Technology
IDEA	Interactive Data Extraction and Analysis
IES	International Education Standards
IFAC	International Federation of Accountants
IMA	Institute of Management Accountants
IoT	Internet of Things
IT	Information Technology
MDEC	Malaysia Digital Economy Corporation

MIA	Malaysian Institute of Accountants
MICPA	Malaysian Institute of Certified Public Accountants
MoHE	Ministry of Higher Education
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework
MYOB	Mind Your Own Business
NoSQL	Not only Structured Query Language
RM	Ringgit Malaysia
RPA	Robotic Process Automation
SAP	Systems, Applications, and Products
SAS	Statistical Analysis System
SME	Small and Medium Size Enterprise
SPM	Sijil Pelajaran Malaysia (Malaysian Certificate of Education)
SPSS	Statistical Package for the Social Sciences
SQL	Structured Query Language
STPM	Sijil Tinggi Pelajaran Malaysia
UiTM	Universiti Teknologi MARA
XBRL	eXtensible Business Reporting Language

List of Symbols

α	Alpha level of significance
CI	Confidence interval
df	Degrees of freedom
F	*F* distribution
M	Mean
MD	Mean difference
MS	Mean square
N	Number of respondents
p	Probability value
SD	Standard deviation
SE	Standard error
SS	Sum of squares
t	*t* distribution

Chapter One: Introduction

1.1 Overview

This chapter is structured to provide a comprehensive overview of the study. It begins with Section 1.2, which discusses the background of the study by examining digital transformations in the accounting profession and the increasing demand for digital competencies among accountants. Following this, Section 1.3 presents the motivation and research problem, highlighting the challenges and gaps that drive this investigation. Section 1.4 outlines the aim, research objectives, and research questions. Section 1.5 discusses the significance of this research, detailing its potential contributions to the field. Section 1.6 provides an outline of the thesis structure as a guide to the upcoming chapters. Finally, Section 1.7 concludes the chapter with a summary of the chapter.

1.2 Background of the Study

In recent decades, technological advancements have significantly transformed business practices and strategies across various industries. Many industries have adapted their operations to address the evolving challenges and opportunities arising from the "Fourth Industrial Revolution" (Schwab, 2017).[1] Increasing attention has shifted to emerging digital technologies such as big data analytics, artificial intelligence (AI), blockchain, the Internet of Things (IoT), and advanced robotics, which are expected to have profound implications for businesses (Chen et al., 2012; PricewaterhouseCoopers [PwC], 2023). For instance, about 62% of global business leaders are excited and positive about generative AI, with 79% expecting it to drive substantial changes within their organisations and industries over the next three years (Deloitte, 2024). Many believe that these technologies will enhance efficiency, boost productivity, and reduce costs. As these technologies continue to develop, they are transforming how individuals work and perform tasks, thus creating a need for new digital competencies in the workplace (Oberländer et al., 2020; Ra et al., 2019).

Accounting is one of many industries that have experienced massive institutional changes in response to digital technologies (Higgins, 2021; Pan & Seow, 2016). Largely influenced by the growing integration of emerging technologies and software in accounting and auditing (Henry et al., 2023; Kennedy, 2024; KPMG International, 2024; Qasim &

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[1] Fourth Industrial Revolution, also known as Industrial Revolution 4.0, integrates digital technologies into manufacturing and industrial processes. It enhances automation, data exchange, and smart system connectivity to improve efficiency and decision-making (Kruskopf et al., 2020; Zolkifli et al., 2022).

Kharbat, 2020), the profession has experienced significant changes to adapt to the advancements (Baldwin, 2024; Kokina & Davenport, 2017; Kotb et al., 2019). Many manual and routine accounting tasks of the past have been automated (Ghani & Muhammad, 2019). For example, technologies such as AI enable the automation of human-intensive audit tasks, such as testing large volumes of payment transactions, by extracting and validating data efficiently (Kommunuri, 2022). Similarly, blockchain technology is transforming accountants' roles by eliminating many manual documentation and data entry tasks, such as recording and preparing financial statements (Deloitte, 2017; Han et al., 2023; McWaters et al., 2016). Ongoing technological trends are expected to further automate transactional-level accounting tasks (Baldwin, 2024; Institute of Chartered Accountants in England and Wales [ICAEW], 2017). These advancements are reshaping the accounting profession, making it more efficient and enabling accountants to focus on higher-value tasks (Dennis & Jenkins, 2024; Kokina et al., 2021). Such changes are affecting the nature of the work of accountants, leading to a shift toward more diverse digital competencies required of professional accountants (Association of Chartered Certified Accountants [ACCA], 2016; Elo et al., 2024; Jackson et al., 2023; Savić & Pavlović, 2023). Jeffrey Thomson, former President of the Institute of Management Accountants (IMA), explains this shift in the skills required of professional accountants:

> As consumers and professionals, we're in the midst of a digital revolution that's being spurred on by technologies such as artificial intelligence, machine learning, and robotic process automation, to name a few. These changes are redefining and expanding the role of accountants and making our cultivation of skills such as data analytics, data visualisation, storytelling, and strategic management more important than ever before so we can increase our relevance in the face of automation. (Thomson, 2018, para. 3)

In addition to proficiency in using relevant information systems or software, there is also a growing emphasis on how accountants acquire, analyse, and interpret data to inform and support business decision-making (Kotb et al., 2019; Moll & Yigitbasioglu, 2019). Modern accountants need to develop not only technical competencies but also the ability to think critically and creatively to solve complex problems (ACCA, 2023a; Brink & Stoel, 2019; Cooper et al., 2019; Vien, 2021). They must be adept at collating, analysing, and communicating large volumes of information, utilising advanced data analysis and visualisation techniques, and leveraging digital tools to enhance business processes and outcomes (Appelbaum et al., 2021; ICAEW, 2019). To remain competitive, future accountants have to be digitally competent and adaptable to technological change. They are expected to have the expertise and diverse competencies to leverage various emerging technologies to work within evolving digital parameters. However, digital technologies are the major competency area where accounting graduates often have skill gaps[2] (ACCA, 2016; Chartered Institute of Management Accountants [CIMA], 2020; Daff, 2021; Deloitte, 2023; Heang et al., 2019; ICAEW Insights, 2024; Shafie et al., 2023). The existence of this gap highlights the need to better equip accounting students in Higher Education Institutions (HEIs) with digital competencies (Berikol & Killi, 2021; Ghani & Muhammad, 2019; Jackson et al., 2023).

Amidst ongoing technological advancements, HEIs face new pedagogical challenges in designing their curriculum and learning environment to meet the changing needs of employers and technologically savvy graduates (O'Connell et al., 2015). Numerous international accounting education standards have been published to guide HEIs in revising their curriculum to keep up with the needs of the digital age. For example, the International Accounting Education Standards Board (IAESB) has revised International Education Standard 2 (IES 2) to provide some guidance on the specific Information and Communications Technology (ICT) competence expected of accounting graduates before entering the profession (International Federation of Accountants [IFAC], 2019). Similarly, the Association to Advance Collegiate Schools of Business (AACSB), through Standard A5[3], mandates that the new accounting curricula integrate three primary components including information system and business processes, data analytics, and information technology (IT) agility among students and faculty, recognising the need to continual learning new skills required by accounting professionals (AACSB, 2018, 2022; Andiola et al., 2020; Salleh et al., 2023).

In addition, recent calls for improvements in accounting curriculum tend to emphasise on emerging technologies (Dzuranin et al., 2018; Gallagher, 2021; Qasim & Kharbat, 2020; Richardson & Watson, 2021; Taylor, 2021; Vien, 2021). These calls highlight the necessity for accounting education to evolve to complement technology, ensuring that accounting graduates are proficient in modern technological tools and methodologies. By incorporating these components, HEIs can produce graduates who are not only adept in traditional accounting principles but also skilled in leveraging advanced technologies to enhance business processes, perform sophisticated data analyses, and adapt to the continuous advancements in IT. However, accounting employers claim that university accounting programmes are not always aligned with market expectations (Bui & Porter, 2010; IFAC, 2019). Despite ongoing efforts to modernise accounting education, there remain concerns

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[2] The skills gap refers to a mismatch between the skills university graduates possess and the skills demanded by employers (Succi & Canovi, 2020).

[3] Standard A5 requires accredited accounting degree programmes to incorporate learning experiences designed to develop skills and knowledge necessary for integrating both current and emerging information technologies into accounting and business (AACSB, 2022).

and dissatisfaction among employers regarding graduates' readiness as potential employees. Much of this dissatisfaction is attributed to the changing skill sets required by evolving technologies (Schirf et al., 2017). This raises a critical question: Are accounting graduates adequately equipped to meet these evolving demands?

1.3 Motivation and Research Problem

The rapid advancement of emerging technologies has significantly reshaped the modern workplace, driving a shift towards digital competencies among accounting graduates. This shift highlights the need for thorough research into the digital competencies required to integrate and leverage the innovations effectively in accounting practices (Kroon et al., 2021). Business leaders have expressed concern about the discrepancy between the digital competencies required by the labour market and those possessed by accounting graduates. According to ICAEW Insights (2024), finance leaders worry that the current talent shortage in finance and accounting may worsen due to a lack of competencies especially in new-age technologies among current graduates, thereby increasing the strain on the existing competencies gap. Despite the concern and the job market's demand for graduates with new competencies such as data analytics, the accounting curriculum has not been calibrated adequately to prepare graduates for the changing landscape of the profession (Birt et al., 2023; Richardson & Watson, 2021; Wells, 2018).

The issue of inadequate development of competencies in accounting education is longstanding (see Abayadeera & Watty, 2014; Bui & Porter, 2010; Howcroft, 2017). Since the mid-1980s, various stakeholders including professional accounting bodies, employers, and academics have criticised accounting programmes for failing to equip graduates with the necessary competencies (Bui & Porter, 2010). For instance, the American Accounting Association (1986) identified a growing gap between what accountants do and what accounting educators teach in its report. In other words, the accounting curriculum taught in educational institutions has not been aligned with industry requirements and has remained so for nearly four decades.

Numerous accounting studies have explored the competencies required in the workplace. Findings from this stream of literature consistently highlight gaps in stakeholders' perceptions regarding the competencies expected from students and graduates, and the competencies they have acquired (e.g., Abayadeera & Watty, 2014; Asonitou & Hassall, 2019; Bui & Porter, 2010; Howcroft, 2017). For instance, Howcroft (2017) examined the views of employers, university educators, and chartered management accountants, identifying a competencies gap and differing opinions on the role of university education in preparing graduates.

However, limited attention has been paid specifically to gaps in digital competencies within the accounting education literature. Most existing studies have largely focused on generic skills[4] (e.g., Abayadeera & Watty, 2014, 2016; Al Mallak et al., 2020; Bui & Porter, 2010; Howcroft, 2017) and professional skills (e.g., Asonitou & Hassall, 2019; Chaffer & Webb, 2017), reflecting long-standing stakeholder concerns that students often lack essential skills such as communication, problem-solving, and critical thinking to complement technical accounting skills[5] (Al Mallak et al., 2020; Kavanagh & Drennan, 2008).

Although a growing number of studies have examined the impacts of emerging technologies on the accounting profession and the requisite competencies (e.g., Brink & Stoel, 2019; Dzuranin et al., 2018; Jackson et al., 2022, 2023; Kokina & Davenport, 2017; Kokina et al., 2021; Richardson & Watson, 2021; Tsiligiris & Bowyer, 2021), the question of which digital competencies should be developed and emphasised in university courses remains unclear. This uncertainty stems from the rapid pace of technological advancements, diverse technological preferences and implementations across organisations, and varying interests in these technologies (Jackson et al., 2023).

Previous studies in accounting education have predominantly focused on technical ICT skills or the use of specific software, such as Microsoft Excel or MYOB (e.g., Heang et al., 2019; Pan & Seow, 2016; Rackliffe & Ragland, 2016; Sithole, 2015; Spraakman et al., 2015). However, there is a lack of research addressing broader and transferable digital competencies such as data analytics, data visualisation, and critical thinking with digital tools, extending beyond specific software skills. These competencies are essential to ensure that future accountants are well-equipped and adaptable in an era of continuous technological change. A critical concern remains that competencies related to data processing, digital systems, and emerging technologies are still underdeveloped in accounting education and require more attention (Elo et al., 2024; McKinney Jr. et al., 2017; Rikhardsson & Yigitbasioglu, 2018).

Several professional bodies, such as the Chartered Global Management Accountant (CGMA) and the Institute of Management Accountants (IMA), have proposed digital skills frameworks for professional accountants. These frameworks outline essential digital

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[4] Generic skills refer to personal attributes that enhance an individual's social interactions, job performance, and career prospects. Examples of generic skills include communication, interpersonal, intellectual, and ethics skills (Al Mallak et al., 2020). These skills have also been referred to as professional, key, soft, transferable, transversal, vocational or employability skills (e.g., Crawford et al., 2012; De Lange et al., 2006; Howcroft, 2017; Ng & Harrison, 2021; Succi & Canovi, 2020; Tan & Laswad, 2018; Towers-Clark, 2015).

[5] Technical accounting skills refer to the specific knowledge and abilities required to perform core accounting tasks effectively. This includes auditing, financial accounting, taxation, and ICT (IFAC, 2024).

competencies to meet the demands of technological transformation in the workplace. However, there is a lack of studies that propose or adapt such frameworks for new-age accounting graduates. Addressing this gap is critical for ensuring that accounting graduates are equipped with the digital competencies needed to meet current and future industry demands.

In Malaysia, the gap between the competencies needed in the digital era and what the accounting curriculum provides has also been raised in recent years (Salleh et al., 2023). A 2022 survey by the Malaysian Institute of Accountants (MIA) identified the lack of talent capable of effectively utilising technology as the top barrier to technology adoption. This issue has consistently ranked among the top challenges since 2017, and in 2022, it was identified as the most critical barrier to successful technology adoption, highlighting a growing concern (MIA, 2023a). This trend suggests that with technological advancements, the demand for professionals with strong digital competencies has grown even more critical. The redundancy of traditional accounting roles, such as accounting, bookkeeping, and payroll clerks in Malaysia, further emphasises the need for graduates to develop competencies in IT and emerging areas such as data analytics, cybersecurity, complex problem-solving, and AI (Ghani & Muhammad, 2019; World Economic Forum, 2020). With the growing digital transformation in Malaysia, there is a pressing need to explore and examine areas of digital competencies in greater depth. Despite many initiatives promoted by the Malaysian government and statutory bodies, such as MyDigital, introduced in 2021 to enhance digital literacy and competencies among citizens, reports indicate that a shortage of digital talent persists (Kamrulbahri et al., 2021; Nehru & Mardhiah, 2024). The Malaysian Committee to Strengthen the Accountancy Profession (CSAP) report (2014) had already raised similar concerns a decade earlier, emphasising the need to enhance competencies and diversify talent to better meet market demands.

In addition, studies specifically exploring accounting graduates' new-age digital competencies within the Malaysian context remain scarce, thus motivating this study. Most of the studies on new-age digital competencies were conducted in Western countries (e.g., Brink & Stoel, 2019; Elo et al., 2024; Jackson et al., 2022, 2023). However, these Western studies may not be entirely applicable to the Malaysian context due to differences in educational systems, current technological infrastructure, and industry requirements. For example, the integration of emerging technologies and industry expectations for entry-level graduates differ significantly across countries (World Economic Forum, 2020). A few studies in Malaysia, such as those by Zulkarnain et al. (2021) and Taib et al. (2023), have investigated digital competencies. Zulkarnain's study involved students from various faculties, including accounting, while Taib's study focused only on postgraduate accounting students. Other studies have examined Malaysian graduates' skills gaps between stakeholders, but these have predominantly focused on generic skills (Ghani et al., 2024; Ismail, 2013; Lim et al., 2019; Ngoo et al., 2015; Norman et al., 2018). With the rapid pace of digital transformation, greater emphasis is now needed on digital competencies to prepare graduates for future challenges in the accounting profession.

To determine the alignment of accounting education with the current industry needs of the new digital generation, it is crucial to study the perspectives of various stakeholders, as advocated by Al-Htaybat et al. (2018) and Bui and Porter (2010). Comparing the expectations and perceptions of different stakeholder groups is particularly important especially in light of current technological developments and competencies related to emerging technologies. Few, if any, studies have explored and examined these perception gaps among stakeholders, particularly in relation to digital competencies, in both Western and non-Western contexts. In Malaysia, such investigations remain limited.

It is therefore critical to investigate the digital competencies expected by employers, how far the current educational curriculum aligns with these expectations from educators' perspectives, the actual digital competencies acquired by graduates and issues that impede the development of these competencies in universities. In addition to employers and educators, graduates are vital stakeholders in this discourse, as they can provide insights into the alignment between the digital competencies acquired during their studies and those they expected for their entry into professional careers. Daff (2021) called for studies to investigate recent accounting graduates' perceptions of the digital competencies they had obtained by the time they graduated. Examining these perspectives is crucial in assessing how well accounting education prepares graduates for the digital demands of the industry, particularly within the Malaysian context.

1.4 Aim, Research Objectives, and Research Questions

In light of these challenges, this study aims to examine the digital competencies required by accounting graduates entering the early stages of the accounting profession in Malaysia, by incorporating the perspectives of three key stakeholders: educators, employers, and accounting graduates. While advanced technology can be classified in many ways, this study focuses on the broad spectrum of digital competencies necessary to work effectively with a wide range of emerging technologies.

For the purpose of this study, digital competencies are conceptualised as a multidimensional construct. Although terms such as digital literacy, digital skills, and digital competence are often used interchangeably, this study adopts the broader term *digital competencies* to capture the dynamic integration of technical and generic capabilities required in professional accounting contexts. The eight digital competencies examined are categorised into two main groups: *technical competencies* (e.g., information system, data visualisation, data analytics, and data governance), and *generic competencies* (e.g., communication, problem-solving, critical thinking, and creativity), each of which is related to the use of digital technologies. These competencies were identified through a synthesis of professional frameworks (e.g., MIA, CIMA, IMA) and academic literature, providing a rationale for their selection.

This study is underpinned by human capital theory and stakeholder theory, which provide the theoretical foundation for understanding the importance of competency development and the relationships among key stakeholders in accounting education. The perspectives of educators, employers, and accounting graduates are central, as they directly reflect the teaching, learning, and workplace application of digital competencies.

Building on this foundation, the study contributes to the accounting literature by exploring several dimensions of expectation-performance gap. This focus is especially important, as it provides a structured way to evaluate whether graduates' competencies align with stakeholder expectations. For educators, it highlights whether programmes sufficiently prepare students for professional practice. For employers, it shows whether new recruits are ready to contribute effectively in digitally enabled workplaces or whether further digital competencies development is required. For graduates, it indicates how well their preparation matches the demands of early career roles. By concentrating on these three stakeholder groups, this study addresses the perspectives most relevant to the development, acquisition, and application of digital competencies in accounting.

To achieve this, this study adopts and extends Bui and Porter's (2010) expectation-performance gap framework, by including graduates' perspectives. For the purpose of this study, *graduates* are defined as individuals who have completed an undergraduate accounting degree and are in the early stages of their professional careers, i.e. up to five years of professional working experience. This definition aligns with Jackson et al. (2023), who conceptualise early-career accountants as those holding an undergraduate degree with one to five years of accounting experience, including recent graduates, when assessing preparedness for new technology at university.

The Bui-Porter framework is widely used in accounting education research to analyse differences between the competencies expected by different stakeholders and those actually acquired by students or graduates. The study adopts the same terminology of gaps as used in their framework, which consists of four key dimensions:

(a) *Expectation gap*: The differences in the expectations of educators, employers, and graduates regarding the digital competencies graduates should acquire.

(b) *Performance gap*: The differences in the perceptions of educators, employers, and graduates regarding the digital competencies graduates have acquired.

(c) *Constraints gap*: The differences between the expected[6] digital competencies and the acquired digital competencies as perceived by educators or graduates, possibly due to academic staff, institutional or student-related constraints.

(d) *Expectation-performance gap*: The differences between digital competencies required by employers and the competencies acquired by graduates, as perceived by employers.

Understanding these gaps provides a structured approach to evaluating misalignments in digital competencies within accounting education. This framework directly informs the research objectives and research questions, which are outlined below:

1. To examine the perceptions of educators, employers, and accounting graduates regarding the expected level of digital competencies for accounting graduates.
2. To examine the perceptions of educators, employers, and accounting graduates regarding the level of digital competencies acquired by accounting graduates upon graduation.
3. To examine whether there are significant differences in the perceptions of educators, employers, and accounting graduates regarding digital competencies. This includes differences between the groups (educators vs. employers vs. graduates), focusing on the expectation gaps and performance gaps. It also examines differences within the groups (i.e., level of expectation vs. level of acquired competencies), which relate to the constraints gap and expectation-performance gap.
4. To examine any constraints faced by accounting educators to adequately prepare accounting graduates to be digitally competent.

[6] In this study, the terms "desired" and "expected" are used interchangeably to refer to the competencies considered important for accounting graduates to possess, as perceived by educators, employers, and graduates.

The study is guided by the following research questions (RQ):

(a) *Expectation Gap*:

RQ 1: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies desired of accounting graduates?

RQ 2: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies desired of accounting graduates?

RQ 3: Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies desired of accounting graduates?

(b) *Performance Gap*:

RQ 4: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies that accounting graduates have acquired upon graduation?

RQ 5: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies that accounting graduates have acquired upon graduation?

RQ 6: Are there any differences in perceptions of employers and graduates regarding the level of digital competencies that accounting graduates have acquired upon graduation?

(c) *Constraints Gap*:

RQ 7: Are there any differences in the perceptions of educators regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?

RQ 8: Are there any differences in the perceptions of graduates regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?

(d) *Expectation-Performance Gap*:

RQ 9: Are there any differences in the perceptions of employers regarding the desired level of digital competencies accounting graduates should have acquired and the level of digital competencies accounting graduates hired by them have acquired upon graduation?

A more detailed discussion of these competency gaps is presented in Chapter Four.

1.5 Significance of the Research

This study examines the digital competencies among accounting graduates in Malaysia. Previous literature indicates a persistent skills gap between what the industry demands, and the competencies accounting graduates acquire at universities. While most prior research has focused on employability, generic, and professional skills, limited attention has been given to digital competencies. This study makes a valuable contribution to the accounting education literature by exploring the expectation and performance gap in the digital competencies of accounting graduates.

There is also a noticeable gap in the accounting education literature concerning digital competencies specifically among Malaysian accounting graduates. Most of the existing studies focused on developed countries, where technological infrastructure, educational approaches, and industry demands differ from those in Malaysia. Given Malaysia's ongoing digital transformation and the persistent concerns over skills shortages in accounting (MIA, 2023a), it is essential to examine digital competencies within this specific national context. Findings from Western jurisdictions may not be fully applicable due to variations in curriculum design, employer expectations, and technological adoption in the workplace (World Economic Forum, 2020). Addressing this gap will provide insights tailored to the Malaysian accounting education system and workforce needs.

Further, existing studies in Malaysia mainly concentrated on technical skills, such as proficiency in Microsoft Excel and accounting information systems skills rather than examining the diverse range of digital competencies essential for adapting to technological advancements, such as data analytics, data visualisation, critical thinking, and problem-solving. Despite the growing importance of digital competencies, there is currently no comprehensive framework for digital competencies tailored specifically to accounting graduates in Malaysia. This study introduces a diverse digital competencies framework that integrates both technical competencies and generic competencies, related to digital technology. The framework aims to clarify the various types of digital competencies required of accounting graduates or early-career accountants in the digital technology era. By outlining these competencies, it serves as a guide for educators, employers, and policymakers in designing effective curricula or training programmes that meet the evolving needs of the accounting profession.

By examining the digital competencies of Malaysian accounting graduates, this study contributes to a deeper understanding of the digital competencies landscape in Malaysia, particularly in the accounting sector. The findings of this study will be valuable to Malaysian HEIs regarding the existence and extent of competency gaps between current industry demands and the digital competencies of graduates.

Furthermore, this study examines the potential constraining factors that limit the development of digital competencies within HEIs, as part of the broader investigation into the constraints gap (i.e., RQ 7 and RQ 8) between expected and acquired digital competencies. Understanding these barriers is crucial for developing effective strategies to enhance digital competencies in accounting education. The insights gained from this study may help not only in identifying the current gaps but also in formulating actionable recommendations for curriculum development, pedagogical strategies, and policymaking in accounting education.

1.6 Structure of the Thesis

Following Chapter One, *Introduction,* the structure of this thesis is organised as follows:

Chapter Two: The Malaysian Context

This chapter provides an overview of Malaysia, including its demographics and education system. It outlines the roles of the Ministry of Higher Education and other statutory bodies that oversee and support higher education in the country. The chapter also discusses Malaysia's digital transformation initiatives and the current job market landscape. This chapter aims to give readers a foundational understanding of the Malaysian context, which is essential for comprehending the specific issues and developments discussed in this study.

Chapter Three: Literature Review

This chapter reviews the literature on digital competencies, including their definitions from various sources, the expected competencies required of accounting graduates, and the competencies they have acquired. It examines these aspects from the perspectives of three key stakeholders: educators, employers, and accounting graduates. The chapter also explores the expectation gap, performance gap, and constraints gap of educators and graduates, and discusses the factors that constrain the development of digital competencies in accounting education. Lastly, it examines the expectation-performance gap from employers' perspective.

Chapter Four: Theories and Conceptual Framework

This chapter discusses two relevant theories, human capital theory and stakeholder theory, employed to support the development of the conceptual framework for the study. It also covers the development of the competency gap analysis based on Bui and Porter's (2010) model, which serves as the foundation of the study's conceptual framework. The chapter provides a detailed explanation of the gaps in digital competencies, including expectation, performance, constraints, and expectation-performance gaps. Additionally, the chapter introduces a digital competencies framework, extending the discussion on accounting education to address the evolving demands of the profession.

Chapter Five: Research Methodology

This chapter presents the methodology used in the study. It discusses the ontology, epistemology, and axiology of the research stance that led to the choice of survey research design. It then details the process of developing and administering the questionnaires, including the expert interview, pilot study, sample selection, and data collection procedures. It also covers data preparation and preliminary analyses. Finally, the statistical methods used to analyse the data and address the research questions are presented.

Chapter Six: Findings and Discussion on Expectation and Performance

This chapter presents the descriptive results of the study, organised into sections focusing on the three specific groups of respondents: educators, employers, and graduates. It provides demographic information, the expected level of digital competencies, and the acquired level of competencies. The chapter also explores variations in expected and acquired digital competencies across demographic characteristics within each respondent group. Additionally, for employers, the chapter examines the perceptions of software proficiency.

Chapter Seven: Findings and Discussion on Gaps

This chapter addresses the study's research questions by comparing between-group findings to gain insights into the expectation gap (e.g., educators versus employers) and performance gap. Additionally, the chapter provides findings and discussion within-group to understand the constraints gap and expectation-performance gap (e.g., levels of digital competencies expected versus levels of digital competencies acquired, as perceived by educators). The chapter also examines and discusses the constraining factors that impede the digital competencies development at universities, perceived by educators to understand the constraints gap.

Chapter Eight: Conclusion

This chapter summarises the results of the previous two chapters, presents the contributions and the overall implications of the research. It also discusses the limitations of the study and provides recommendations for future research.

1.7 Summary of the Chapter

The rapid advancement of technology has created a significant gap between the digital competencies required by employers and those possessed by accounting graduates. Employers and professional bodies have expressed concerns about this competency gap, emphasising the importance of digital competencies in the modern workplace. Despite the increasing demand for such competencies, accounting curricula have not evolved sufficiently to equip students with the necessary competencies. For decades, stakeholders have criticised accounting education for its misalignment with industry needs, with the gap between academic teaching and professional requirements persisting since the 1980s.

The key focus of this study is to address a gap in the accounting education literature by specifically examining digital competencies among Malaysian accounting graduates. While existing studies have predominantly concentrated on technical or application-specific accounting skills, diverse digital competencies remain underexplored. Additionally, most research has investigated gaps in generic or professional skills without focusing explicitly on digital competencies. This study aims to examine several dimensions of competency gaps, including the expectation gap, performance gap, constraints gap, and expectation-performance gap. This study also explores factors within HEIs that may impede the development of these competencies, explaining the constraints gap. By exploring these gaps within the Malaysian context, this study seeks to provide insights into aligning accounting education with the demands of a technology-driven business environment.

Chapter Two: The Malaysian Context

2.1 Overview

This chapter provides essential background information on Malaysia to contextualise the research. Understanding Malaysia's demographic background and current situation establishes a foundation for the study. Section 2.2 covers Malaysia's demographics, offering important national context for interpreting the profiles of the study's participants. Section 2.3 presents an overview of the Malaysian education systems, examining its structure and its influence on accounting education. Section 2.4 introduces the Malaysian Institute of Accountants (MIA) and discusses the crucial role it plays in regulating and developing the accountancy profession in Malaysia. Section 2.5 explores digital transformation in Malaysia. Section 2.6 addresses the Malaysian job market dynamics, specifically focusing on employment trends, skill gaps, and the demand for accountants. The chapter concludes with a summary in Section 2.7.

2.2 Malaysia's Demographics

Malaysia, located in Southeast Asia, is geographically divided into two distinct regions: Peninsular Malaysia and East Malaysia. Peninsular Malaysia borders Thailand and Singapore, while East Malaysia on the island of Borneo shares borders with Indonesia and Brunei. Malaysia consists of 13 states[7] (namely Johor, Selangor, Malacca, Negeri Sembilan, Pahang, Terengganu, Kelantan, Perak, Penang, Kedah, Perlis, Sabah, and Sarawak) and three federal territories (namely Kuala Lumpur, Putrajaya, and Labuan). Among the 13 states, Selangor is the most populous, with a total registered population of 7.2 million people in 2023 (Department of Statistics Malaysia [DOSM], 2024a; Koya, 2023).

Selangor is a major economic powerhouse in Malaysia, positioned to become a hub for trade and logistics in the Association of Southeast Asian Nations (ASEAN) region (Malaysian Investment Development Authority, 2023; Morning Studio 2024; Razak, 2023). According to Selangor Chief Minister, the state contributed 25.5% to Malaysia's Gross Domestic Product (GDP) in 2022, highlighting its critical role in driving the nation's economic growth. Selangor is also known as part of Klang Valley, an urban conglomeration centred

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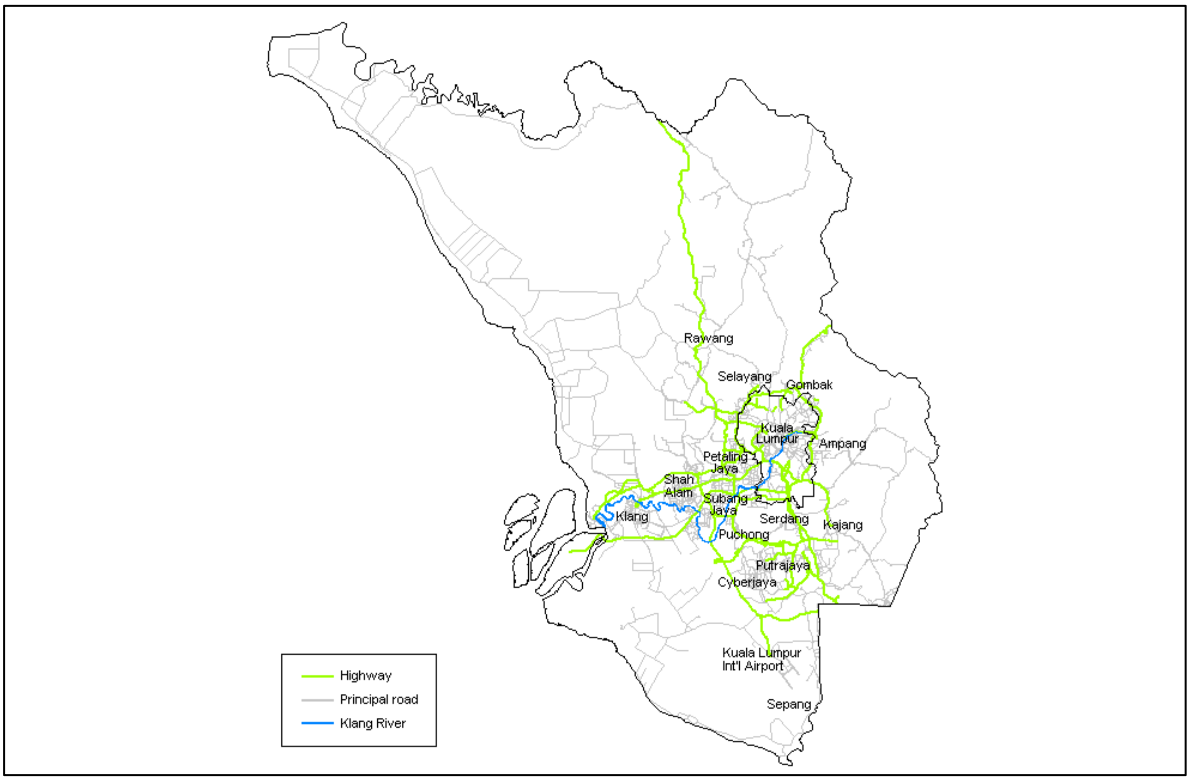
[7] In Malaysia, states have their own constitutions, legislative assemblies, and executive councils, granting them autonomy over specific matters such as land, natural resources, local governance, and Islamic affairs. In cases of conflict, however, federal law takes precedence. In contrast, federal territories are directly administered by the federal government without state legislatures or elected state governments (Loh, 2020).

around the federal territories of Kuala Lumpur and Putrajaya. Known as the heartland of Malaysian industry, Klang Valley serves as a hub for commerce and industrial activities (Wahab et al., 2022; Wong, 2023; Yasin et al., 2022). Figure 2.1 illustrates the principal cities within Klang Valley.

Figure 2.1 *Principal Cities within Klang Valley*



Note. Principal cities within Klang Valley are located within the borders of Selangor and the federal territories of Kuala Lumpur and Putrajaya. From "Klang Valley" (2016).

Malaysia is a multicultural country with a population of approximately 34 million in 2024 (Bernama, 2024a; DOSM, 2024a). Malays[8] constituted the largest ethnic group, accounting for 58% of the total population and other *Bumiputera* groups (e.g., indigenous peoples) made up around 12.4% of the population. The Chinese ethnic group comprised 22.4%, while Indians accounted for 6.5% and the remaining were other ethnicities such as non-citizens (DOSM, 2024a). The gender distribution consists of 17.8 million males and 16.2 million females, resulting in a sex ratio of 111 males per 100 females (DOSM, 2024a).

Regarding ethnic composition, the Malaysian population can be categorised as the "*Bumiputera"* (or indigenous people) and "non-*Bumiputera*". The term *Bumiputera*, meaning 'sons of the soil,' is the major category consisting of Malays ethnicity and other indigenous

[8] The Malays are an ethnic group within the broader Austronesian family (Blust, 1986). Article 160 of the Federal Constitution of Malaysia defines a Malay as a person who professes Islam, habitually speaks the Malay language, and conforms to Malay customs (Federal Constitution of Malaysia, 2009).

groups (Floyd, 2019; Frankie Fan, 2024; Janus et al., 2008). Other indigenous groups include the Orang Asli, Dayak, Iban, Bidayuh, Kenyah, Kayak, and many more (Nicholas, 2023). The non-*Bumiputera* category consists of Malaysian Chinese, Malaysian Indian, and other non-natives (Sadiq, 2009).

In Malaysia, *Bumiputeras* receive special privileges mandated under affirmative action policies.[9] Article 153, Clause (1) places upon the Yang di-Pertuan Agong (the King) the responsibility to "safeguard the special position of the Malays and natives of any of the states of Sabah and Sarawak" (Abd-Aziz, 2023; Federal Constitution, 2009, p. 123). Clause (2) of the same Article further outlines the king's authority to exercise all necessary functions, specifically mentioning the "safeguards" that could be taken. These include establishing quotas or reservations of positions in public office, public scholarship, public education, trade or businesses, and other training or special facilities (Abd-Aziz, 2023; Federal Constitution, 2009, pp. 123-124).

Initially, these constitutional protections for Malay privileges were part of an ethnic agreement or social contract that granted non-Malays citizenship and cultural rights while ensuring Malays retained their special position (Faruqi, 2003; Mohamad et al., 2019). When the Federation of Malaysia was established on 16 September 1963, this special status was extended to include the *Bumiputera* people in Sabah and Sarawak (i.e., other indigenous groups). Article 153 also legalises affirmative policies and executive action to promote economic balance and reduce social disparity across Malaysian society (Husain, 2021).

As part of the New Economic Policy to create more opportunities for *Bumiputera* students, the Malaysian government implemented a quota system for public university enrolment in the 1970s (Ali, 2016; Selvaratnam, 2016). Although the quota system was abolished for public universities in 2002, a 90% quota remains for *Bumiputeras* in matriculation colleges (pre-university) (R. Tan, 2024). Some have questioned the effectiveness of this policy, arguing that enrolment numbers alone do not confirm that the quota system has fully achieved its objectives. Nevertheless, there were a significant number of *Bumiputeras* that graduated from local universities. According to former Malaysian higher education minister Mohamed Khaled Nordin, as of December 2023, *Bumiputera* students comprised 81.9% of the student population in public universities, compared to 18.1% for non-*Bumiputera* students, a ratio of more than four to one (R. Tan, 2024). By comparison, *Bumiputeras* constitute 70.4% of the national population, while non-*Bumiputeras* account for 29.6% (DOSM, 2024a).

[9] Affirmative action refers to programmes or schemes that provide preferential treatment to elevate the status of economically, socially, and culturally disadvantaged communities (Faruqi, 2003; Lee, 2012).

2.3 Malaysian Education System

2.3.1 An Overview of the Malaysian Education System

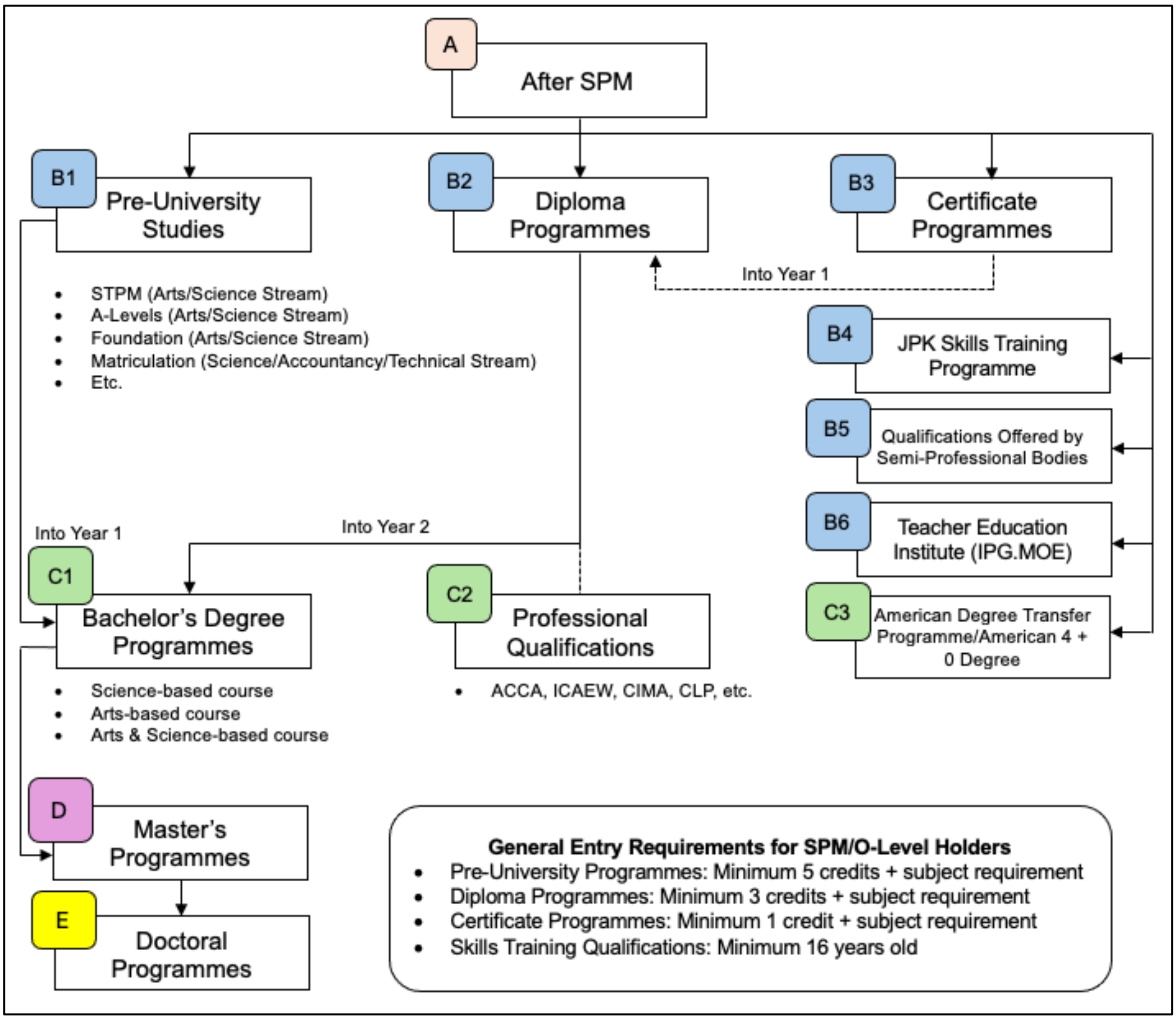
The formal education system in Malaysia falls under the jurisdiction of the Ministry of Education Malaysia. The education system in Malaysia is structured into five stages: preschool education, primary education, secondary education, post-secondary education, and tertiary education (MyGovernment, 2024a). Preschool education starts at the age of four and is optional. Primary education begins at the age of seven and lasts for six years of education. This is followed by secondary education which lasts for five years (Form 1 to Form 5) catering to students aged 13 to 17. Most students who have completed primary education are admitted to Form 1, the first year of secondary school. In the final year of secondary education (i.e., Form 5), students are required to take the Malaysian Certificate of Education examination, known as the *Sijil Pelajaran Malaysia* (SPM). This centrally administered exam is equivalent to the General Certificate of Secondary Education of England, Wales, and Northern Ireland, the Nationals 4/5 of Scotland, and the GCE Ordinary Level (O Level) of the Commonwealth of Nations. The achievements obtained in SPM will determine the future tertiary education path of the students (e.g., basic eligibility to enter the programme at a higher level), their eligibility for scholarships, and their success in job applications (MyGovernment, 2024a). After completing secondary education, students have several pathways for further studies (Sani, 2020), as illustrated in Figure 2.2.

Figure 2.2 outlines Malaysia's five educational levels, labelled A to E: *Level A* represents the completion of secondary school with the SPM qualification. This serves as the starting point for students to pursue further education. *Level B* consists of multiple post-secondary pathways, which students can pursue after completing SPM. Pre-university options (B1), such as Form 6 (STPM),[10] A-Levels, matriculation, or foundation prepare students for university admission. Alternatively, diploma programmes (B2) in Malaysia offer recognised undergraduate qualifications through public and private universities or colleges. A Malaysian diploma allows graduates to enter the workforce or progress to a bachelor's degree with advanced standing, typically gaining direct entry into Year 2 of a degree programme. Certificate programmes (B3) are primarily offered through Technical and Vocational Education and Training, such as skill training institutes, polytechnics, and community colleges (Ministry of Higher Education [MoHE], 2021). Other alternative post-

[10] The Malaysian Higher School Certificate, known as *Sijil Tinggi Persekolahan Malaysia* (STPM), is a pre-university examination in Malaysia. It is conducted throughout the two-year Form 6 programme at selected secondary schools (MyGovernment, 2024a).

secondary pathways include JPK Skills Training Programmes (B4), semi-professional certificates (B5), and teacher education institutes (B6).

Figure 2.2 *Study Pathway After Sijil Pelajaran Malaysia (SPM)*



Note. Adapted from StudyMalaysia.com (2020).

Level C encompasses bachelor's degree programmes (C1), professional qualifications (C2), and American degree transfer (C3). Bachelor's degrees are offered by both public and private universities, with various programmes available in both the science and arts streams. Accounting programmes typically fall under the arts stream, depending on the curriculum and focus areas. Professional qualifications, such as the Association of Chartered Certified Accountants (ACCA) and the Chartered Institute of Management Accountants (CIMA), provide specialised training in the field of accounting. Another option is the American Degree Transfer Programme, which allows students to complete part of their studies in Malaysia before transferring to universities in the United States.

At the postgraduate level, *Level D* includes master's degree programmes which focus on advanced studies specialisation and professional development. Finally, *Level E* represents the highest academic achievement, encompassing doctoral programmes. This level signifies the peak of academic and scholarly achievement, with individuals engaging in research and contributing to knowledge in their respective areas of expertise. Each level in Malaysia's educational framework represents a significant step towards personal and professional growth, providing individuals with the competencies necessary to excel in their chosen fields.

2.3.2 Malaysian Universities

There are two main types of universities in Malaysia: public universities, referred to locally as *Universiti Awam,* and private universities, also known as *Institut Pengajian Tinggi Swasta* (Othman et al., 2024). Entry into these universities is based on the SPM or STPM examination results, foundation, or matriculation, as discussed above. All universities are under the purview of the MoHE, which was established on March 27, 2004, to enhance the nation's development by focusing on human capital development in the context of both national and global socio-economic conditions. MoHE oversees the entire higher education sector, including public and private universities, as well as other Higher Education Institutions (HEIs) such as polytechnics and community colleges (MyGovernment, 2024a). It plays a central role in shaping a high-quality higher education ecosystem in Malaysia.

In addition, the Malaysian Qualifications Agency (MQA) is a statutory body that oversees HEIs in Malaysia. It was established in 2007 under the MQA Act (2007). MQA's primary function is to implement and regulate the Malaysian Qualifications Framework (MQF). This body is responsible for monitoring quality assurance practices and granting accreditation to both public and private universities in Malaysia (MQA, 2023; The Star, 2023). All academic programmes must be accredited by MQA to be formally recognised (MyGovernment, 2024b). Accreditation signifies that a certificate, diploma, or degree programme meets national quality standards and complies with the MQF, ensuring that graduates receive recognised qualifications (Lai & Zainal, 2023; The Star, 2023).

The MQF serves as a national reference for qualification standards across HEIs (MQA, 2023). As an integrated framework, it organises qualifications into levels, each with defined learning outcomes and credit requirements (MQA Act, 2007). These levels range from certificates (Levels 1 to 3), diplomas and advanced diplomas (Levels 4 to 5) and bachelor’s, master’s and doctoral degrees (Levels 6, 7, and 8). The MQF 2nd Edition defines five key clusters of learning outcomes, which set out the core competencies expected from students at each level:

(a) Knowledge and understanding
(b) Cognitive skills
(c) Functional work skills with a focus on:
- Practical skills
- Interpersonal skills
- Communication skills
- Digital skills
- Numeracy skills
- Leadership, autonomy, and responsibility
(d) Personal and entrepreneurial skills
(e) Ethics and professionalism

These clusters are intended to help institutions design curricula that align with the MQF's standards, ensuring that graduates are well-equipped with both the academic knowledge and practical skills needed for their careers. In accounting education specifically, the MQA Accounting Programme Standards (2024) emphasise that programmes must prepare students with the knowledge, skills, and competencies prescribed by the MQF 2nd Edition. Importantly, the standards are advised to be read alongside *Hala Tuju 4* (RoadMap), a key policy document issued by the MoHE that sets out a clear strategy for advancing accounting higher education in Malaysia (MQA, 2024). The roadmap reflects the national policy direction and underscores the importance of embedding current technological and competency-oriented enhancements in accounting education. This alignment ensures consistency between MQA's regulatory framework and national policy objectives for the development of accounting education in Malaysia.

2.3.3 Accounting Education in Malaysian Universities

In 2022, the MoHE reported that Malaysia had 20 public universities and 50 private universities offering various programmes, including accounting.[11] According to the Malaysian Qualifications Register (2022), 52 public and private universities provided accounting programmes at different levels, including diplomas, bachelor's degrees, and professional certificates. Selangor and Kuala Lumpur hosted the highest concentration of institutions, with 33 universities combined (Malaysian Qualifications Register, 2022). Figure 2.3 illustrates the

[11] As of 2024, Malaysia has 20 public universities, 390 private higher education institutions (including private universities, university colleges, and colleges), 36 polytechnics, and 105 community colleges (MoHE, 2024).

three main pathways to pursue accounting after SPM: enrolling in a diploma offered by HEIs, undertaking foundation or pre-university studies, or following the Certified Accounting Technician (CAT) route.

The first pathway involves students enrolling in a diploma in accounting, which typically lasts 2 to 2.5 years. As discussed earlier, diploma programmes are offered by HEIs. After completion, students can either enter the workforce or continue their education by enrolling in a bachelor's degree program in accounting. Those who choose to transition from a diploma to a degree often receive exemptions for relevant coursework, allowing them to enter directly into the second year of the programme, beginning in semester three.[12] In this case, the bachelor's degree can usually be completed within 2 to 2.5 years instead of the typical 3.5 to 4 years. Students who follow this pathway typically commence their diploma studies at around 18 years of age and complete the programme by the age of 20. If they enter the workforce immediately after obtaining their diploma, they can begin their careers in accounting at this stage. However, those who continue their education are likely to complete their bachelor's degree by the age of 23. Alternatively, students may choose to undertake foundation or pre-university studies, such as A-Level, Unified Examination Certificate,[13] or STPM. These programmes generally take between one to two years to complete and serve as a preparatory stage before entering a degree programme in accounting. Upon completion, they can proceed to a degree programme in accounting, which typically takes 3.5 to 4 years. In some cases, students who have completed foundation studies may directly enter the ACCA Applied Knowledge level. Students who pursue professional programmes such as ACCA after foundation or pre-university generally complete their qualifications by the age of 21.

Another option is the CAT[14] pathway, which enables students to obtain professional accounting qualifications without enrolling in a diploma or bachelor's degree. This pathway allows students to complete the CAT qualification, which takes between 1 to 1.5 years, followed by ACCA, which requires an additional 2 years. This fast-track route is designed for students who wish to attain full professional accreditation without undertaking a university degree. These qualifications are available through selected HEIs in Malaysia, including

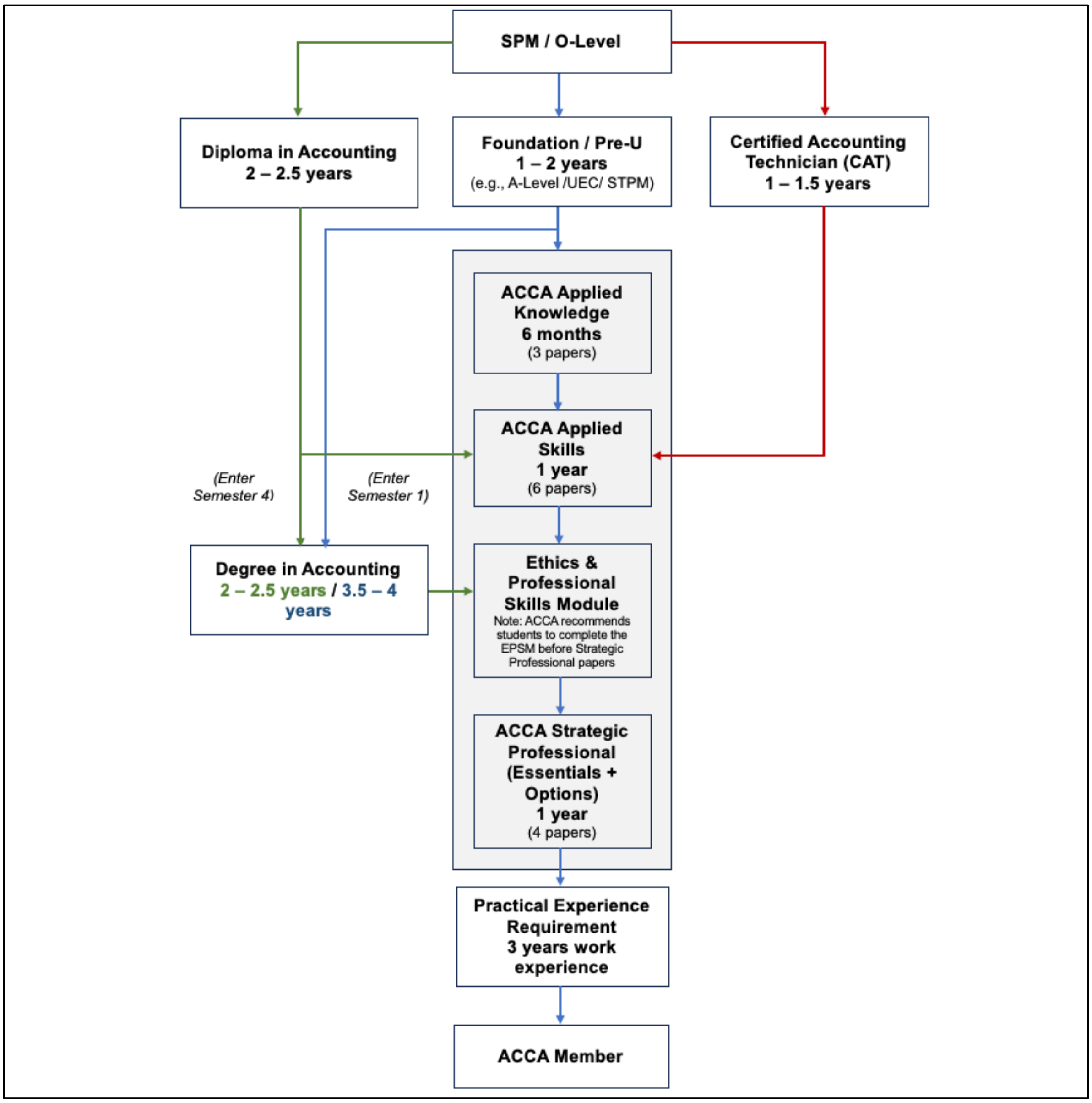
[12] In Malaysia, an academic year is divided into two semesters, with examinations held at the end of each semester.

[13] The Unified Examination Certificate is a standardised examination for Chinese independent high school students in Malaysia, administered by the United Chinese School Committees Association (Dong Zong). It is typically taken after secondary education, similar to STPM or A-Levels.

[14] The CAT Qualification provides foundational knowledge in finance, accounting, and technical skills for accounting support roles. It is internationally recognised and well regarded by employers in Malaysia.

Universiti Teknologi MARA (UiTM), a public university (Malaysian Qualifications Register, 2024; UiTM, 2020). Through this route, students can complete both the CAT and ACCA qualifications within three years thereby completing their professional exams by the age of 20 (ACCA, n.d.).

Figure 2.3 *Accelerated Pathway for SPM Students*



Note. Adapted from ACCA Global (n.d.) and EduAdvisor (n.d.).

For students pursuing a bachelor's degree in accounting, many universities in Malaysia integrate professional certification pathways within their degree programmes. This integration often aligns with professional accounting bodies, allowing students to receive exemptions from certain professional examinations upon completion of their degree. For instance, many accounting graduates from ACCA-accredited programmes in Malaysia only need to sit for the final four ACCA professional papers to gain ACCA affiliate status, as the remaining nine papers are exempted upon successful completion of the degree programme (ACCA, n.d.; Aziz et al., 2024).

Industrial training is a fundamental requirement in accounting education, ensuring that students acquire industry-relevant skills before graduation. Students are required to complete a one-semester internship or industrial training as part of the compulsory component of their study programme. The internship takes place in the final year of their study for both diploma and bachelor's degree programmes (Sani, 2018). Internship or industrial training refers to a formal arrangement by the universities where students work in organisations related to their field of studies, and under the supervision of the site and academic supervisors (Craig & Wikle, 2016). The duration of the internship varies between four to six months based on the programme requirements of the institution. The structure of the internship aligns with the MQA Accounting Programme Standard, which mandate that a minimum of eight credits be allocated for practical training. The credit allocation is based on a formula, where one credit equals two weeks of training (i.e., a minimum of eight credits) corresponding to three to four months of internship to fulfil the requirements of the programme (MQA, 2024). Therefore, most universities typically have a duration of four to six months for the internship programme. During the internship, students work in organisations relevant to their field of study under the supervision of both an industry supervisor and an academic supervisor. Assessment components often include an internship report, a progress logbook, an evaluation by both industry supervisors and the academic supervisor, an observation at the workplace by the academic supervisor, and a final presentation by the student upon completion of the training (MQA, 2024; Rosli & Yahya, 2017). Similarly, to qualify as an ACCA member, students must complete three years of relevant practical work experience. This requirement ensures they gain practical skills to complement their academic knowledge.

2.4 Malaysian Institute of Accountants

In Malaysia, the title "Accountant" is legally protected under the Accountants Act 1967 (MIA, n.d.). Individuals who wish to practise as accountants, hold related positions or obtain the Chartered Accountant Malaysia designation "C.A. (M)" must be registered with the MIA (MIA, 2024a). To apply for MIA membership, one must have either (i) hold a qualification from a recognised university by MIA, such as a Degree of Bachelor of Accounting with Honours and have at least three years of working experience, (ii) be a member of a recognised accountancy body programme (e.g., ACCA, CA ANZ, MICPA), or (iii) have passed the MIA

Qualifying Examination with a minimum of three years of practical experience in a related area (Aziz et al., 2024; MIA, 2024a).

The MIA is a statutory body established under the Accountants Act 1967, with a mandate to regulate and develop the accountancy profession in Malaysia. MIA working closely alongside businesses, connects its members to a wide range of information and resources, including professional events, professional development, and networking opportunities. MIA also collaborates with other International professional accountancy organisations such as the ASEAN Federation of Accountants (AFA), and the IFAC, to foster a high-quality accounting profession in Malaysia that is recognised and respected globally.

As of 2024, MIA has over 40,142 members working across various industries in Malaysia and around the world, the majority of whom are professional accountants (MIA, 2024b). In addition to regulating individual accountants, MIA also regulates MIA Member Firms, which play a crucial role in Malaysia's business environment, particularly in supporting Small and Medium Enterprises (SMEs). These firms, operated by sole proprietors or partnerships, provide critical services such as auditing, consultancy, taxation, bookkeeping, and forensic accounting. They are governed by the Accountants Act, MIA Rules, and the By-Laws on Professional Conduct and Ethics. Recognising the critical role of academia in shaping future accountants, MIA extends membership to academic professionals. The MIA actively engages with universities to strengthen the link between accounting education and industry expectations. Through its collaborations with HEIs, MIA ensures that accounting curricula remain relevant to industry needs by participating in curriculum reviews, industry dialogues, and academic forums (MIA, 2024a). This collaboration is essential in preparing accounting graduates with both technical expertise and practical industry insights, strengthening their readiness for the workforce.

To ensure that members remain compliant with the latest standards, professional practices, and regulations, MIA continuously updates members on the latest laws, policies, guidelines, and technical information affecting the profession. It also provides interpretation of by-laws, offers comprehensive guidance on technical and practice related matters and supports members in setting up and managing their professional practices. Additionally, MIA has introduced the MIA Competency Framework, which outlines the essential competencies for accounting professionals. This framework is shared with members, other stakeholders, and the public. Further detail of the framework is discussed in Chapter Three, *Theories and Conceptual Framework*, of this study.

In response to the digital transformation of the accounting profession, MIA has placed significant emphasis on developing digital competencies among its members. The MIA Digital Technology Blueprint 2018 highlights its commitment to advancing digital competencies and technological integration within the profession (Izma, 2018; MIA, 2018). Recent initiatives, such as the MIA Accounting and Financial Technology Showcase 2024, have aimed to equip finance and accounting professionals with the necessary digital expertise for leadership roles in sustainability and executive decision-making. These events also provide valuable insights into how digital innovation can transform the accounting profession (Abdul-Rahman, 2024; Bernama, 2024c). In addition to these large-scale events, MIA organises various training programmes and workshops such as the "Data Visualisation & Analytics with Power BI" programme to enhance members' digital competencies (MIA, 2023b). Through proactive initiatives and strategic partnerships, MIA continues to strengthen its role as a leading professional body, ensuring that its members, educators, and stakeholders are well-prepared to navigate and innovate within the dynamic landscape of accounting and financial services.

2.5 Digital Transformation in Malaysia

Malaysia's digital economy has become one of its fastest-growing sectors, driven by substantial investment and technological advancements. In the first half of 2024, digital investments reached RM 66.22 billion[15] (approximately USD 14.1 billion), significantly surpassing the total investments made in 2023, which amounted to RM 46.2 billion (Ministry of Digital, 2024). This growth reflects strong investor confidence in Malaysia's digital sector, particularly in areas such as data centres, cloud services, and Global Business Services.[16] These sectors have been pivotal in job creation, contributing to the rise of high-skilled and high-income positions (Ministry of Digital, 2024; Shahrizal, 2024).

The digital sector's expansion aligns with Malaysia's ambitions to become a digital hub within Southeast Asia (Economic Planning Unit, Prime Minister's Department, 2021; Lee, 2024). Currently, the sector contributes 23.2% to the country's total GDP, making it the third-largest contributor to the Malaysian GDP. Furthermore, it has been projected that by 2025, the total contribution of the digital sector will reach around 25.5% of the total GDP (Forbes, 2023; Telecom Review Asia, 2024). This growth is anchored by MyDigital, an initiative launched in 2021, which aims to transform Malaysia into a high-income nation and regional pioneer in the digital economy (Economic Planning Unit, Prime Minister's Department, 2021; MyDigital Corporation, n.d.). As part of this initiative, the Malaysia Digital Economy Blueprint serves as a strategic framework to accelerate technological advancement and economic progress. The blueprint emphasises key areas

[15] RM stands for Malaysian Ringgit, the official currency of Malaysia.

[16] Global Business Services creates customer-centric, digitised end-to-end processes across functions and geographies through agile units managed independently from traditional business structures.

such as e-commerce, digital infrastructure, data analytics, and talent development (Economic Planning Unit, Prime Minister’s Department, 2021).

Alongside these ambitions, global digitalisation trends and shifts in consumer behaviour have further accelerated Malaysia's digital economy. A PwC’s global survey indicates that more people are opting for online transactions, including e-commerce and bill payments, reflecting a broader shift towards digital lifestyles (PwC, 2019). The vast growth in global digital data, with nearly 90% of it created in recent years, has driven increasing demand for data-centric services (IBM Corporation, 2022; World Bank Group, 2023). Rising internet usage, technological advancements, and changes in consumer behaviour have further contributed to this rapid data growth. In addition, insights from the COVID-19 pandemic reinforced the necessity for digital resilience and equitable access, prompting Malaysia to focus on advancing its digital development strategies (Economic Planning Unit, Prime Minister’s Department, 2021; MIA, 2023a).

Despite significant advancements, Malaysian SMEs continue to face challenges in adopting digital technologies, unlike large enterprises that have embraced digital transformation (Ammeran, 2023; Tong & Gong, 2020). The 2022 National Business Digital Adoption Index (BDAI) revealed large enterprises exhibit higher levels of digital maturity compared to micro and SMEs (Malaysia Digital Economy Corporation [MDEC], 2022). The World Bank Malaysia also reports that SMEs, despite being the backbone of the country's business environment, have been slower to integrate digital technologies (Kaur, 2021). This challenge is mirrored in the accounting sector, where a 2022 MIA survey indicated that only 16% of Small and Medium Practices had advanced in digital adoption, while the majority remain in the early stages of their digital transformation journey (MIA, 2023a). To address these challenges and promote inclusive growth, the Malaysian government has introduced various initiatives in the 2024 budget. These include digitalisation grants of up to RM 5,000 to help SMEs upgrade their digital systems and allocated RM900 million in loans through Bank Negara Malaysia to support automation (Azmi et al., 2023; Thomas, 2024).

To advance digital transformation, the government has also prioritised enhancing internet connectivity in HEIs, addressing student concerns about slow campus internet connectivity and limited digital infrastructure (Bernama, 2023; Shahabudin, 2024; The Sun, 2023a). A 2024 budget of RM 250 million was announced to improve internet access in public universities, including RM 5 million to support digital teaching hospitals. Furthermore, RM 300 million has been allocated to maintain and upgrade the infrastructure at HEIs, supporting the expansion of digital learning capabilities. Another RM 20 million has been set aside to establish an AI faculty at one public university to build a digitally skilled workforce (Bernama, 2023).

The MDEC[17] plays a pivotal role in this ecosystem, collaborating with educational institutions to ensure a steady supply of digitally skilled talent. MDEC's initiatives aim to foster an innovation-driven future by supporting companies' expansion into regional markets and encouraging the development of digital competencies (Forbes, 2023; MDEC, 2022). Similarly, the MIA is actively promoting digital transformation within the accounting sector, preparing future accountants with essential digital skills to remain competitive in an increasingly digital landscape, as discussed earlier.

Together, these initiatives reflect a holistic approach to digital transformation, emphasising the need for comprehensive infrastructure, supportive policies, and an adaptable workforce. As Malaysia progresses toward becoming a regional digital hub, continued investments in these areas will be essential for sustaining growth and ensuring that all segments of society can benefit from the opportunities presented by the digital economy.

2.6 Malaysian Job Market Dynamics and Demands for Accountants

The job market in Malaysia has shown notable resilience and growth in recent years, reflecting the country's steady economic recovery and adaptability (DOSM, 2024b; HR Asia, 2024). This resilience is reflected in the employment-to-population ratio, which rose to 68.1% (16.66 million persons) as of August 2024, marking an increase from previous years: 65.2% in 2021, 67.1% in 2022, and 67.7% in 2023 (DOSM, 2024b). Aligning with this consistent positive trend, Malaysia's unemployment rate has remained relatively stable. It recorded 3.3% in February 2024, with a slight decrease to 3.2% by August 2024 (Bernama, 2024b; J. Tan, 2024). This rate is projected to remain stable throughout the year (Choy 2024; MIDF Research, 2024; The Star, 2024). This is a notable improvement compared to previous years: 4.6% in 2021, 3.7% in 2022, and 3.4% in 2023, reflecting a consistent decline in the unemployment rate (DOSM, 2024b).

Job creation has also expanded across several industries, reflecting shifts in economic priorities and workforce demands. The Malaysia Foundit Insights Tracker (FIT) report for 2024 highlights a significant rise in hiring activity, particularly in retail, engineering, construction, and IT (Foundit Malaysia, 2024). This positive trend highlights a strong recovery in the job market, with an increase in employment opportunities. However, not all industries have experienced the same level of growth. For example, the Banking, Financial Services, and Insurance sectors have recorded a decline in hiring activity. This decline is largely due to the ongoing shift towards digitalisation within the financial services industry, which has

[17] MDEC is a government agency under the purview of the Ministry of Digital.

reduced the demand for certain traditional roles (HR Asia, 2024; Shah, 2024). Looking ahead, Malaysia's hiring landscape in 2025 is expected to transform further, with key drivers including new government policies, digital transformation, and an increasing focus on upskilling (Robert Walters Malaysia, 2024).

Despite these positive trends, challenges remain, particularly in youth[18] unemployment. Youth unemployment is a pressing concern, with the rate standing at 10.4% as of August 2024 for those aged between 15 to 24 years, and 6.4% for those aged 15 to 30 years. Both rates are considerably higher than the national average of 3.3% unemployment rate (Bernama, 2024b; DOSM, 2024b). Additionally, a report from Michael Page Malaysia's Talent Trends 2024 revealed that 53% of employers struggled to find candidates with the right skills, indicating a persistent skills mismatch in the job market (Wu, 2024). Digital skills are the top focus for employees in Malaysia, with most still prioritising basic digital skills. Advanced digital skills such as AI and machine learning, cloud computing, and cybersecurity are also gaining importance (Economist Impact, 2023).

Beyond employment trends and skill mismatches, gender inequality remains an issue within the Malaysian workforce. While the labour force participation rate for women aged 15 to 64 has increased from 45% in 1995 to 56.7% in 2024, it still lags behind the 83.3% rate for men (DOSM, 2024b). Furthermore, there is an underrepresentation of women in management roles in Malaysia, as only 24.85% of these positions are held by women. This rate is significantly lower compared to countries such as Sweden and Singapore, which have female representation rates of 44% and 38%, respectively (Morhan, 2024). While there has been some progress over the last century, women in Southeast Asian countries such as Malaysia still face cultural gender norms hindering their equal status at home, in their communities, and at work (Eswaran, 2024).

The demand for accounting professionals in Malaysia remains strong. However, the shortage of accountants in Malaysia is an ongoing issue. The Malaysian government set a target in 2010 to produce 60,000 accountants by 2020, yet as of 2023, only 38,500 were registered with the MIA (Poo, 2023). The Critical Occupations List by Malaysia's Critical Skills Monitoring Committee (CSC)[19] identifies accountants as one of the key professions facing significant shortages (CSC, 2021). Following this, the Critical Occupations List MyCOL 2022/2023 report highlights issues regarding accounting and bookkeeping clerks, specifically in relation to skill shortages and recruitment challenges. Employers have

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[18] Youth is defined as individuals aged 15 to 30 years (Awang, 2023).

[19] The Malaysian government established the CSC under the Eleventh Malaysia Plan to monitor skill imbalances. A key output is the Critical Occupations List, which identifies high-demand, hard-to-fill skilled occupations essential for economic growth (CSC, 2021; Ministry of Human Resources & Talent Corporation Malaysia, 2024).

reported that vacancies for these roles often go unfilled due to a lack of candidates with the necessary experience or qualifications (Ministry of Human Resources & Talent Corporation Malaysia, 2023). The report indicates that digital skills are increasingly important as organisations continue to adopt technology-driven processes, which suggests a need for continual upskilling in this occupation to align with the evolving demands of the labour market. To support the nation’s economic development, there is a growing need for professionals with digital skills in the accounting field.

2.7 Summary of the Chapter

This chapter provides essential background information on Malaysia to contextualise this research. It also outlines Malaysia's educational system, providing insights into its structure and functions. Several ministries and statutory bodies have been established to oversee and govern the educational system. These organisations play pivotal roles in policymaking, policy implementation, and ensuring the quality and accessibility of education across the country.

In response to global digital and technological trends, the Malaysian government initiated various programmes and policies aimed at modernising both the economy and the education system. Economic shifts driven by digital trends have necessitated significant changes, affecting businesses and education. The government, along with statutory bodies such as MIA, supports and plays a crucial role in this digital transformation. Despite these efforts, challenges such as SMEs struggling to adopt new technologies and HEIs facing limitations in technology infrastructure still remain. These issues were recently acknowledged by the government in the 2024 budget, which includes initiatives aimed at addressing technology adoption challenges for SMEs and improving technology infrastructure in HEIs. Additionally, other pressing concerns, such as youth unemployment and a shortage of accountants with the necessary competencies, require continued attention. As Malaysia strives to enhance the digital economy's contributions, foster nationwide digitalisation, and bridge the digital divide, it is crucial for accounting education to equip graduates with essential digital competencies. These skills are necessary for navigating the rapidly evolving global digital landscape, particularly within the accounting field. Therefore, this study aims to assess the extent to which Malaysian universities are preparing accounting graduates with digital competencies, drawing insights from educators, employers, and graduates.

The literature review for the study is discussed in the next chapter.

Chapter Three: Literature Review

3.1 Overview

This chapter reviews the literature that forms the foundation for the study. It examines how educators, employers, and accounting graduates perceive the digital competencies that accounting graduates should possess and the competencies they actually acquire. The literature review further aims to identify gaps in existing research on digital competencies. Section 3.2 defines digital competencies and examines various frameworks that outline these competencies. Section 3.3 explores the viewpoints of educators, employers, and graduates regarding the expected digital competencies for accounting graduates. Section 3.4 provides a combined overview of studies that capture the perspectives of these three groups on the digital competencies acquired by accounting graduates. Section 3.5 discusses the expectation gap, comparing the perceptions of these groups regarding the expected competencies for accounting graduates. Section 3.6 focuses on the performance gap, comparing their perceptions on the competencies graduates have actually acquired. Section 3.7 discusses the constraints gap by analysing educators and graduates' perceptions on expected versus acquired competencies, considering the constraints that limit the development of these competencies. Section 3.8 explains the expectation-performance gap from the perspective of employers, highlighting the differences between the competencies they expect and those they believe graduates possess. Finally, Section 3.9 concludes the chapter with a summary.

3.2 Defining Digital Competencies

Extant literature frequently uses the terms digital literacy, digital competence, digital skills, and digital competencies interchangeably. Their definitions and applications vary depending on the context and terminology used across different fields (Iordache et al., 2017; Oberländer et al., 2020). Gilster (1997) first introduced digital literacy as "the ability to understand and use information in multiple formats via computers, emphasising critical thinking rather than Information, Communications and Technology (ICT) skills" (p. 1). Lankshear and Knobel (2008) further describe digital literacy as the ability to read, write, view, listen, compose, and communicate information. However, in research, policy, and education, digital competence is often the preferred term, as it is perceived to offer greater legitimacy compared to digital literacy (Godhe, 2019; Oberländer et al., 2020). While digital literacy primarily focuses on understanding information and ICT-related cognitive abilities, digital competence encompasses a broader range of knowledge, skills, and attitudes (Ala-Mutka, 2011; European Union, 2018; Falloon, 2020; Ferrari et al., 2012).

Janssen et al. (2013) argued that digital competence extends beyond knowing how to use devices, integrating communication, technology, and information management. Other scholars also highlighted that digital competence encompasses critical, creative, and adaptive thinking, problem-solving, analysis and interpretation, cultural agility, transdisciplinary learning, and collaboration (Ala-Mutka, 2011; Calvani et al., 2008; Ferrari et al., 2012; Torres-Coronas & Vidal-Blasco, 2011). In addition, the European Digital Competence Framework for Citizens reinforces this comprehensive perspective. It defines digital competence through five key areas and 21 competencies,[20] incorporating elements of digital literacy within a broader skill set (European Commission, 2016, 2022). These perspectives suggest that digital competence is more than information comprehension; it is the ability to transform information into knowledge through analytical and creative use of digital tools.

Based on these existing definitions of digital competence and digital literacy, Oberländer et al. (2020) provide a workplace-specific perspective by constructing their own definition of “digital competencies.” Their study emphasises that digital competencies involve not only technical proficiency but also a range of cognitive, social, and problem-solving skills relevant to professional contexts. Beyond general workplace contexts, the accounting profession also recognises digital capabilities, though different terms are used to describe similar concepts. Professional bodies such as the Association of Chartered Certified Accountants (ACCA), the Institute of Management Accountants (IMA) and Chartered Global Management Accountant (CGMA) use terms such as digital skills, digital quotient, and digital competencies within their competency frameworks to highlight the technological capabilities required of accounting professionals. ACCA promotes a Digital Quotient for professional accountants, incorporating aspects of existing and emerging technologies, data governance, digital practices, and strategic digital management (ACCA, 2021). The CGMA’s Competency Framework considers digital skills as essential skills permeating other knowledge areas including technical skills, business skills, people skills and leadership skills (CGMA, 2019). Meanwhile, the IMA use the term “competencies” and identifies six domains of core knowledge, skills and abilities needed to remain relevant in the Digital Age that include technology and analytics competencies (IMA, 2023).

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[20] The five key areas of the European Digital Competence Framework (DigComp) are: (1) Information and data literacy, (2) Communication and collaboration, (3) Digital content creation, (4) Safety, and (5) Problem solving. The 21 competencies are distributed across these five areas and outline specific knowledge, skills, and attitudes needed for effective digital engagement.

This study adopts the term digital competencies instead of digital competence or digital literacy to reflect the broader and dynamic nature of digital knowledge and skills required in contemporary workplaces. Digital competencies encompass a combination of behaviours, expertise, know-how, characteristics, attitudes, and critical understanding. They integrate both information technology competencies and other generic competencies. Other generic competencies include communication, creativity and higher-order thinking such as critical thinking and problem-solving. Although various professional accounting bodies have outlined digital competencies required of accounting professionals, to the best of the author's knowledge, no specific framework exists for accounting graduates. Given the evolving technological landscape, it is essential to understand the level of digital competencies required before graduates enter the workforce. Thus, a digital competencies framework for accounting graduates would be of immense use as it will highlight the important competencies required of early career accountants.

This study defines digital competencies through eight categories: (1) information systems, (2) data visualisation, (3) data analytics, (4) data governance, (5) communication, (6) problem-solving, (7) critical thinking, and (8) creativity. Each competency encompasses five to six specific knowledge areas and skills, which are detailed in Chapter Five. In this study, skills refer to specific abilities that allow individuals to perform particular tasks within a competency. Additionally, this study uses the term proficiency to indicate the level of mastery in a specific skill or competency. The following section provides an overview of the literature that addresses the significance of digital competencies for accountants.

3.3 Digital Competencies Expected

Previous studies have largely explored the expectations of digital competencies across three key stakeholders: educators, employers, and graduates. The following three sections separately discuss insights from prior research on each stakeholder group's expectations.

3.3.1 Educators' Expectations

Educators play a crucial role in preparing accounting graduates for future employment by ensuring they possess up-to-date intellectual capabilities, including digital competencies (Al-Htaybat et al., 2018; Jackson et al., 2023). Their perceptions are equally important in identifying which digital competencies accounting graduates should possess to meet the expectations of potential employers. One widely recognised digital competency is proficiency in Microsoft Excel, which educators consider a "must-have" skill for accounting students before graduation (Rackliffe & Ragland, 2016). Microsoft Excel is widely integrated into accounting courses, with educators incorporating various functions such as data analysis tools, pivot tables, and financial formulas depending on the course structure. Educators' emphasis on Excel proficiency aligns with employers' expectations, who require graduates to have at least an intermediate level of proficiency (Daff, 2021; Lamberton et al., 2024; Spraakman et al., 2015). Beyond Microsoft Excel, educators expect accounting graduates to have moderate proficiency in using accounting software packages to create reports and a higher level of proficiency in several other areas including understanding business cycles in an electronic environment and safeguarding electronic accounting records (Winstead & Wenger, 2015).

While technical competencies are essential, educators also recognise the need for a broader range of competencies to effectively operate sophisticated technology such as data analytics. Accounting educators rank analytical thinking, problem-solving, and effective communication as the most important data analytics skills (Dzuranin et al., 2018). They also consider Microsoft Excel the most essential data analytics software for university curricula, followed by audit tools (e.g., IDEA and ACL), data visualisation software (e.g., Tableau, Qlik, and Power BI), and database tools (e.g., Microsoft Access). As automation transforms the accounting profession, educators advocate for integrating both contemporary technological skills (e.g., new technologies skills, data analytics, and privacy and security) and classic skills[21] (e.g., technical accounting knowledge, problem-solving, critical analysis, and analytical skills) into accounting curricula (Al-Htaybat et al., 2018). Mcbride and Philippou (2022) further identify essential generic skills for effectively utilising big data and data analytics including (a) questioning and scepticism, (b) critical thinking, (c) understanding and ability to analyse, and (d) the ability to communicate and apply results.

However, the integration of these competencies into curricula remains limited. Research indicates that such expectations for digital competencies have not been fully embedded in curricula and continue to be a low priority (Banasik & Jubb, 2021). Birt et al. (2023) find that the business analytics topics are outdated, and Accounting Information Systems (AIS) courses still focus heavily on traditional tools, such as MYOB, business processes, internal control, Excel spreadsheets, math, and statistics. Contemporary topics, such as eXtensible Business Reporting Language (XBRL), cybersecurity, Enterprise Resource Planning (ERP), risk management, Systems, Applications, and Products in Data Processing (SAP), blockchain, and issues related to digital security, ethics, and responsible technology use have received limited coverage. Academic respondents in Birt et al. (2023)'s study advocated for integrating advanced ICT skills, including Tableau, Power BI, Excel,

[21] Classic skills refer to foundational, stable, and consistently relevant skills that have been long valued in the accounting profession (Al-Htaybat et al., 2018)

basic programming, and Structured Query Language (SQL), into the accounting curriculum to better prepare graduates for the evolving landscape.

Similar trends have been observed in non-Western countries. In Brunei, accounting educators widely agree that digital accounting literacy is essential for accounting students to thrive in the modern workspace (Don et al., 2023). Key competencies include knowledge of digital accounting tools, data analytics, and information security (Don et al., 2023). In Malaysia, academics acknowledge the shift towards IT technologies in their own roles and recognise the growing IT requirements for accounting graduates in the Industrial Revolution 4.0 era (Ghani & Muhammad, 2019; Zin et al., 2022). This aligns with findings from the MIA, survey on Malaysian universities, which identified AI, blockchain, cloud computing, cybersecurity, and data analytics as crucial for accounting curricula. It also reported that 52% of universities had integrated these technologies into their courses, while 23% had no plans to do so, and the rest anticipated incorporation within the next 6 to 24 months (MIA, 2021). Despite these developments, a more recent study found that big data analytics skills are not generally included in the current Malaysian university accounting curriculum of the selected academic participants, raising concerns about the lag in integrating these advancements into teaching (Zin et al., 2022).

While previous studies have primarily focused on technical skills (e.g., Aldhizer, 2015) and the importance of generic skills (e.g., Bui & Porter, 2010; Gunarathne et al., 2021; Howcroft, 2017), there is a growing recognition that digital competencies are equally essential for accounting graduates. This shift reflects educators' acknowledgement that, while technical and generic skills remain fundamental, digital competencies are increasingly critical in the digital era. However, there remains a gap in understanding which specific digital competencies are expected of accounting graduates by educators, especially within the Malaysian context. This gap highlights the need for further research to capture and address the unique expectations of educators within the Malaysian context.

3.3.2 Employers' Expectations

Employers are key stakeholders since they are the ones who will hire accounting graduates and play an important role in further developing future accountants (Al-Htaybat et al., 2018). Understanding their perceptions on digital competencies expected from accounting graduates or early career accountants is crucial. Earlier studies have consistently highlighted the growing emphasis on technology competency in the accounting profession (Albrecht & Sack, 2000; Bradbard et al., 2014; Tan et al., 2004). Employers regard IT competency as fundamental to career success for accountants (Oliver et al., 2011).

Proficiency in Microsoft Excel remains one of the most in-demand technological competencies for accounting graduates. In New Zealand, employers expected management accounting graduates to have intermediate proficiency in Microsoft Excel, Word, PowerPoint, and Outlook, along with sufficient familiarity with ERP systems (Spraakman et al., 2015). Similarly, job advertisements in Australia and New Zealand frequently emphasise IT skills, including Excel, MYOB, Xero and other database systems as top professional requirements (Tan & Laswad, 2018). Daff (2021) further reinforced these findings, reporting that employers expected entry-level accounting graduates to possess accounting package knowledge and intermediate spreadsheet competencies, particularly in Excel.

The integration of emerging technologies such as Robotic Process Automation (RPA), AI, big data, and data analytics with traditional accounting software has become increasingly prevalent (Birt et al., 2023; Kokina et al., 2021; Vitali & Giuliani, 2024; Yigitbasioglu et al., 2023). While Big Four firms prioritise proficiency in AI and RPA, non-Big Four firms place greater emphasis on expertise in accounting software and data analytics for cloud-based solutions (Yigitbasioglu et al., 2023). Industry reports reinforce these findings, highlighting the growing reliance on AI, cloud computing, ERP, data analytics, and regulatory technology in financial reporting (CPA Australia, 2023). Companies expect auditors to have the skills to leverage these tools for analysing large datasets, extracting insights, and enhancing decision-making processes (KPMG International, 2024). Employers also emphasise the importance of data analytics, data visualisation, and a basic understanding of systems risks, threats, and issues (Birt et al., 2023). These advanced technological expectations reflect the increasing role of digital tools in modern accounting, where technological proficiency is crucial to using these tools. Employers highly value training students in these emerging technologies and identify them as areas requiring greater attention in the curriculum (Birt et al., 2023; Jackson et al., 2023).

As accounting evolves, employers increasingly seek graduates with both technical and non-technical competencies. Employers particularly value data analytics as a competency that extends beyond technical proficiency to include critical thinking, problem-solving, data interpretation, and effective communication (Birt et al., 2023; Daff, 2021; Jackson et al., 2020). Similarly, operating RPA effectively requires both technical and non-technical competencies including communication, creative and analytical competencies. As automation advances, creative and analytical thinking is becoming increasingly important (Kokina et al., 2021; World Economic Forum, 2023). These findings align with digital competencies defined by prior scholars (Ferrari et al., 2012; Janssen et al., 2013; Oberländer et al., 2020) which have received less attention in the accounting discipline.

While numerous studies have been conducted in Western countries, these findings may not fully apply to Malaysia due to differences in technology adoption and industry expectations for entry-level graduates across countries (World Economic Forum, 2020). Although some Malaysian studies have explored employers' expectations, they primarily focus on specific digital skills rather than broader digital competencies. For example, Amirul et al. (2017) found that employers expect graduates to understand daily accounting systems such as MYOB, UBS, Great Plains, SAP, Oracle, and tax return software, with a fundamental understanding of ERP and Customer Relationship Management applications. The rise of Industrial Revolution 4.0 has further increased the demand for IT capabilities, making proficiency in Microsoft Excel, Microsoft PowerPoint, and specialised audit and accounting software essential for graduates (Ghani & Muhammad, 2019; Ismail et al., 2020).

A job advertisement analysis across four ASEAN countries, including Malaysia, further reinforced these expectations and has identified high demand for Excel, accounting software (SAP, Xero, MYOB, QuickBooks), tax software, ERP, and cloud-based applications (Suarta et al., 2024). More recent findings highlight the increasing significance of IT proficiency and data analytics in accounting, with employers expecting graduates to effectively use accounting software, databases, and technological tools for accounting tasks and financial data analysis (Hussin et al., 2024). Additionally, future graduates are expected to be familiar with emerging technologies such as data analytics, AI, cybersecurity, blockchain, and cloud computing (MIA, 2018, 2021). However, existing studies in Malaysia largely overlook the broader framework of digital competencies required for modern technologies. Few studies comprehensively address this gap, but research has emphasised the importance of big data analytics knowledge and other key competencies such as reporting, visualisation, collaboration, analytical and interpretive skills, and effective communication (Zin et al., 2022).

Prior research has outlined specific technological competencies and proficiency levels expected by employers from accounting graduates and professionals. Beyond fundamental proficiency in accounting software, employers now expect graduates to develop a diverse set of digital competencies to leverage emerging technologies. As business environments evolve and digital competency expectations shift, continuous engagement with employers is needed to keep accounting education aligned with industry demands (Spraakman et al., 2015). However, much of the existing literature focuses narrowly on specific software or technology skills, neglecting the broader spectrum of digital competencies. Only a few recent studies have examined emerging digital competencies that employers now consider vital in the evolving technological landscape. This gap in knowledge, particularly in Malaysia, highlights the need for more comprehensive research to examine the relevant digital competencies to adequately prepare accounting graduates in the digital era.

3.3.3 Graduates' Expectations

Accounting graduates are expected to possess excellent competencies to achieve job success (ACCA, 2016). Understanding their perceptions of the digital competencies they need is therefore essential. However, despite being one of the key stakeholder groups, graduates' perceptions of the digital competencies they expect to develop at university remain underexplored.

Earlier studies found that graduates consistently rated Excel as an essential IT skill by graduates (Awayiga et al., 2010). Similarly, Ragland and Ramachandran (2014) highlighted its importance in public accounting, with new hires (i.e., graduates) emphasising Excel functions such as basic formulas, data filtering and sorting, document formatting, and advanced functions. However, their study found that accounting students tend to underestimate the importance of these functions. Beyond Excel, recent studies indicate that graduates emphasise the need for greater exposure to the latest versions of different types of software to meet industry demands and stay updated with technological advancements (Jackson et al., 2023).

The demand for data visualisation and data analytics competencies is also on the rise, with tools such as Microsoft Excel playing a crucial role (Perkhofer et al., 2019; Spraakman et al., 2021). Research shows that experienced professionals prefer data-related skills, and graduates entering the workforce also recognise their importance. For example, experienced accountants ranked data visualisation, data extraction, and data analytics as the three most useful skills, while programming languages were considered the least relevant for career success (Chiang et al., 2021; Harrast et al., 2023). Similarly, graduates acknowledge the significance of these skills, indicating that while both data analytics and data visualisation are considered important, data analytics is perceived as more crucial (Lee et al., 2018). Lee et al. report that Excel is the most frequently used tool among new entrants in various accounting roles, followed by ERP systems, and advocate for greater emphasis on these tools in accounting curricula. The ACCA's survey reinforces this trend, showing that although Excel remains foundational, accountants at various career stages, including graduates, recognise the growing need for advanced analytics, RPA, cloud systems, and ERP tools (ACCA, 2023a).

Although limited research has explored graduates' views on digital competencies, existing studies suggest that a combination of digital and generic skills is valued. Graduates recognise the need for digital literacy and software proficiency, alongside generic skills such as communication (e.g., interpreting data and communicating what it means), problem-solving (e.g., reasoning, analysing, diagnosing), and creativity (Brink & Stoel, 2019; Jackson et al., 2020, 2022). Moreover, effective use of digital tools requires strong analytical and communication skills to support meaningful decision-making (ACCA, 2023a). Similarly, studies on accounting students acknowledge the importance of general technological proficiency but indicate that programming skills, robotics, and AI knowledge as less crucial (Elo et al., 2024). However, they also regard intellectual skills such as problem-solving and critical thinking as very important for the future.

To the best of the author's knowledge, no prior studies have examined accounting graduates' expectations in Malaysia. However, studies in the neighbouring country of Indonesia reveal similar trends, with students highlighting the importance of operating and interpreting accounting software. They also highlight the need for IT courses such as Information Technology and Communication, Computerised Accounting, and Auditing, which should be taught using the latest software (Purnamasari et al., 2019). The ACCA's survey highlights the global importance of digital skills for accountants. Many young accountants, including those in Malaysia, find these skills highly relevant and prioritise data analytics and spreadsheet proficiency as the most important for accounting roles (ACCA, 2020b). This lack of studies emphasises the need for further research on Malaysian graduates' expectations of digital competencies within the context of digital transformation and evolving industry demands.

3.3.4 Summary

The literature on digital competencies expected of accounting graduates indicates that graduates are entering industries which are consistently characterised by technological change. Based on the three different perspectives: educators, employers, and graduates, there is no doubt that digital competencies, especially Microsoft Excel, accounting software, and understanding of emerging technologies, are extremely important for accounting graduates to succeed in the workplace. Prior studies confirm that the usage of advanced technology is growing; hence, graduates are required to develop a broad range of digital competencies, including technical and generic skills. Despite the growing importance of digital competencies for accounting graduates or early-career accountants, research in this area remains limited, particularly in Malaysia. Existing studies primarily focus on basic technical IT skills such as Excel or specialised competencies for operating technology. However, a major limitation of prior literature is the absence of a conceptual framework that systematically captures the expectations of key stakeholders of educators, employers, and graduates regarding the digital competencies needed in a high-tech job market. The significance of proposing a digital competencies conceptual framework lies in providing a structured approach to identify and integrate essential competencies for accounting graduates. It may ensure that educational programmes align with industry needs, facilitating better preparation for accounting graduates to meet the demands of a digitally transformed workplace. The next section reviews prior literature on the digital competencies acquired by accounting graduates, specifically examining whether the expected competencies have been achieved.

3.4 Digital Competencies Acquired

Given the debate over the types of competencies expected of accounting graduates, it is crucial to assess the digital competencies that accounting graduates have acquired upon graduation (i.e., digital competencies performance). It is pertinent to mention here that there is less literature on performance than expectations. Therefore, this section provides a combined overview of studies which captured the perspectives of educators, employers, and graduates, in relation to digital competencies acquired by accounting graduates, students, and accountants.

3.4.1 Educator, Employer, and Graduate Perceptions

Existing research shows that accounting new hires (i.e., graduates) and students have varying Excel proficiency levels. Ragland and Ramachandran (2014) found that new hires and their supervisors viewed their Excel skills as moderate, with proficiency largely depending on usage and experience. Early career public accountants demonstrated more advanced skills, such as vertical/horizontal lookup and If/Then statements, relevant to their roles. Similarly, educators believed accounting students at their institutions were moderately proficient in Excel (Rackliffe & Ragland, 2016). Beyond Excel, accounting students show mixed proficiency in other digital tools. They generally have intermediate to advanced Excel skills but lack familiarity with advanced visualisation tools such as Tableau. They also have beginner to intermediate proficiency in advanced data analytics and statistical modelling software, such as R, SPSS, and SAS (Kokina et al., 2017)

The rise of emerging technologies has led to an obvious shift in the competence profile of future accountants, requiring them to develop strong digital competencies to meet evolving industry demands. For example, a few recent studies reported that employers and early-career accountants believe graduates are reasonably prepared to tackle the technological advancements in the workplace, yet there is room for improvement in the technological skills developed by universities (Jackson et al., 2020, 2022, 2023). Similarly, educators, students, and accountants recognise that accounting students demonstrate strong IT skills and communication skills, particularly in using technology for visual presentations (Asonitou & Hassall, 2019). Employers also observe that while recent graduates have adequate proficiency in using accounting software, they lack a deeper understanding of accounting principles, such as debits and credits, which affects their ability to effectively leverage these software (Daff, 2021). Additionally, Busulwa et al. (2024) found that Junior/Trainee accountants, who are graduates, rated their digital skills about 10% lower than those at higher career levels, such as senior leaders and experts. Despite this, they felt reasonably confident in their ability to work in digital environments and use Business and Accounting Information Systems. However, their proficiency in advanced software applications, including data analytics and data science tools, was lower compared to more experienced accountants.

Due to the limited research on graduates' acquired digital competencies, studies on professional accountants offer valuable insights into the skills developed through workplace experience. Research shows that management accountants possess IT skills in ERP systems, SAP and Dynamics, Customer Relationship Management applications, Excel, Word and PowerPoint, as well as skills in SQL and Data Warehouse, but lack essential data analytics competencies (Oesterreich & Teuteberg, 2019). Similarly, digital skill deficits have been identified in data analytics, coding, cybersecurity, and cloud computing among professionals (CIMA, 2020). These findings highlight the importance of strengthening digital competencies during university education to ensure graduates enter the workforce with relevant skills.

Meanwhile, in non-Western countries, particularly in Southeast Asia, accounting students face challenges in adapting to digital accounting practices. For example, studies indicate that Bruneian (Don et al., 2023) and Indonesian (Purnamasari et al., 2019) accounting students are inadequately prepared for the digital shift, and lacking digital literacy despite having access to relevant tools. In Malaysia, findings are mixed, where accounting students reported confidence with basic applications such as word processors and data entry tools but were less proficient in accounting software and spreadsheets (Wahab et al., 2017). However, a more recent study by Abd-Hadi et al. (2021) found that most students generally reported above-average knowledge in using spreadsheets for financial reporting. This is attributed to students taking AIS courses on basic IT applications, such as Microsoft Excel and MYOB during their university studies (Ghazali et al., 2022; Zolkifli et al., 2022). Despite this, accounting graduates and interns expressed dissatisfaction with the technology taught at universities. Many felt that outdated systems, such as MYOB, and the superficial training in Microsoft Excel did not equip them with the necessary skills for industry applications (Heang et al., 2019). Similarly, students had generally low IT proficiency, with limited applicability of their training during internships, as firms often used proprietary IT systems or software to perform audit-related work (Zolkifli et al., 2022). Supporting this, Awang et al. (2023) observed that while internship students had moderate technological knowledge and strong skills in office automation tools, such as Microsoft Office 365, Google Apps, Hyper Office, they demonstrated limited knowledge of complex accounting systems.

These limitations in digital proficiency persist as students transition into the workforce. The ACCA's survey found that while many young accounting professionals across various countries, including Malaysia, felt adequately skilled, some remained uncertain about their digital proficiency. Spreadsheets were the most commonly cited tool of expertise, followed by ERP systems and analytics applications. However, only half of the respondents reported expertise in data visualisation tools and data governance (ACCA, 2020b). Similarly, Ilias et al. (2020) found that young accounting practitioners showed moderate readiness to adopt new technologies but lacked knowledge of more advanced digital tools.

Beyond these specific challenges in accounting-related technologies, studies assessing students' broader digital competencies provide further insights. Zulkarnain et al. (2021) assessed undergraduate students' digital competencies using the European Commission Digital Competence Framework. Students, including those in accounting, demonstrated strong information and data literacy, virtual communication and collaboration, and security awareness. However, they struggled with analysing digital content, applying creativity in digital technology use, content creation, and programming. At the postgraduate level, students generally attained moderate to high levels of digital competencies, including information literacy, media literacy, ICT literacy, digital literacy, and digitalisation (Taib et al., 2023). While these studies provide insights into students' digital competencies, there remains limited research specifically examining the digital competencies acquired by Malaysian accounting graduates.

3.4.2 Summary

Various studies have explored the IT skills and digital competencies acquired by accounting graduates, students, and professionals. However, there are deficiencies in the digital competencies expected for today's accounting landscape. Furthermore, research specifically examining the digital competencies performance among accounting graduates from educators', employers', and graduates' perspectives is scant. In addition, there is a noticeable inconsistency in the proficiency levels reported across different jurisdictions. While Western literature found that in general accounting graduates seem to be reasonably prepared, significant improvements are still needed to equip them with the relevant digital competencies. Additionally, it has been found that most professionals attain higher levels of digital competencies due to better exposure at the workplace. In contrast, non-Western countries, including Malaysia, reported a lower level of overall digital competencies with difficulties in adapting to new technologies especially among graduates. Studies on

Malaysian accounting graduates and students show mixed results, with some reporting confidence in basic IT skills but dissatisfaction with their training in advanced technology. Additionally, previous studies have primarily focused on software tools rather than broader digital competencies. To better understand the adequacy of accounting graduates' digital competencies, more in-depth research is necessary, incorporating the perspectives of three important stakeholders: educators, employers, and graduates.

The next section explores research on the expectations gap from the perspectives of educators, employers, and graduates, focusing on the differences in the competencies they expect.

3.5 Expectation Gap

Diverse backgrounds among employers, educators, and graduates often lead to differing perceptions on the competencies most critical for accounting graduates. This misalignment in perceptions is commonly referred to as the “expectation gap” (Bui & Porter, 2010). The existence of the expectation gap between the three stakeholder groups indicates that there is a misalignment or difference of opinion regarding the digital competencies required for a successful accounting career. To clearly understand the nature of the conflict, that is the expectations gap, this section reviews the literature which examines the expectation gap between the groups: educators versus employers, graduates versus educators, and employers versus graduates.

3.5.1 Educators versus Employers

The disparities between educators and employers often arise due to different aims and perceptions of tertiary education. While educators have an obligation to adhere to the curriculum and university principles to develop graduates’ intellectual capabilities, employers prioritise skills needed for workplace success (Bui & Porter, 2010). Numerous studies have consistently highlighted these differences. For instance, earlier studies identified significant differences in the views of educators and employers about the subject matter taught in universities (Francis & Minchington, 1999; Novin et al., 1997; Theuri & Gunn, 1998). One key area of disagreement is the importance of critical thinking and problem-solving skills for accounting graduates. While most educators believed these skills were essential, employers largely rated them as less important (Bui & Porter, 2010; Howcroft, 2017).

Recent studies continue to reflect these trends. Khouloud and Tahar (2020) observed that educators tend to prioritise accounting knowledge, whereas employers place more emphasis on organisational, business, and IT skills. Likewise, employers desired a wide range of soft skills, such as communication, problem-solving, analytical, adaptability, and flexibility, including digital skills (Gunarathne et al., 2021). Educators' emphasis on intellectual capabilities indicates that they aim to produce critical thinkers, whereas employers desire more practical skills related to workplace success, leading to a gap in skills expectations.

Findings from another stream of literature, however, suggest that no expectations gap exists between the two groups. For example, both groups consistently emphasise the importance of communication, technical (computer skills, IT skills, data analytics), and intellectual skills (critical thinking and problem-solving) in accounting practice (Abu Asabeh et al., 2023; Tan et al., 2004). Other studies also reported no differences in the perception of the two groups regarding teamwork skills (Van Romburgh & Van Der Merwe, 2015) and organisational and business management skills (Jackson & Hancock, 2010).

The majority of the studies focused on graduates' employability, generic, or professional skills and less attention has been paid to examining the expectations gap regarding digital competencies across the two groups. The variance in expectations between employers and educators is also affected by how quickly technological advancements are integrated into accounting programmes. The accounting curriculum has been criticised for being resistant to change and for being more focused on the development of technical accounting knowledge rather than digital competencies needed in the market (Birt et al., 2023; Carvalho & Almeida, 2022). Winstead and Weger (2015) reported some interesting insights suggesting that both stakeholders agreed on the desired level of computer operation and accounting software proficiency in the accounting curriculum. However, differences emerged in six areas, for instance, understanding business cycles in an electronic environment, data-sharing technologies, XBRL, problem-solving with technology, e-commerce, and safeguarding electronic accounting records. Similarly, while educators and employers are found to have agreement regarding the importance of core topics such as internal controls and spreadsheet skills, they differ on the importance of emerging topics such as SQL, ERP systems, XBRL, and e-commerce (Garnsey et al., 2019). A gap remains between the ICT skills expected by employers and those taught in accounting curricula, limiting graduates' readiness for the job market (Birt et al., 2023).

In Malaysia, studies on the expectations gap in digital competencies remain limited, though studies on generic skills offer some insights. For example, Ali et al. (2016) highlighted significant differences between educators' and employers' perceptions regarding the inclusion of soft skills, such as resource management and critical thinking in the accounting curriculum. Similarly, Ghani et al. (2024) identified an expectations gap between both groups across 24 generic skills required of accounting graduates in the context of Industrial Revolution 4.0. Educators prioritised critical thinking, ethical behaviour and adaptability, whereas employers emphasised strong communication skills, with the most notable divergence in financial reporting skills.

3.5.2 Graduates versus Educators

Numerous prior studies have explored the expectation gap between educators and employers. However, there is limited focus on assessing the divergence between educators' and graduates' perceptions. Research on the expectation gap between educators and graduates presents mixed findings. Earlier, Baker and McGregor (2000) identified discrepancies in how postgraduate students and educators valued communication skills, highlighting a misalignment in expectations. Similarly, in the context of technology competencies, educators and new hires held differing views on the relevance of Excel functions (Rackliffe & Ragland, 2016). While both groups in their study agreed on the importance of basic functions and lookups for public accounting, educators placed greater emphasis on advanced features, such as macros, pivot tables, audit formulas, data analysis add-ins, statistical regression, financial functions, and charts.

More recent studies, however, suggest greater alignment. No statistically significant differences were found between graduates and educators regarding generic skills required of accounting graduates, indicating the absence of an expectations gap (Al Mallak, 2018). Likewise, accounting educators and students shared similar views on the importance of soft skills (communication), technical and functional skills (IT and data analytics), and intellectual skills (critical thinking and problem-solving) (Abu Asabeh et al., 2023). Further supporting this, Carvalho and Almeida (2022) found agreement between educators, students, and recent graduates on the essential transversal skills needed for the technological landscape. All the groups rated communication the most important, followed by proactivity and teamwork. They further agreed that expertise in blockchain, big data, AI, and digitalisation are of immense importance (Calvalho & Almeida, 2022).

Despite these insights, no research has specifically examined the expectation gap between graduates and educators concerning digital competencies, particularly in Malaysia. Thus, comprehensive studies in this area are essential to provide invaluable insights.

3.5.3 Employers versus Graduates

Earlier studies found no significant expectation gap between employers and graduates in generic skills (Gabric & McFadden, 2001; Hassall et al., 2003). Both groups largely agreed on the importance of professional skills, particularly analytical, problem-solving, communication, and technology skills (Awayiga et al., 2010; Kavanagh & Drennan, 2008).

However, gaps emerged in work-related skills, with employers placing greater emphasis on business awareness, ethics, professionalism, and basic accounting, which students did not prioritise as highly (Kavanagh & Drennan, 2008).

More recent studies have identified notable gaps. Most generic skills showed no significant differences in expectations, except for personal skills, where a gap persisted (Al Mallak, 2018). In contrast, graduates underestimated the importance of certain soft skills while overestimating technical skills relative to employer expectations (Dolce et al., 2020). Dolce et al.'s findings show that graduates' views only partially matched employers' actual expectations.

Recent studies also have shifted toward examining digital competencies. Both employers and early-career accountants recognised data and technology skills as crucial for professional success, highlighting digital literacy, technological proficiency, and familiarity with software such as Microsoft Excel, and overseeing data processing considered fundamental (Jackson et al., 2020, 2022, 2023). Beyond technical skills, soft skills such as communication and problem-solving remained highly valued. Additionally, both employers and graduates acknowledged the importance of automated systems, analytics, data interpretation, and emerging technologies such as artificial intelligence (Jackson et al., 2022, 2023). Similarly, employers and accounting students agreed on the essential skills required for accountants, including communication, IT, data analytics, critical thinking, and problem-solving (Abu Asabeh et al., 2023).

Studies on the expectations gap in digital competencies in Malaysia remain scarce, though studies on generic skills provide some relevant insights. Earlier findings indicated alignment between employers and graduates, with Singh and Singh (2008) reporting no statistically significant expectation gap. However, later studies identified notable discrepancies. Ngoo et al. (2015) identified the largest expectation gap in intellectual skills (critical thinking and problem-solving skills) but not in communication skills. Additionally, a perceptual gap existed in certain generic skills, such as handling stress and working under pressure, while analytical, critical thinking, communication, and problem-solving skills showed no significant differences (Lim et al., 2019).

3.5.4 Summary

A review of previous literature reveals diverse findings regarding the expectation gap between educators and employers. Most studies indicate that educators prioritise producing critical thinkers and intellectual capabilities, whereas employers focus on work-related skills, leading to a gap between the skills valued by educators and those desired by employers. Studies comparing graduates' and educators' perspectives generally show agreement on generic skills, though educators tend to place more emphasis on certain competencies, particularly those related to technology. When comparing employers' and graduates' perspectives, there is generally a high level of agreement regarding the importance of essential skills, especially digital competencies.

One major caveat of most of the previous studies is their concentration on graduates' employability, generic, or professional skills with less attention given to the expectation gap in digital competencies. As the demand for digital competencies continues to grow, expectations regarding the competencies required of accounting graduates are shifting. Therefore, further studies focusing on digital competencies are critical to fill this gap in the literature, particularly in the Malaysian context.

The following section explores the literature on the performance gap among educators, employers, and graduates to understand discrepancies between their perceptions of the actual competencies achieved by accounting graduates.

3.6 Performance Gap

Performance gap describes the differences between the perceptions of different stakeholder groups regarding the competencies which graduates have acquired upon completion of their university education. Similar to the expectations gap section, this study reviews the literature on stakeholders' perceptions of the performance gap and arranges it into three groups of performance gap: educators versus employers, graduates versus educators, and employers versus graduates.

3.6.1 Educators versus Employers

Studies examining the performance gap between educators' and employers' perceptions of accounting graduates' competencies present mixed findings. While some research suggests alignments in certain skill areas, others highlight notable disparities in competencies assessment. Several studies indicate no significant performance gap across various generic skills, as educators and employers reported similar views on categories such as intellectual, personal, and communication (Abayadeera & Watty, 2014; Al Mallak, 2018). Similarly, Asonitou and Hassall (2019) observed agreement between both groups on IT skills acquired by accounting students. Maali and Al-Attar (2020) also found no performance gap in areas such as communication, problem-solving, computational, proficiency in accounting software, analytical thinking, programming, and the ability to work under pressure. However, their study identified differences in logical reasoning and interpretation skills, which employers rated lower than educators.

Other studies highlight notable disparities between these groups, specifically in relation to communication, critical thinking, analytical thinking, and the ability to analyse and solve complicated problems (Oliver et al., 2011). Howcroft (2017) identified communication skills as a major gap in graduate competence assessment, with educators perceiving graduates as more competent in vocational skills than employers believed.

Research specifically addressing the performance gap in digital competencies remains scarce. The only study explicitly examining this aspect is by Khouloud and Tahar (2020), who identified performance gaps in technical accounting knowledge, professional values, ethics, and proficiency in various software applications. These applications included audit software, Excel, standard internet software (email, web browser), PowerPoint, and Computer-Assisted Audit Tools (CAATs). They also reported discrepancies in interpersonal and communication skills, further reinforcing the divide between academic training and workplace demands.

Despite these findings, no study in Malaysia has specifically examined the performance gap in digital competencies. Given the increasing reliance on technology in accounting, further research is crucial to address this gap.

3.6.2 Graduates versus Educators

Finding prior literature on the performance gap between educators and graduates proves to be a challenge as most studies focus on comparisons between educators with employers. This challenge highlights the need for further research in this area.

Bui and Porter (2010) found that some accounting students in New Zealand were dissatisfied with the skills acquired, believing their courses were overly theoretical, while educators did not recognise this gap in the curriculum. Existing literature also suggests misalignment in Excel proficiency, where new hires perceive themselves as highly skilled, whereas faculty believe their students lack expertise (Rackliffe & Ragland, 2016). Rackliffe and Ragland’s findings suggest that graduates may gain Excel knowledge at work, through continuing education, or during personal time, which may not be reflected in their formal education. This discrepancy suggests that educators should address this gap in the accounting curriculum to better align with industry expectations. However, contrasting findings exist, as educators and students reported no significant difference in most professional skills, suggesting alignment in competency development (Asonitou & Hassall, 2019). Both groups in their study agreed that students demonstrate strong IT and communication skills.

In Malaysia, studies highlight a gap in 21st-century skills. Tanius et al. (2019) reported a performance gap between graduates and educators in adaptability, research, and technology-related skills, while both groups agreed on applied skills such as problem-solving.

However, as their study focused on business graduates rather than accounting, these findings may not fully reflect the context of accounting education.

3.6.3 Employers versus Graduates

Similar to the previous section, the performance gap in digital competencies within these groups has not been widely addressed in prior literature. Most of the studies have predominantly focused on generic skills or professional skills.

Graduates have reported lacking in computing skills and spreadsheet application, a concern shared by employers, who observed that many new hires did not possess accounting-related technology competencies when they were first employed (Awayiga et al., 2010). Additionally, graduates perceive their own Excel skills as lower than how employers evaluate them, suggesting a lack of confidence in their abilities. However, both groups agreed that new hires were only moderately proficient in Excel (Ragland & Ramachandran, 2014). A similar trend exists in generic skills, where graduates rate their acquired competencies lower than employers' evaluations (Al Mallak, 2018). This misalignment in perceptions reinforces the existence of a performance gap.

However, some studies suggest alignment in IT competency assessments. For example, in Greece, both employers and students reported that students performed well in IT-related skills (Asonitou & Hassall, 2019). Employers and early-career accountants also believed that graduates were reasonably prepared for modern technological demands, though they acknowledged the need for improvements in accounting education (Jackson et al., 2022, 2023). Employers and graduates further agreed on the need to enhance digital competency development in accounting education programmes, emphasising a shared recognition that existing curricula may not fully equip students with the technological skills required in the profession (Atanasovski et al., 2019; Jackson et al., 2023).

Despite these findings, no studies have specifically examined the performance gap in digital competencies between employers and graduates in Malaysia. Further research is needed to examine how employers and graduates perceive graduates' acquired digital competencies and whether their views align.

3.6.4 Summary

The literature highlights a notable performance gap in various competencies among educators, employers, and graduates, reflecting differences in perceptions of graduates' acquired skills. While some agreement exists on certain skills acquisition, such as IT skills, significant gaps remain across other skill areas, thus necessitating curriculum improvements. Although previous studies have addressed competencies such as communication, problem-solving, and critical thinking, there is a noticeable lack of research focusing on digital competencies, specifically in the Malaysian context. Most prior studies have concentrated on the acquisition of generic or employability skills, overlooking the impact of digital transformation and the specific digital competencies required in today's evolving accounting landscape. This underscores the necessity for comprehensive studies to bridge the perceived gaps to ensure accounting graduates are well-prepared for the future.

3.7 Constraints Gap

The concept of a constraints gap is rooted in Bui and Porter's (2010) expectation-performance gap framework. It refers to a gap between the level of competence that should be acquired and the level of competence that has been acquired by graduates (i.e., desired versus acquired). It focuses on the underlying barriers or constraining factors that hinder the development of accounting graduates' digital competencies, as perceived by educators and graduates. This section reviews relevant literature on the constraints gap from both perspectives.

3.7.1 Educators' Perceptions

Educators play a key role in preparing graduates for the workforce, yet they often observe a mismatch between the competencies they aim to develop, and those graduates actually acquire. Bui and Porter (2010) highlighted that structural limitations in accounting education hinder competency development, affecting the extent to which graduates meet industry expectations. These gaps suggest that despite efforts to embed essential skills into the curriculum, graduates may not be acquiring them at the expected level.

Educators have reported significant gaps between the competencies they expect graduates to acquire, and the skills graduates actually develop. For instance, studies have highlighted persistent gaps in critical areas such as critical thinking, problem-solving, and computer technology competence (Abayadeera & Watty, 2014). Similarly, educators observed that graduates fall short in communication, problem-solving, and critical analysis, despite these being core vocational skills, owing to deteriorating staff-student ratio in business schools (Howcroft, 2017). These gaps suggest that while educators recognise the importance of such competencies, they are not seeing the expected outcomes in graduates' abilities.

Studies on digital competencies remain scarce. However, several studies on IT-related skills highlight areas of concern. Educators recognise the importance of Excel proficiency in professional practice but believe that students' actual proficiency is inadequate (Rackliffe &

Ragland, 2016). Some studies have found that while communication, problem-solving, time management, and professional values remain underdeveloped, students generally meet their expectations in IT-related skills, such as using relevant software and electronic information sources (Asonitou & Hassall, 2019). However, contrasting evidence suggests that graduates' technology-related knowledge, including spreadsheets, databases, utility software, and accounting packages, does not align with educators' expectations, reinforcing the presence of a constraints gap (Khouloud & Tahar, 2020).

Research on the constraints gap in accounting education in Malaysia remains limited. Zin et al. (2022) found that while universities recognise the relevance of big data analytics in accounting, its integration into curricula remains inconsistent. However, little empirical evidence exists on whether this has contributed to a constraints gap, where graduates fall short of expected digital competencies. Further research is needed to examine educators' perceptions of these gaps and their impact on graduate readiness.

3.7.2 Graduates' Perceptions

Most prior studies on the constraints gap in accounting education have centred on educators, with less emphasis on the perspectives of graduates or students (Elo et al., 2024). However, some studies suggest that graduates experience significant gaps between the skills they expect to acquire and those actually developed during their studies.

Graduates have reported constraints gap in key competencies, particularly in accounting software skills, as they felt their programmes did not sufficiently emphasise these essential skills (Kavanagh & Drennan, 2008). Similarly, graduates recognised computer skills and spreadsheet applications as crucial but often found themselves lacking in these areas due to technological advancements (Awayiga et al., 2010; Dolce et al., 2020). The issue was exacerbated by inadequate equipment and facilities, complicating the efforts to meet the needs of the students in relation to those skills (Awayiga et al., 2010).

Beyond technical skills, research has identified gaps in generic skills, including teamwork, interpersonal, communication, and intellectual skills, suggesting that graduates do not develop these skills as expected (Al Mallak et al., 2020; Dolce et al., 2020; Towers-Clark, 2015). However, some studies found a greater congruence between the importance of specific professional capabilities and how well these skills were developed in university courses but could do so more effectively (Jackson et al., 2022, 2023; Wells et al., 2009)

Limited studies have examined the constraints gap in emerging technologies and digital competencies. Students noted insufficient development during their studies in key skills, including accounting software proficiency, analytical thinking, computer literacy, and technological competence (Krikorian et al., 2020). Similarly, Elo et al. (2024) showed a significant constraints gap in technological and data processing skills with the largest disparity observed in robotics and AI. Additionally, substantial gaps were identified in analytical reasoning, critical thinking, problem-solving, and communication skills, further reinforcing the constraints gap in digital competencies.

Studies in Southeast Asia have highlighted graduates' struggles with digital competencies but have not explicitly examined the constraints gap. Indonesian accounting students reported a need for software operation and interpretation skills to meet Industrial Revolution 4.0 demands but felt inadequately prepared for digital challenges (Purnamasari et al., 2019). Similarly, Malaysian graduates expressed frustration with insufficient technical knowledge, weak communication skills, and limited tech-savviness, stating that universities prioritised theoretical aspects over practical preparation (Heang et al., 2019). Despite the growing importance of emerging technologies, young accounting practitioners were found to be only moderately prepared to embrace these advancements (Ilias et al., 2023). However, little empirical evidence exists on whether this has contributed to a constraints gap. Further research is needed to examine graduates' perceptions of these gaps and their impact on their work readiness.

3.7.3 Summary

The literature highlights a significant constraints gap in accounting education, which reflects the disparity between educators' aspirations and what is realistically achievable given existing limitations. Studies consistently find a notable gap between the skills educators expect graduates to acquire and the skills that graduates actually possess. Similar to the educators' constraints gap, students and graduates felt that many important skills were not adequately developed during their studies because they were given less priority in the curriculum. Most prior research has focused on generic or professional skills, with limited attention to digital competencies, despite their increasing importance in the evolving accounting field. Additionally, there is a lack of studies examining the constraints gap in digital competencies within the Malaysian context. Given the technological advancements in accounting, further research is needed to explore constraint gaps in digital competencies from the perspectives of both educators and graduates. The following sections provide an overview of the literature discussing possible reasons for these constraint gaps.

3.7.4 Constraining Factors

The previous section identified several constraints gaps perceived by educators and graduates. Prior studies identified a number of barriers that explain these gaps and why accounting educators failed to provide graduates with the desired competencies. Understanding those barriers is extremely important to narrowing the gap (Bui & Porter, 2010). Senik and Broad (2011) classified barriers to information technology skills into three groups: academic staff-based barriers, environmental-based barriers, and student-based barriers. Based on this literature, these three categories are discussed in the following sections.

3.7.4.1 Academic staff barriers

Academic staff-based barriers are identified as one of the main obstacles to the integration of updated technology into the curriculum and the development of graduates' digital competencies. Extant literature identified a few issues related to academic staff that affect the technology integration process. For example, lack of motivation among academic staff to change their teaching approaches and lack of knowledge regarding which skills to develop and which technology packages to include in the curriculum have been identified as major staff-based barriers (Senik & Broad, 2010). The situation deteriorates when educators lack interest in using technology. Other staff-based barriers include a lack of IT qualified faculty members, a lack of academic staff with IT knowledge and competence, and a lack of interest in teaching IT (Al-Htaybat et al., 2018; Birt et al., 2023; Gunarathne et al., 2021; Johnson et al., 2014; Kotb et al., 2019). Similarly, in Malaysia, the lack of experts in emerging technologies among accounting educators is highlighted as the key barrier (MIA, 2021). MIA's survey findings suggest that over 65% of educators had little to no competency in all emerging technologies, with more than 85% lacking proficiency in AI and blockchain.

Other issues included large classes and heavy workloads, excess academic responsibilities, research prioritisation over teaching, and driven reward mechanisms (Bui & Porter, 2010; Rusdi et al., 2023; Watty et al., 2016). Xu et al. (2024) highlighted the lack of external incentives, such as promotions, teaching awards, and course releases, as a barrier to educators' engagement in teaching data analytics. These issues have negatively impacted the quality of education educators provide and hindered the development of graduates' competencies.

In addition, university educators often lack confidence in teaching competencies required in the employment market, particularly competencies in computer technology and accounting software (Abayadeera & Watty, 2014). This is compounded by the attitude of academics toward change, which impedes the development of digital competencies among graduates (Birt et al., 2023; Dangi et al., 2023). Al-Htaybat et al. (2018) found that educators are not fully convinced of the need for immediate adaptation to technological advancements, with some expressing scepticism about the complete automation of tasks within the next two decades. Furthermore, educators frequently underestimate the impact of technology on the accounting profession (Kotb et al., 2019), and show resistance to change, or the use of innovative technology (Watty et al., 2016). Further issues include educators' unfamiliarity with the latest technologies, which results in deficiencies in terms of integrating technologies into the curriculum (Birt et al., 2023; Dzuranin et al., 2018), eventually leading to inadequate utilisation of technology in the classroom (Al Ghatrifi et al., 2023).

3.7.4.2 Environment-based barriers

Environmental-based barriers to digital competencies development include time constraints, curriculum limitations, and financial constraints. Prior studies report that monetary costs, limited availability of classrooms equipped with appropriate technology, and scheduling difficulties, limit the efforts required to integrate software into courses, hence, hindering the development of expected information technology skills (Birt et al., 2023; Ghazali et al., 2022; Kotb et al., 2019; Senik & Broad, 2011). Furthermore, institutional factors such as insufficient staff, laboratories, budgets, and instructional materials have also been identified as the main impediments to developing graduates' competencies (Andiola, 2020; Birt et al., 2023; Bui & Porter, 2010; Kholoud & Tahar, 2020; Kotb et al., 2019; Xu et al., 2024). In addition, the lack of faculty capacity, IT training, and support to educators hinders the integration of technological development into the accounting curriculum (Ahadiat et al., 2005; Kotb et al., 2019; Watty et al., 2016). Addressing these challenges through training is essential to enhancing educators' knowledge and competence.

In Malaysia, the lack of funding for establishing facilities for emerging technologies has been identified as a significant barrier (ASEAN Accounting Education Workgroup [AAEW] 2023; MIA, 2021). Universities struggle to develop essential technology infrastructure, including updated software, platforms, and reliable internet. Students have also reported negative experiences in digitalised classrooms, often due to unstable internet and incompatible devices (Shamsudin et al., 2023). The lack of ICT infrastructure remains a key challenge in teaching emerging technologies such as blockchain and data analytics (Dangi et al., 2023; Fernandez & Guat, 2023), thereby impeding the development of accounting graduates' digital competencies (Anis & Islam, 2019). Similarly, studies in Indonesia (see Purnamasari et al., 2019) and Brunei (see Don et al., 2023) found that lack of access to technology and infrastructure were the major issues. They highlighted the need for sufficient Wi-Fi, well-equipped classrooms, and computer laboratories.

Another issue of environmental barriers is the university's resistance to changing the outdated curriculum and mode of delivery (Aldhizer, 2015; Birt et al., 2023; Heang et al., 2019; Howcroft, 2017). Despite the transformative impact of advanced digital technologies, such as blockchain, data analytics, and AI, universities continue to prioritise traditional learning methods and outdated software (Carvalho & Almeida, 2022). As a result, the current curriculum fails to equip accounting graduates with the necessary digital competencies for the profession's future, thus highlighting the urgent need for curriculum and assessment updates (Birt et al., 2023).

In addition, the variety of different systems used by organisations, alongside the different software tools taught by universities, leads to uneven outcomes (Jackson et al., 2023). This inconsistency affects graduates' preparedness for workplace technologies, limiting their ability to adapt to different systems. To address this, universities should consider standardising the core software and digital tools taught in accounting programmes, ensuring alignment with industry practices. Implementing a more uniform approach to technology training would enhance graduates' digital competencies and readiness for diverse workplace environments (Damerji & Salimi, 2021; Yan et al., 2022).

3.7.4.3 Student-based barriers

Student-based barriers are other factors hindering the development of digital competencies in accounting students. For example, it has been highlighted that accounting students show less interest in engaging in IT-related activities (Senik & Broad, 2011), diminishing their motivation to engage in activities aimed at increasing their digital competencies. This disengagement is often fuelled by a reluctance to adapt to new technologies, with some students fearing the changes that come with it (Don et al., 2023). The students may also find adapting to technology stressful; thus, they are reluctant to explore and learn skills necessary to navigate new applications and complete complex assignments requiring the application of digital competencies (Shamsudin et al., 2023). On a positive note, a recent study shows some shift in attitudes, with students beginning to accept data analytics in their accounting courses, reflecting their perception of the ease of use and usefulness of data analytics applications (Vysotskaya & Prokofieva, 2024).

Students' lack of IT knowledge is another significant barrier to developing digital competencies (Ghazali et al., 2022). Many struggle with basic tasks such as activating user accounts, changing passwords, or saving files. This aptitude deficiency can impede their ability to acquire and effectively use the digital competencies necessary in today's technology-driven world. Additionally, students' attitudes play a crucial role, as a lack of desire to learn can further limit their engagement with digital learning and competencies development (Khouloud & Tahar, 2020).

In summary, various constraints within higher education hinder accounting education from equipping graduates with the competencies expected by stakeholders. Many of these barriers are institutional, particularly those related to educators, such as curriculum limitations and a lack of digital expertise. Additionally, student-related constraints, including limited exposure to digital tools and varying levels of digital literacy, further challenge the development of graduates' digital competencies, explaining the constraints gap.

3.8 Expectation and Performance Gap

The expectation-performance gap in accounting education arises from a perceived mismatch between the competencies required by employers and those acquired by graduates (Abayadeera & Watty, 2014; Bui & Porter, 2010). This section reviews relevant literature on the expectation-performance gap from employers' perceptions.

3.8.1 Employers' Perceptions

Over the years, employers have often voiced their concern and dissatisfaction with accounting graduates' knowledge and skills (ACCA, 2020b). Several previous studies have discussed the expectation-performance gaps, which focused on generic, professional, soft, and technical skills (e.g., Abayadeera & Watty, 2014; Albrecht & Sack, 2000; Bridgstock, 2009; Hassall et al., 2005; Jackling & De Lange, 2009; Kavanagh & Drennan, 2008; Yu et al., 2013). These researchers often highlight that there is a lack of generic skills among accounting graduates including communication, interpersonal, analytical, and problem-solving skills.

Despite these concerns, employers have reported satisfaction with graduates' competencies in computer technology, ability to handle complexity, personal traits, research skills, and core accounting and bookkeeping knowledge (Abayadeera & Watty, 2014). However, a critical shortcoming remains in the application of practical skills. Employers acknowledged that graduates possess strong conceptual accounting knowledge but criticised accounting programmes for insufficient practical training, particularly in bookkeeping and business knowledge (Bui & Porter, 2010).

Recent studies continue to highlight this expectation-performance gap across various skill categories. Employers recognise the importance of generic skills but often perceive graduates as lacking competence in them (Al Mallak, 2018; Gunarathne et al., 2021; Howcroft, 2017). Similarly, research on New Zealand's Institutes of Technology and Polytechnics found that while graduates met expectations in generic skills, gaps persisted in certain technical accounting competencies, indicating a misalignment between employer needs and Institutes of Technology and Polytechnics' accounting education (Edeigba, 2022).

Limited research has specifically addressed the expectation-performance gap in digital competencies, but studies on IT-related professional skills provide useful insights. Graduates have been found to struggle with basic IT skills, such as spreadsheets, word processing, presentations, and email (Kunz & De-Jager, 2019). Significant gaps were also reported in communication skills and personal attributes. Similarly, graduates did not meet employer expectations in accounting software skills, such as Access, PowerPoint, and accounting and audit software (Khouloud & Tahar, 2020; Maali & Al-Attar, 2020). However, they performed well in taxation, Excel, and standard internet applications, including email and web browsers. In contrast, Asonitou and Hassall (2019) found students' IT proficiency was rated highly important and performed well, thus showing no gap.

Studies on emerging technologies have highlighted graduates' struggles with digital competencies but have not explicitly examined the expectation-performance gap. Employers value training in cloud-based software, blockchain, and AI but perceive graduates as underprepared due to limited curriculum focus on these areas (Jackson et al., 2023). Despite the importance of emerging technologies like data analytics, cybersecurity, cloud computing, and AI, these remain the most common skill deficits (CIMA, 2020; ICAEW Insights, 2024; KPMG International, 2024; Krumwiede & Lawson, 2017).

Studies from Southeast Asia, including Malaysia, have also identified an expectation-performance gap. In Vietnam, a significant gap was found in English language and computer skills among graduates (Ha et al., 2012). Similarly, Malaysian employers perceived recent graduates as lacking communication skills, despite being more satisfied with their teamwork abilities (Sawani et al., 2016). A recent study found that accounting graduates in Malaysia fell short of employer expectations, particularly in communication, professional demeanour, and analytical skills, highlighting these areas as requiring the most attention (Norman et al., 2018). However, technology skills were generally found to meet employer expectations, with only a small gap reported.

3.8.2 Summary

The expectation-performance gap in accounting education highlights discrepancies between employer expectations and graduates' acquired competencies, as perceived by employers. Employers have consistently raised concerns about graduates' preparedness, particularly in generic skills such as communication, interpersonal, analytical thinking, and problem-solving skills. While graduates demonstrate strengths in basic IT, research skills, and core accounting knowledge, deficiencies persist in practical application, particularly in bookkeeping and business knowledge.

Although digital competencies receive less attention in expectation-performance gap research, studies reveal significant deficits in areas like accounting software proficiency and emerging technologies. Employers expect graduates to be well-versed in cloud computing, blockchain, AI, and cybersecurity, yet many remain underprepared due to limited curriculum coverage.

Studies in Southeast Asia confirm gaps in communication, analytical skills, and professionalism, though technology skills generally meet expectations. However, no research has specifically examined the expectation-performance gap in digital competencies within the Malaysian context, indicating a gap in the literature.

3.9 Summary of the Chapter

Based on the existing literature, digital competencies extend beyond mere technical skills, encompassing a broad range of abilities that include behavioural traits, expertise, attitudes, and critical understanding. This encompasses not just IT skills but also communication, creativity, and higher-order thinking skills, such as critical thinking, analytical, and problem-solving skills. While professional accounting bodies have provided a framework of digital competencies needed for professionals, no specific framework exists for accounting graduates.

The literature further highlights the crucial role of technology competencies for accounting graduates in an industry characterised by rapid technological advancements. Educators, employers, and graduates viewed the necessity of skills, especially in Microsoft Excel, accounting software proficiency, and a foundational understanding of emerging technologies. While employers and educators have emphasised the necessity of generic competencies to work with new technologies, there is less emphasis on broader digital competencies from graduates' perspectives. Most studies on graduates' perspectives often focus narrowly on basic technical skills without addressing broader digital competencies. However, graduates seemed to acknowledge the importance of emerging digital competencies. Additionally, there is a notable gap in research on the digital competencies required by accounting graduates, particularly in Malaysia. Future research should focus on assessing the digital competencies of graduates, particularly Malaysian accounting graduates, due to the current lack of studies in this area.

Moreover, the literature emphasised the need for educational programmes to integrate both technical and generic skills, such as critical thinking, problem-solving, and communication skills, to prepare graduates for the digital era. Despite numerous calls for updated curricula, a digital competencies gap persists, particularly in non-Western countries like Malaysia, where graduates report lower proficiency in these competencies and struggle to adapt to new technologies. Previous studies have largely focused on technical skills (specific to software), often lacking in addressing the broader spectrum of digital competencies.

A review of the existing literature reveals varied findings on the expectation gaps and performance gaps between different groups. Most studies focus mainly on generic, professional, or employability skills, with limited attention being paid to digital competencies. This is similar to the gaps identified in studies investigating the constraints gap (educators' and graduates' perspectives) and expectation-performance gap (employers' perspectives). To the best of the author's knowledge, there is a lack of research on digital competencies required in today's digital workplace.

In light of the dynamic technological landscape and the reported lack of digital competencies among accounting graduates, this research aims to examine the perceptions of educators, employers, and graduates regarding the digital competencies expected and acquired by graduates. Specifically, the current study investigates whether those stakeholders hold differing views on the digital competencies that should be developed or have been acquired at the universities. The study explores various gaps, including the expectation gap, performance gap, constraints gap, and expectation-performance gap. Understanding the necessary digital competencies for graduates is crucial as technology evolves. In addition, developing a digital competencies framework for accounting graduates would be valuable to ensure that they possess the essential skills to thrive in a digitally driven professional environment.

The theories and conceptual framework underpinning the current study are discussed in the next chapter.

Chapter Four: Theories and Conceptual Framework

4.1 Overview

This chapter presents the theories and conceptual frameworks that underpin the study's investigation of digital competencies among accounting graduates. Section 4.2 reviews the theories guiding this research – human capital theory and stakeholder theory. These theories provide the foundation for viewing digital competencies as valuable elements of human capital and for understanding the varying expectations of different stakeholders. Guided by these theories, Section 4.3 introduces the Expectation-Performance Gap framework by Bui and Porter (2010), which is extended in this study to incorporate graduates' perspectives. Section 4.4 examines various professional competency frameworks that shape the digital competencies conceptual framework. These include key frameworks from the Malaysian Institute of Accountants (MIA), the Chartered Global Management Accountant (CGMA), the Institute of Management Accountants (IMA), and the Association of Chartered Certified Accountants (ACCA), that offer a broad view of competency needs in the accounting profession. Section 4.5 presents the study's proposed conceptual framework designed to assess the digital competencies of accounting graduates. The chapter concludes with Section 4.6 providing a summary of the key points discussed.

4.2 Relevant Theories

This section examines two foundational theories underpinning the current study: human capital theory and stakeholder theory. These theories provide a basis for understanding the significance of skill development and the relationship between education and stakeholders' expectations within accounting education.

4.2.1 Concepts and Origin of Human Capital Theory

Human capital theory, developed notably by Becker (1962), views human capital as the knowledge, skills, and health of individuals that contribute to their productivity and overall well-being.[22] This theory highlights the importance of investing in human capital, particularly through education and training, as these investments enhance productivity, lead to higher earnings, and create better opportunities (Becker, 1962, 1994; Psacharopoulos & Patrinos, 2018; Schultz, 1961). Rosen (1976, 1989) extended Becker's work by developing a model

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[22] Other key pioneers include Mincer (1958), Schultz (1961, 1971), and Rosen (1976, 1989).

to explain how lifetime earnings are determined through the accumulation of human capital. Rosen's model provided further insights into how investments in education influence individuals' long-term earning potential and economic outcomes. Similarly, Mincer (1958) and Sandamali et al. (2018) argued that as individuals develop greater competencies, their value in the labour market increases. It is also contended that individuals with greater knowledge and skills tend to experience higher job satisfaction, increased job security, better prospects for career advancement, and an overall sense of well-being and quality of life (Berger & Fisher, 2013; Diener & Biswas-Diener, 2002; Kabir & Parvin, 2011; Mouw & Kallberg, 2010). This understanding has led to an increased emphasis on education and skill development as a key strategy for both economic growth and individual success. As a result, governments and policymakers recognise investing in education and human capital as a top priority for fostering economic development and enhancing individuals' prospects for prosperity (Leoni, 2023; Saint-Paul & Verdier, 1993).

4.2.1.1 Integrating Human Capital Theory into this Study

Human capital theory is best suited to this study as it conceptualises digital competencies as investments that raise graduates’ labour-market value and organisational contribution. This framing aligns with the study’s early-career focus and with the competency frameworks used to specify technical and generic capabilities. In addition, educational institutions play a crucial role in cultivating human capital (Parvais, 2014; Walters, 2004). They serve as the central hub for equipping individuals with the knowledge and competencies necessary to thrive in the workforce (O’Neill & Bagchi-Sen, 2023). Through their curriculum design, these institutions offer diverse educational programmes tailored to meet the varied demands of different industries and sectors. Furthermore, they implement effective teaching methods, innovative pedagogies, and experiential learning opportunities to enhance students' human capital by developing their intellectual capacities and practical skills for the job market (Ishak & Jamil, 2020; Shaftel & Shaftel, 2005; Spanjaard & Stegemann, 2018).

Human capital theory emphasises the value of employees' abilities and qualifications, viewing them as organisational assets whose expertise and competencies enhance overall organisational productivity and competitiveness (Leoni, 2023). From the perspective of employers, the theory reshapes how talent management is approached. Employers recognise that their workforce is a significant investment, prompting them to attract, develop, and retain top talent. This involves not only hiring graduates with the right competencies but also providing ongoing training to enhance their human capital. Research has demonstrated a strong connection between human capital and organisational performance, with empirical studies further supporting the relationship between specific human capital attributes (e.g., knowledge, skills, and capabilities) and organisational performance (Aman-Ullah et al., 2022; Chen et al., 2021; Gupta & Raman, 2021; Harris & Brown, 2021; Irawan et al., 2019; Turulja & Bajgoric, 2018; West & Noel, 2009). These studies have been conducted across a range of contexts, including sectors such as banking (Cuganesan, 2006), technology (García-Sanchez et al., 2018; Hoang & Ngoc, 2019), and accounting (Chaudhry et al., 2020), as well as SMEs (Singh et al., 2021; Zuhir et al., 2017).

Based on the underlying principles of human capital theory, enhancing the digital competencies of the workforce is becoming increasingly important in modern workplaces. While technological advancements have revolutionised many operational processes, human input remains critical (Chuang, 2024; Frey & Osborne, 2017; Hamadamin & Atan, 2019). Rather than replacing the human workforce, these advancements have shifted the focus towards the development of workers' knowledge, skills, and digital capabilities to complement and leverage new technologies (Kokina et al., 2021). This signifies the role of competencies and capabilities as complementary to technology, aligning with the principles of human capital theory.

In the context of accounting graduates, the fusion of digital competencies with human capital theory holds profound implications. Beyond traditional accounting skills, graduates are now expected to possess a comprehensive understanding of digital technologies and their application in financial management, data analysis, and decision-making processes (Kotb et al., 2019; Lawson & Smith, 2018; Moll & Yigitbasioglu, 2019). This includes proficiency in utilising information system (e.g., accounting software), data analytics and visualisation tools, and knowledge of emerging technologies such as AI and blockchain. Graduates must also develop generic skills such as communication, critical thinking, problem-solving, and creativity to navigate the dynamic digital landscape effectively (ACCA, 2020a, 2021; McBride & Phillippou, 2022). By enhancing their human capital, graduates can increase their value to employers, contribute meaningfully to organisational performance, and improve their quality of life through better employment prospects, higher pay, and benefits.

The evolving nature of the accounting profession necessitates continuous learning and upskilling in digital competencies (Kruskopf et al., 2020). Graduates should actively engage in lifelong learning initiatives, professional development programmes, and certifications to stay abreast of emerging technologies and industry trends. By doing so, they can position themselves as vital assets within organisations, contributing to innovation, efficiency, and efficient decision-making processes. Employers seek accounting graduates with a good and strong set of competencies, to ensure the optimal performance and effectiveness of their organisational functions (Albrecht & Sack, 2000). Specifically, industries have now entered an era of human-machine collaboration that continues to evolve. Thus, the integration of digital competencies within human capital theory highlights the imperative for accounting graduates to cultivate diverse competencies that encompass not only core accounting knowledge and practices but also digital proficiency to succeed in the modern workplace.

4.2.2 Concepts and Origin of Stakeholder Theory

Freeman (1984) formalised the stakeholder theory by defining stakeholders as individuals or groups who can affect or are affected by an organisation's objectives. Nutt and Backoff (1992) described stakeholders as those who influence, or are influenced by, an organisation's strategy. This perspective advocates for organisations to take into account the concerns and interests of all stakeholders, beyond just shareholders, in decision-making and strategic formulation processes. According to stakeholder theory, organisations should strive to generate value not only for shareholders but also for all parties affected by their actions, including employees, customers, suppliers, and communities. The theory emphasises the significance of understanding and addressing the needs, expectations, and concerns of diverse stakeholder groups in an organisation's strategy and operations (Nutt & Backoff, 1992). As stakeholder theory has evolved, it has raised critical questions about how organisations can strategically manage stakeholders. This includes how to identify and prioritise stakeholders, understand their interests and demands, balance the relationships among them, and engage them in organisational activities (Freeman et al., 2010; Harrison et al., 2010; Sulkowski et al., 2018). The theory emphasises the importance of stakeholder engagement, communication, and relationship management to build trust and mutual understanding between the organisation and its stakeholders (Ali & Haapasalo, 2023; Foster & Jonker, 2005; Frooman, 1999). By considering the interests of all stakeholders, organisations can enhance their long-term sustainability, reputation, and success.

Historically, stakeholder theory has its roots in management and business ethics literature (Freeman, 1984; Freeman et al., 2010; Mahajan et al., 2023). It has since been applied across related fields such as corporate governance, corporate social responsibility, sustainability, and public policy (Duckworth & Moore, 2010; Freeman et al., 2010; Heath & Norman, 2004). Over time, the theory has evolved and expanded to encompass a wider range of organisational contexts, including HEIs (Eggins, 2014; Syed et al., 2024). HEIs, which serve various purposes, involve many participants or people, each with their own interest. These individuals or groups, known as stakeholders, have varying degrees of influence over decisions within the institution (Alves et al., 2010; Kerr, 1963). Several studies have identified key stakeholder groups in higher education and examined their roles, interests, and influence. For example, Chapleo and Simms (2010) named twelve stakeholder groups considered of particular importance to HEIs. Among these, the three most significant stakeholders are current students and alumni, employers, and university staff. Kettunen (2015) outlined four key stakeholder perspectives within HEIs: (a) the processes and structures perspective, which includes collaboration with partners such as employers and other institutions involved in education and research; (b) the external impact perspective, focused on stakeholders affected by institutional outcomes, such as student unions, alumni, and regional communities; (c) the financial perspective, which involves funding bodies including government ministries and external financiers; and (d) the organisational learning perspective, which includes stakeholders contributing to knowledge development and staff training, such as research universities and teacher training institutions. Similarly, Langrafe et al. (2020) identified stakeholder groups of HEIs commonly used in the literature including faculty, such as all professors at the HEIs, labour market, such as employers and contractors of students, alumni (former students), and current or prospective students.

4.2.2.1 Integration of Stakeholders Theory into the Study

Given the study focuses on the expectation-performance gap of digital competencies, it is crucial to identify the primary stakeholders and understand their perspectives. In light of the concerns regarding the digital competencies of accounting graduates, stakeholder theory offers a valuable perspective to analyse the interests and expectations of educators, employers, and graduates. This would appear to align with the focus of the current study.

The HEIs play a central role in preparing accounting graduates for the demands of the digital age. Consistent with stakeholder theory, stakeholders in higher education can be categorised as internal or external parties (Amaral & Magalhães, 2002; Stoner & Freeman,1999). Internal stakeholders are members of the academic community who are actively engaged in the daily operations of institutions. This includes educators, general staff, managers, students, and the institution itself, represented through its leadership and formal governance (Marshall, 2018). External stakeholders, meanwhile, refer to groups or individuals that have an interest in HEIs, and are distinct from internal stakeholders (Amaral & Magalhães, 2002). This group includes employers, parents, the wider society (e.g., non-consumers of education), government bodies and agencies, as well as national and international organisations that represent these stakeholders (Marshall, 2018).

In the context of this study, educators are considered key internal stakeholders, as they are responsible for delivering knowledge, shaping graduates' digital competencies, and actively contributing to curriculum development and educational standards (Johnson, 2001; Meek, 2006). Most decisions regarding how teaching is organised and conducted are typically made by educators. As faculty members, they determine whether students meet the required standards for graduation and play a critical role in ensuring that graduating students meet societal expectations. While there is a general alignment between faculty and student interests, especially concerning education's broader goals, conflicts can emerge between individual faculty members and students. These conflicts may arise as HEIs move towards a mass consumer model, where students increasingly view education as a transactional service rather than a formative process (Trow, 2010). At the same time, educators themselves are experiencing dramatic changes in their roles (Eagle & Brennan, 2007; Finney & Finney, 2010; Gappa et al., 2007). They face various challenges, including political pressures (Knott, 2017; Zamudio-Suaréz, 2017), expectations for research output (Golhasany & Harvey, 2022; Huenneke et al. 2017), heavier teaching and administrative workloads (Bui & Porter, 2010; Rusdi et al., 2023; Watty et al., 2016), and the need to adapt to evolving technologies that shape information use and knowledge creation (Henderson & Corry, 2021; Reinsfield, 2020).

Another key internal stakeholder group is students, who are seen as crucial stakeholders of university activities (Burrows, 1999; Kavanagh & Drennan, 2008; Reavill, 1998). As the primary beneficiaries of institutional activities, students are fundamental to the existence and functioning of universities (Kettunen, 2015; Yang et al., 2016). The outcomes of educational processes are centred around students' achievements (Kettunen, 2015). Marshall (2018) further argues that students are the most direct stakeholders in HEIs, as they rely on the educational system and have invested a significant amount of time and money in obtaining personal and professional benefits from their education. This study recognises students as important internal stakeholders; however, the primary focus is on graduates (i.e., alumni) who have completed their studies. By examining graduates' preparedness and digital competencies, this research aims to assess how well HEIs equip them for employment.

Employers are a key external stakeholder group, as they benefit from hiring graduates and utilising their human capital (e.g., Albrecht & Sack, 2000; Awayiga et al., 2010; Bui & Porter, 2010; Watty et al., 2016; Wells et al., 2009). They also play a role in educational processes by serving on advisory boards in HEIs and contributing to curriculum development. Their board appointment is intended to minimise the competencies gap and has become a critical element for higher education development (Dobni & Luffman, 2003). By considering the perspectives of employers, HEIs can tailor their curricula, teaching methods, and resources to better address any competencies gap among accounting graduates.

While stakeholder theory provides valuable insights into understanding the roles and perspectives of different groups, it also presents challenges. One major limitation is balancing the conflicting interests of various stakeholders and the difficulty of accurately assessing the power and influence of different stakeholder groups (Freeman, 1984; Harrison et al., 2010). Different groups often have varying, and sometimes conflicting desires and expectations. For instance, educators focus on broader educational objectives defined by the curriculum, while employers demand graduates with competencies that add value to their organisations. Meanwhile, graduates expect their HEIs to equip them with the competencies necessary to secure employment and advance their careers. Different desires, needs, and expectations of these various stakeholder groups may occasionally result in conflicts, making any strategy designed to effectively meet their demands challenging (Conway et al., 1994). These conflicting priorities can create a gap when stakeholders' expectations are not aligned (Bui & Porter, 2010). This is especially relevant in the context of this study, where the understanding of educators', employers' and graduates' expectations is crucial in addressing accounting graduates' digital competencies.

4.3 The Competency Gap Conceptual Framework

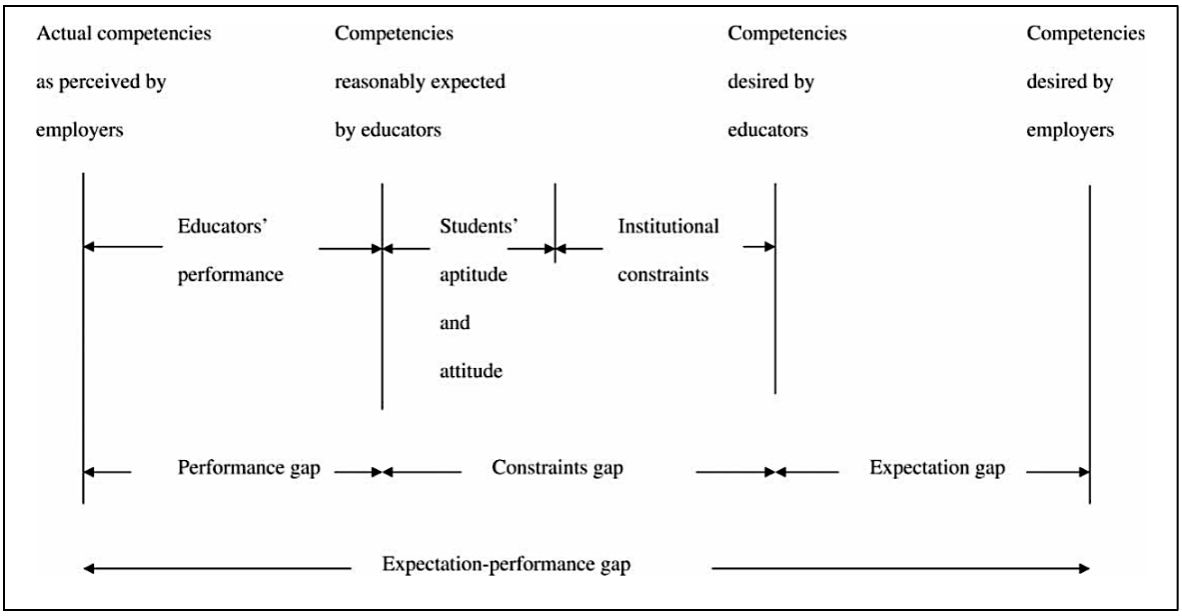
Human capital and stakeholder theories jointly frame this study's examination of the expectation–performance gap in digital competencies. Human capital theory frames these competencies as investable assets developed through education that generate returns for graduates and organisations. Stakeholder theory highlights the interdependent roles of educators, employers, and graduates and locates the gap in their misaligned expectations.

These theoretical foundations support the development of the conceptual gap framework. This study's focus is to examine how the expectation-performance gap can be addressed by aligning the expectations of all key stakeholders and ensuring that accounting graduates develop the human capital required to meet the profession's digital challenges. This section first introduces Bui and Porter's (2010) framework, then sets out the extension developed in this study, which incorporates graduates' perspectives and applies the framework specifically to digital competencies.

4.3.1 Bui and Porter (2010) Expectation-Performance Gaps Framework

Bui and Porter's (2010) Expectation-Performance Gap Framework was motivated by the debate on accounting education's failure to adequately equip accounting graduates with the competencies expected in the accounting profession. Their framework examines the disparities between competencies expected by different stakeholders. It comprises three main components: the expectation gap, the constraints gap (i.e., encompassing institutional and student constraints), and the performance gap. The framework addresses the expectation-performance gap in accounting education by identifying the discrepancies between educational outcomes and industry expectations. Bui and Porter (2010) validated their framework through an exploratory study conducted at a New Zealand university, involving perspectives from educators, employers, and students. Their study highlighted several approaches to narrowing the gaps. Since its introduction, the framework has been applied in various international contexts including Saudi Arabia, Sri Lanka, Tunisia, and Finland (e.g., Al Mallak, 2018; Elo et al., 2024; Gunarathne et al., 2021; Khouloud & Tahar, 2020), confirming its effectiveness. Figure 4.1 illustrates the structure of Bui and Porter's framework.

Figure 4.1 *Bui and Porter's Expectation-Performance Gap Framework*



Note. From "The Expectation-Performance Gap in Accounting Education: An Exploratory Study," by B. Bui and B. Porter, 2010, *Accounting Education, 19*(1–2), p. 31 (https://doi.org/10.1080/09639280902875556). Copyright 2010 by Taylor & Francis.

The three key components provided in Bui and Porter's framework are outlined as follows:

(a) *Expectation Gap*: According to Bui and Porter (2010), it refers to "*differences in the expectations of accounting employers and educators regarding the competencies accounting graduates should acquire*" (p. 31). This gap uncovers disparities between employers' workplace expectations and the academic objectives set by educators.

(b) *Constraints gap*: This gap emerges when educators' efforts to develop desired competencies are constrained by institutional factors or students' abilities. Bui and Porter define the constraints gap as "*constraints on the effectiveness of accounting education resulting from (a) institutional factors and (b) accounting students' ability and aptitude"* (p. 31).

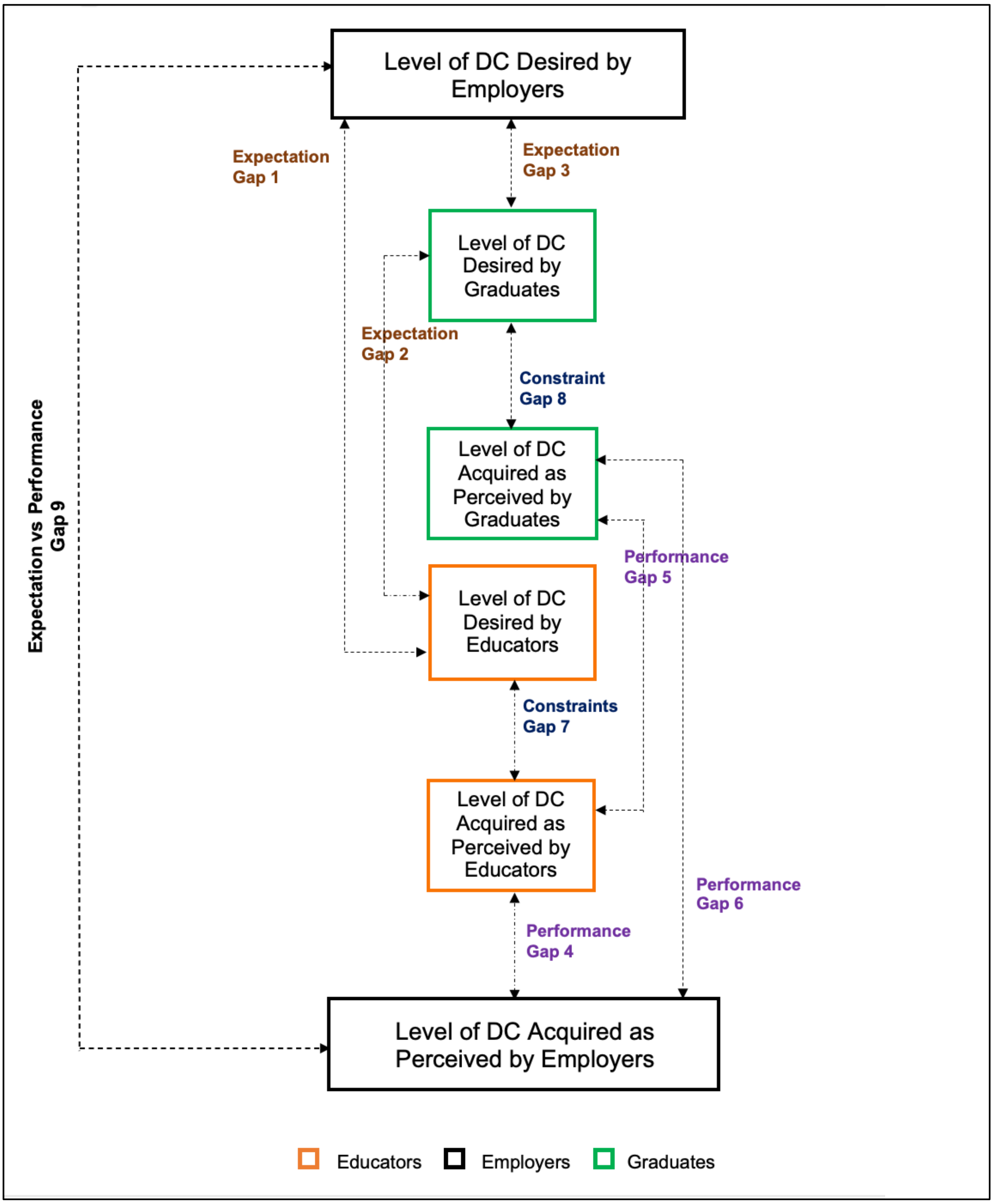
(c) *Performance gap*: This component highlights *"differences in the competencies accounting educators can reasonably expect accounting graduates to acquire (given the constraints) and those employers perceive the graduates possess when they enter the workforce"* (p. 31). Bui and Porter explain that this gap stems from discrepancies in educators' performance in delivering the intended competencies.

4.3.2 Extension of the Framework with Graduates' Perspective

This study extends Bui and Porter's (2010) expectation-performance gap framework to consider not only the perspectives of educators and employers but also graduates' perspectives on digital competencies. Originally focused on generic skills, the framework is extended to include digital competencies and incorporate graduates' expectations and self-assessments, acknowledging their role as both products of higher education and participants in the workforce transition. Understanding their desired and self-perceived digital competencies provides a more comprehensive view of the expectation-performance gap, bridging the divide between educational outcomes and workplace demands.

Figure 4.2 illustrates the Competency Gap Analysis Framework developed for this study, which is structured around four key gaps: (a) the Expectation Gap, (b) the Performance Gap, (c) the Constraints Gap, and (d) the Expectation-Performance Gap. This extended framework thus provides a structured approach to understanding how digital competencies are perceived and attained across different stakeholder groups, with the aim of improving strategies to close these gaps within accounting education.

Figure 4.2 *The Competency Gap Analysis Framework*



Note. DC = Digital Competencies.

Based on Figure 4.2, the following gaps have been identified, aligning with the research questions of this study.

(a) *Expectation Gap*:

Gap 1: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies desired of accounting graduates? (RQ 1)

Gap 2: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies desired of accounting graduates? (RQ 2)

Gap 3: Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies desired of accounting graduates? (RQ 3)

(b) *Performance Gap*:

Gap 4: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies that accounting graduates have acquired upon graduation (RQ 4)

Gap 5: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies that accounting graduates have acquired upon graduation? (RQ 5)

Gap 6: Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies that accounting graduates have acquired upon graduation? (RQ 6)

(c) *Constraints Gap*:

Gap 7: Are there any differences in the perceptions of educators regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired? (RQ 7)

Gap 8: Are there any differences in the perceptions of graduates regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired? (RQ 8)

(d) *Expectation-Performance Gap*:

Gap 9: Are there any differences in the perceptions of employers regarding the desired level of digital competencies accounting graduates should have acquired and the level of digital competencies accounting graduates they hired have acquired upon graduation? (RQ 9)

The study's framework also demonstrates a fusion of human capital theory and stakeholder theory as mentioned earlier. Human capital theory posits that investment in education and training leads to increased productivity and economic growth. In the context of this study, educators, employers, and graduates represent distinct stakeholders who contribute to the development and utilisation of human capital within the accounting profession.

Educators play a critical role in shaping graduates' knowledge and competencies, preparing them for the workforce (Bui & Porter, 2010; Jackson et al., 2023). This role aligns closely with human capital theory, as education contributes to the enhancement of individuals' competencies, thereby increasing individuals' potential value in the labour market. Additionally, educators' perspectives are crucial for understanding and addressing issues within the education system. Their insights provide essential contributions as key stakeholders in improving educational outcomes.

Employers, according to human capital theory serve as the end-users of accounting graduates, leveraging the competencies and qualities of potential hires (e.g., graduates). As such, they can provide valuable insights into the qualities and competencies they seek in accounting graduates. Their involvement reflects the market demand for specific skills and attributes, which directly influences the development of human capital within the accounting profession. Through their participation, employers contribute to the alignment between educational provision and industry expectations, ensuring that graduates possess the requisite competencies to meet organisational needs and drive productivity. As mentioned by Hussin et al. (2024), "Employers' perspectives are essential for educators, legislators, and other stakeholders in accounting education as they work together to close the gap between academic preparation and industry demands" (p. 320).

Graduates represent the beneficiaries of accounting education, who can offer insights into their preparedness for the job market and the extent to which their education aligns with industry demands. They also embody the realisation of human capital investments. Their experiences and perspectives can provide valuable feedback on the effectiveness of educational programmes in preparing them for the workforce. By examining graduates' perceptions, this study assesses the extent to which educational provision aligns with industry demands, thereby informing efforts to optimise human capital development within the accounting profession. According to Dolce et al. (2020), focusing on graduates is highly relevant for understanding how well their academic path has prepared them for real-world job expectations and workplace demands. Understanding the gaps from these stakeholders' perspectives will help identify key focus areas and address their root causes.

4.4 Application of Professional Frameworks to Digital Competencies

This section discusses various professional competency frameworks and how each of them contributed to the development of the digital competencies conceptual framework of this study. By drawing on established models from professional accounting bodies, such as the MIA Competency Framework, the CGMA Competency Framework, the IMA Management Accounting Competency Framework, the ACCA Professional Quotient, and Terblanche and De Clercq's (2021) Critical Thinking Competency Framework, it is to ensure that the framework addresses the current and future needs of the accounting profession. In the upcoming sections, the above mentioned frameworks are examined in detail to highlight their relevance and contribution to the digital competencies framework developed by this study.

4.4.1 The MIA Competency Framework

The MIA Competency Framework, formulated in 2019, defines the baseline competencies required to become accountancy professionals (MIA, 2020). This framework classifies competencies into three proficiency levels (e.g., Foundation, Intermediate, and Advanced), guiding accountants as they progress from entry-level positions to more senior and specialised roles.

This framework aligns with the International Education Standards (IES), established by the IAESB. It also considered Malaysian laws and regulations, feedback from the framework's Exposure Draft, and the ASEAN Mutual Recognition Arrangement on Accountancy Services. It serves as a principle-based guide covering a broad spectrum of the profession, including public practice, the public sector, commerce and industry, and academia. Employers are encouraged to refer to the framework to interpret and define the sets of competencies that best fit their organisations' requirements. The framework specifically outlined the expectations for technical competence, professional skills, and ethical conduct, creating a comprehensive foundation for professional development in the accountancy field.

The core technical competencies emphasised by the MIA framework are critical for accounting professionals. These include Financial Accounting and Reporting, Management Accounting, Finance and Financial Management, Audit and Assurance, Taxation, Governance and Risk Management, and Information and Communications Technologies

(ICT). In addition to technical expertise, the framework places significant emphasis on the following professional skills:

- **Intellectual skills:** These include problem-solving abilities, decision-making skills, adaptability to change, and the exercise of professional judgment. Intellectual skills also involve evaluating data from various sources and perspectives through research, integration and analysis, applying critical thinking to solve problems, and recommending solutions to unstructured, multi-faceted issues. Intellectual skills are usually developed during a period of tertiary education.
- **Interpersonal and communication skills:** These skills relate to the ability of a professional accountant to work and interact effectively with others. This includes communicating clearly and concisely while presenting, discussing, and reporting in both formal and informal settings, demonstrating awareness of cultural and language differences in all communication, and presenting ideas persuasively to influence others and gain their support and commitment.
- **Personal skills:** These include the attitude and behaviour of a professional accountant, such as being openness to new opportunities, anticipating challenges, and planning effective solutions.
- **Organisational skills:** These involve working effectively within an organisation to achieve optimal results, managing people and delegating tasks to complete assignments efficiently.

In the context of this study, the ability to articulate information needs, search for data in digital environments, and demonstrate proficiency in basic hardware and software usage directly corresponds to the ICT competency outlined in the MIA Competency Framework. Similarly, competencies such as communication, problem-solving, critical thinking, and creativity, falling under the intellectual, interpersonal, personal, and organisational domains, are vital. These competencies are essential for leveraging technology and driving innovation in accounting practices. Thus, the MIA Competency Framework serves as a foundational reference for developing the digital competencies framework in this research, which is tailored to the Malaysian environment.

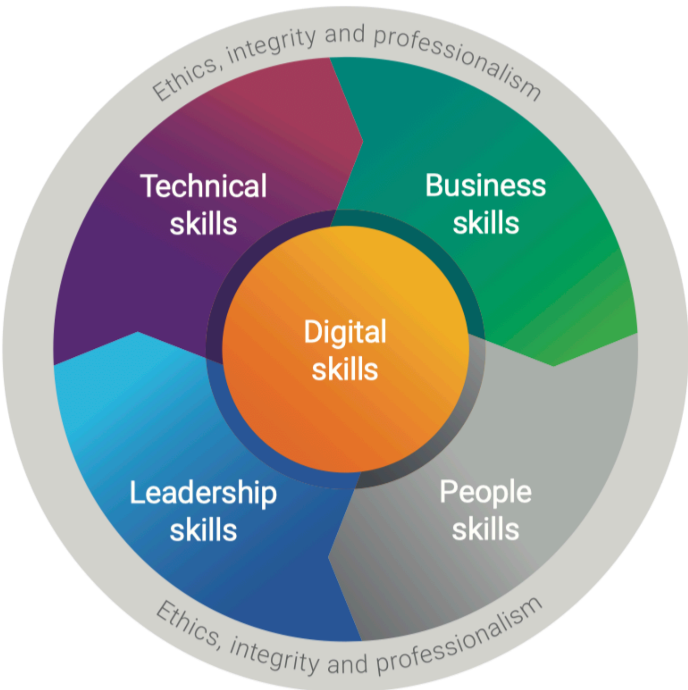
4.4.2 The CGMA Competency Framework

The CGMA Competency Framework was developed to support management accountants and their employers in understanding the knowledge requirements and assessing the competencies needed for both current and desired roles (CGMA, 2019). The framework emphasises objectivity, integrity, and ethical behaviour, along with a commitment to continuously acquire new skills and knowledge. It serves as a foundation to demonstrate the capabilities of a chartered management accountant as a trusted finance and business strategist.

The CGMA Competency Framework was formulated through an extensive research process involving face-to-face interviews, roundtables, and online surveys with finance and non-finance professionals from diverse industries. These participants, representing mid to senior levels from both the private and public sectors, contributed to the framework's development through interactions with 130 organisations across 14 countries and roundtables held in 20 countries throughout Asia, Europe, Africa, and the Americas.

The framework outlines a diverse set of competencies required of CGMA professionals, empowering employers to define expectations for various roles, and aiding educators in preparing students to become well-rounded management accountants. It categorises competencies into key skill areas, including technical, business, people, leadership, and digital, as shown in Figure 4.3. Each of these categories is further divided into four proficiency levels: Foundational, Intermediate, Advanced, and Expert and prescribes a series of skill sets to assist in the CGMA's professional development.

Figure 4.3 *The CGMA Competency Framework*



Note. From *the CGMA Competency Framework*, 2019.

In the context of this study, the digital skills within the CGMA Competency Framework are particularly relevant. The CGMA designation places a strong focus on integrating digital skills to meet the evolving demands of the accounting profession. While the CGMA itself was established in 2012, its founding bodies, the American Institute of Certified Public Accountants (AICPA) and CIMA, have long recognised the importance of early adoption of emerging technologies, ensuring that professionals develop technological proficiency. The CGMA designation emphasises the importance of data literacy, its impact on organisational value, and the need for expertise in cybersecurity, strategic management, financial reporting, and digital costing techniques. The digital skills highlighted in the CGMA Competency Framework include competencies related to the use of technology, such as:

- Information and digital literacy,
- Digital content creation,
- Problem solving,
- Data strategy and planning,
- Data analytics,
- Data visualisation.

These competencies are vital for finance professionals, covering a spectrum from basic digital literacy to more advanced expertise in areas such as cloud computing, cybersecurity, data analytics, and digital costing. In today's rapidly advancing digital environment, finance professionals must remain up to date with technological advancements and effectively manage the finance function within a digital context. The integration of digital skills into other knowledge areas within the framework reinforces the need for a holistic approach to digital competencies. Most of the digital skills outlined in the CGMA Competency Framework have been used as benchmarks for developing the digital competencies conceptual framework in this study.

4.4.3 The IMA Management Accounting Competency Framework

The IMA developed the Management Accounting Competency Framework to outline the competencies needed by management accountants (IMA, 2023).[23] Originally released in 2019 and updated in 2023, the framework reflects the rapid evolution of technology and its

[23] While both IMA and CGMA support management accountants, they differ in scope and certification. The IMA offers the CMA (Certified Management Accountant) credential focused on financial strategy (IMA, n.d.). In contrast, the CGMA, a designation jointly awarded by the AICPA and the CIMA, emphasises global business leadership and advanced management accounting competencies.

profound influence on the business landscape. In response to these changes, the IMA has analysed the emerging competencies needed by management accountants to adapt and excel in the digital age. This framework serves as a comprehensive guide, detailing the knowledge, skills, and abilities critical for navigating the dynamic and technology-driven business environment that has redefined the role of management accountants.

The enhanced framework identifies six core domains of knowledge, skills, and abilities that finance, and accounting professionals need to remain relevant in the digital age and fulfil their roles effectively. Among these, the technology and analytics domain is especially crucial, as it empowers professionals to address the complexities of the digital landscape. Mastery of technology and analytics not only enhances operational efficiency but also enables professionals to harness data-driven insights for informed decision-making and strategic planning, both of which are essential for success in today's rapidly evolving business environment.

Within the technology and analytics domain, specific competencies are defined across a range of proficiency levels, from "limited knowledge" to "expert." These competencies outline the skills necessary to manage technology, analyse data, and make effective business decisions. The four key competencies in this domain are as follows:

- **Information System:** This involves utilising technology to effectively support operational and financial processes, solve problems, analyse data, and enhance business performance. For example, professional accountants must be able to *"demonstrate competencies in using basic hardware and software tools"*, *"identify different types of data (e.g., structured, unstructured, numeric, text, sensor)"*, *"manage the general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance),* and *"demonstrate an understanding of elements in relational databases".*
- **Data Governance:** This competency ensures the availability, utility, integrity, and security of data. For example, professionals should be able to *"exercise sound data stewardship by complying with all data policies and documenting procedures followed"*, "*demonstrate an understanding of the need to protect the security and privacy of stakeholders data"*, and *"demonstrate an understanding of the basic principles of data security"*.
- **Data Analytics:** This encompasses extracting, transforming, and analysing data to gain insights, improve predictions, and support decision making. For example, under this competency, professionals need to have the ability to "*create spreadsheets and manipulate data using basic functions and formulas such as*

graphs, filtering and sorting data, and importing data", "*calculate basic descriptive statistics such as ratios and averages to reveal trends", "extract, transform, and query data using appropriate tools such as Structured Query Language (SQL)",* and *"demonstrate an understanding of business intelligence and data mining".*

- **Data Visualisation:** This competency involves presenting data in a visual format to communicate key patterns, trends, and correlations effectively. For example, professionals should be able to *"create simple charts and graphs using visualisation tools (e.g., Excel, Tableau) or prebuilt visualisation code packages", "demonstrate an understanding of how to best communicate results with basic visualisations (e.g., line, bar, pie, scatterplots)", "utilise table and graph design best practices to avoid distortion in the communication of complex information",* and *"demonstrate an understanding of how to best communicate results with intermediate visualisations (e.g., histograms, area charts, heat maps)".*

Most of the skills in the technology and analytics domain outlined in the CGMA Competency Framework have been used as benchmarks for developing the digital competencies framework in this study.

4.4.4 The ACCA Seven Professional Quotients

The ACCA (2021) identified seven professional quotients that are essential for future accountants to advance their careers and deliver greater value to employers. These quotients represent the behaviours and qualities that ACCA qualified accountants must possess to meet the future needs and demands of the profession. They are embedded within the ACCA Competency Framework and form a core component of the ACCA Qualification. The seven professional quotients are as follows:

- **Technical and Ethical Quotient:** This foundational quotient highlights the importance of technical skills in accounting and adherence to ethical standards. Accountants are expected to perform activities to a defined standard while maintaining the highest integrity, independence, and professional scepticism.
- **Intelligence Quotient:** This refers to the cognitive ability to acquisition and application of knowledge, critical thinking, reasoning, and problem solving. It also involves an understanding of complex and ambiguous situations. The intelligence quotient also emphasises the need for curiosity and continuous learning, which are valuable in making informed decisions in diverse contexts.

- **Digital Quotient:** Digital competency is another fundamental quotient. An accountant must have a varied technological skill set and be able to apply it to their business and industry sector. It encompasses awareness and application of new technologies, such as artificial intelligence, cloud computing, and blockchain. For accountants, the digital quotient enables them to leverage technology for efficient data analysis, interpretation, and reporting, aligning with the digital transformation in the industry. They have four components of digital quotient: existing and emerging technology (e.g., spreadsheet applications, ERP systems, robotics, blockchain), capabilities (e.g., managing transformation, data governance), digital practices (e.g., data management, real-time visualisations, coding), and practices and strategies (e.g., IT strategy, finance systems strategy, data strategy).
- **Experience Quotient**: This quotient is about understanding customer expectations and applying skills to create value. Accountants gain experience through real-world interactions, which helps them understand industry needs and improve client satisfaction. Experience quotient highlights the importance of practical experience in shaping one's ability to meet professional standards.
- **Creative Quotient**: Creativity involves using existing knowledge in new situations to generate innovative ideas and solutions, offer strategic insights, help to solve problems, and give a business a competitive advantage.
- **Emotional Intelligence Quotient:** It is the ability to identify and manage one's own emotions and empathise with others. It covers both personal and interpersonal skills. These skills include effective communication of financial information with clients and colleagues and having an awareness of building multicultural teams.
- **Vision Quotient**: Vision is the ability to anticipate future trends and fill in knowledge gaps with innovative thinking. Vision is a soft skill that involves having an analytical and forward-thinking view. Accountants with a strong vision quotient can foresee industry changes and help businesses adapt proactively.

In this study, the intelligence quotient, digital quotient, creative quotient, and emotional intelligence quotient have been adapted and incorporated into the study framework.

4.4.5 Terblanche and De Clercq's (2021) Critical Thinking Competency Framework

Terblanche and De Clercq's (2021) study developed a critical thinking competency framework specifically for accounting students. Their exploratory study identified the critical thinking skills and competencies essential for accounting students. Using a qualitative research approach, they began by reviewing the literature to identify key competencies related to critical thinking. Terms, concepts, skills, attributes, dispositions, and abilities necessary for critical thinking were gathered from seminal works in the field. These elements were then analysed and grouped by the researchers to consolidate similar concepts. Their study provides a comprehensive definition of critical thinking, designed as a starting point for educators in the field of accounting:

> Critical thinking involves purposeful and reflective judgement generally aimed at making informed decisions. It involves certain cognitive skills (e.g. the ability to interpret, analyse, evaluate, infer, explain and self-regulate) and also certain dispositions (e.g., being inquisitive, self-confident, open-minded, ethical, orderly and systematic, and having intrinsic motivation and a positive attitude). (Terblanche & De Clercq, 2021, p. 349)

Their resulting framework offers a comprehensive set of critical thinking competencies designed to help accountants adapt and remain relevant in the rapidly evolving environment of the Fourth Industrial Revolution, aligned with this study context.

Taken together, each of the professional competency frameworks reviewed above contributed specific elements to the development of this study's digital competencies framework. The MIA (2020) framework emphasised ICT, communication, problem-solving, and critical thinking, which were essential in shaping both the technical and generic competencies. The CGMA (2019) and IMA (2019) frameworks provided detailed guidance on digital and analytic domains, directly informing the technical competencies of information systems, data analytics, data visualisation, and data governance. The ACCA (2021) quotients added breadth through digital, creative, and intelligence dimensions, while Terblanche and De Clercq's (2021) framework provided the foundation for critical thinking. Additional insights were drawn from the AICPA (2018), SAICA (2019), and Jackson et al. (2020), particularly for problem-solving and critical thinking.

Figure 4.4 consolidates this derivation, mapping each of the eight digital competencies identified in this study to their corresponding professional frameworks and sources. This summary makes explicit the systematic process through which the competencies were selected and ensures that the framework developed is grounded in internationally recognised standards while contextualised for accounting graduates in Malaysia.

Figure 4.4 *Key Competencies from Various Sources*

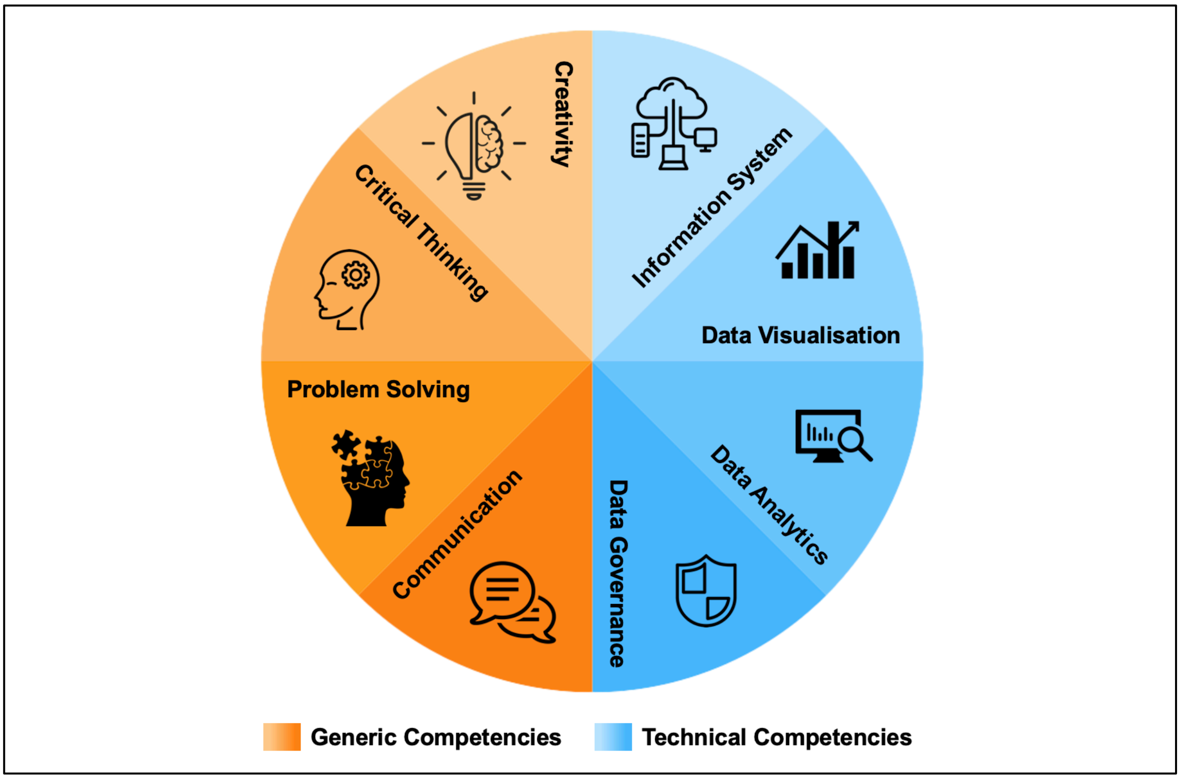
DC / Framework	Information System	Data Visualisation	Data Analytics	Data Governance	Communication	Problem-Solving	Critical Thinking	Creativity
1. MIA (2020)	✓				✓	✓	✓	
2. CGMA (2019)	✓	✓						
3. IMA (2019)	✓	✓	✓	✓	✓			
4. ACCA (2021)	✓				✓	✓		✓
5. Terblanche & De Clercq (2021)							✓	
6. AICPA (2018)						✓		
7. SAICA (2019)							✓	
8. Jackson et al. (2020)						✓		

Building on this foundation, the next section introduces the digital competencies conceptual framework of this study, integrating and classifying the competencies into two categories: technical and generic competencies.

4.5 Digital Competencies Conceptual Framework

This section introduces the digital competencies framework developed as part of the conceptual framework of this study. Figure 4.5 presents the proposed framework, tailored specifically for accounting graduates. The framework identifies eight digital competencies for graduates that are important for the accounting profession in the digital workplace. The competencies are divided into two categories: *technical digital competencies* and *generic digital competencies.* The technical competencies include information system, data visualisation, data analytics, and data governance competencies. The generic competencies are communication, problem-solving, critical thinking, and creativity. In addition to technical competencies, this study highlights the role of generic competencies as integral to digital competencies. These generic competencies are directly linked to the use of digital tools in accounting and are critical for effectively leveraging technology and driving innovation within the profession.

Figure 4.5 *The Digital Competencies Framework*



Each of these competencies plays a vital role in the digital accounting profession. *Information system* competency ensures graduates can effectively use accounting software and enterprise systems, which are fundamental in financial reporting and compliance (Spraakman et al., 2015; Tan & Laswad, 2018). *Data visualisation* allows accountants to communicate insights through dashboards and graphical representations as support for better decision-making (Kokina et al., 2017; Spraakman et al., 2021). *Data analytics* has become increasingly essential as many firms rely on big data to drive financial strategies and risk assessments, creating value through data-driven decision support (Kee, 2024; KPMG International, 2024; MIA, 2020). *Data governance*, including cybersecurity and compliance with data protection regulations, is crucial in maintaining financial integrity (Spraakman et al., 2021). Beyond technical competencies, *communication* remains critical as future accountants must articulate complex financial data to stakeholders across digital platforms

(Banasik & Jubb, 2021; Jackson et al., 2020; Kokina et al., 2021; McBride & Philippou, 2022; Spraakman et al., 2021). *Problem-solving* and *critical thinking* enable graduates to navigate complex business challenges and make informed, data-driven decisions (Banasik & Jubb, 2021; Jackson et al., 2020, 2022; Kokina et al., 2021; McBride & Philippou, 2022; McKinney Jr. et al., 2017; MIA, 2020). Lastly, *creativity* fosters innovation, allowing graduates to leverage emerging technologies and develop solutions for evolving business needs (Kokina et al., 2021; Van Laar et al., 2018; World Economic Forum, 2023).

This conceptual framework provides a structured approach for assessing the digital competencies of accounting graduates, helping bridge the gap between educational preparation and the demands of a technology-driven profession. This study extends beyond the existing framework by focusing specifically on digital competencies within the field of accounting education. While previous studies have explored generic skills (e.g., Abayadeera & Watty, 2014; Al Mallak et al., 2020; Bui & Porter, 2010; Ghani et al., 2024; Jackling & De Lange, 2009; Kavanagh & Drennan, 2008), this study addresses the growing importance of digital competencies in an increasingly technology-driven profession.

4.6 Summary of the Chapter

This chapter builds on Bui and Porter’s (2010) Framework to establish a conceptual framework for examining and comparing the expectations and perceptions of three key stakeholder groups: educators, employers, and graduates. This approach enables an in-depth analysis of the digital competencies that accounting graduates are expected to acquire and those they have actually acquired, as perceived by these stakeholders. Supported by human capital theory and stakeholder theory, the framework provides a foundation for understanding the dynamics that influence the development of graduates’ competencies from the perspectives of these key groups. Human capital theory posits that individuals are valuable assets whose knowledge and competencies significantly contribute to economic productivity. This theory emphasises the importance of investing in education and training to enhance individuals' competencies. In the context of accounting, digital competencies have become increasingly vital in today’s technology-driven business environment. These competencies not only enhance graduates’ marketability but also contribute to organisational competitiveness and growth. Stakeholder theory adds another layer by highlighting the need to understand and address the differing expectations of each stakeholder group. It suggests that managing stakeholder relationships involves understanding how well an organisation meets the diverse needs of its stakeholders. While human capital theory highlights the value of investing in competencies, it does not address the differing perspectives of these stakeholders. Therefore, this study aims to explore any disparities in the perceptions of educators, employers, and graduates regarding the expected and acquired levels of digital competencies (human capital) among accounting graduates. By analysing these perspectives, a comprehensive understanding of any existing competency gaps can be achieved.

This study also develops a digital competencies conceptual framework specifically tailored for accounting graduates by drawing on competency frameworks from several professional bodies and prior studies. From these sources, eight key digital competencies are identified and divided into two categories: *technical digital competencies* and *generic digital competencies.* The technical competencies include information system, data visualisation, data analytics, and data governance. The generic competencies encompass communication, problem-solving, critical thinking, and creativity, all of which are considered essential for preparing accounting graduates to meet the demands of the digital age.

The next chapter, Chapter Five, provides the research methodology for this study.

Chapter Five: Research Methodology

5.1 Overview

This chapter outlines the methodology applied to address the research questions. Section 5.2 explains the philosophical assumptions that guide this study, including ontology, epistemology, axiology, and methodology. Section 5.3 outlines the research design, including the population, survey instruments, and data collection procedures. Section 5.4 outlines the data preparation and preliminary analyses, including steps taken to ensure data quality and the number of usable responses. Section 5.5 describes the data analysis techniques employed to interpret the results, while Section 5.6 concludes with a summary of the chapter.

5.2 Research Philosophy

Research philosophy refers to the set of beliefs and assumptions about the development of knowledge (Bryman, 2016; Saunders et al., 2023). It shapes how knowledge is understood, what is considered valid knowledge, and how researchers seek to obtain it (de Villiers & Fouché, 2015). Research philosophy involves reflecting on how the social world is observed, as these assumptions guide methodological choices and shape the research process (Bahari, 2010; Saunders et al., 2023). Throughout the research process, various assumptions are made at different stages (Burrell & Morgan, 2019). Research assumptions in this study are structured around three key dimensions: ontology (i.e., the nature of reality), epistemology (i.e., the nature of knowledge and how it is acquired), and axiology (i.e., the role of values in research). A well-structured research philosophy establishes consistency between research questions, methodology, and analysis, enhancing the research's credibility by ensuring alignment across all components (Johnson & Clark, 2006; Saunders et al., 2023). In this study, philosophical assumptions provide the foundation for examining the expectation gaps, performance gaps, constraint gaps, and the expectation-performance gap in accounting education.

5.2.1 Ontology, Epistemology, and Axiology

Research in accounting education, like other fields, is conducted within specific paradigms, each with distinct ontological, epistemological, and axiological assumptions (Coll & Chapman, 2000). These philosophical assumptions fall into two main schools of thought named "objectivism" and "subjectivism" (Saunders et al., 2023).

Ontology concerns what is considered real and what counts as reality in the research context (Killam, 2013; Moon & Blackman, 2017; Saunders et al., 2023). For example, in the context of this study, ontological assumptions shape how the author sees the world of accounting education and therefore chooses what to research. In an objectivist ontology, reality is viewed as singular, objective, and measurable, and social entities are considered to exist independently of the individuals who observe them (Hussey & Hussey, 1997; Saunders et al., 2023). Conversely, in a subjectivist ontology, reality is viewed as socially constructed, non-singular, and shaped by individual experiences and perceptions, where what is considered true or real depends on the individual or group's viewpoint (Hussey & Hussey, 1997).

Ontology then translates into epistemology, where questions arise about how knowledge is determined, what forms it takes, and how it can be acquired and passed on to others (Fraser, 2014; Saunders et al., 2023; de Villiers & Fouché, 2015). Epistemology is concerned with all aspects of the validity, scope, and methods of acquiring knowledge (Moon & Blackman, 2017). In an objective epistemology, knowledge is viewed as observable, measurable, and objective. Within this perspective, the subsequent research findings are likely to be considered objective and generalisable (Saunders et al., 2023). In contrast, in subjectivist epistemology, knowledge is considered interpretive and shaped by social context. Saunders et al. (2023) considered the subjectivist view as one where social phenomena are created from the perceptions and consequent actions of social actors. The choice of epistemological stance defines the research paradigm and influences how data is gathered and analysed (de Villiers & Fouché, 2015). It is essential to ensure that ontological and epistemological assumptions align with the chosen research design and methods. A lack of consistency may compromise the trustworthiness and relevance of the research findings (Saunders et al., 2023).

Axiology concerns the role of values and ethics in research, influencing decisions from topic selection to methodology (Killam, 2013; Saunders et al., 2023). A key consideration is whether researchers should remain neutral or acknowledge how their values shape their study. From an objectivist axiology perspective, social entities, and social actors exist independently, so researchers aim to eliminate personal biases by maintaining detachment from their own values throughout a rigorous scientific process. In contrast, in a subjectivist axiology, values are considered an essential part of the inquiry process. Instead of striving for neutrality, researchers acknowledge their influence and incorporate participants' perspectives and lived experiences into the study, recognising that knowledge is shaped by social and contextual factors (Burrell & Morgan, 2019; Crotty, 1998; Lincoln & Guba, 1985; Saunders et al., 2023).

5.2.2 Positivism and Interpretivism

The two dominant paradigms within social science research are "positivism" and "interpretivism" (de Villiers & Fouché, 2015).[24] Positivism is characterised by its emphasis on objectivity and theory testing. It aligns with an objectivist ontological perspective, which assumes that reality exists independently of human thought and can be measured (Walliman, 2011). Positivism also adopts an objective epistemology, where knowledge is considered observable, measurable, and independent of researchers' values (Saunders et al., 2023). This viewpoint guides the classic scientific method, involving the formulation of hypotheses, experimentation, and drawing conclusions from the results. Positivist studies typically test hypotheses by measuring observable social phenomena, although some may not begin with an existing theoretical framework (Morgan & Smircich, 1980; Saunders et al., 2023). This approach is structured, relies on prior theoretical base, seeks to establish the nature of the relationship, causes and effects, and uses empirical validation and statistical analyses to confirm theories (Bisman, 2010). In terms of axiology, positivism adopts an objectivist stance, where researchers aim to remain value-free and minimise personal bias throughout the research process. Therefore, the positivist paradigm aligns with a quantitative approach and structured methods such as surveys or experiments, aiming to uncover objective truths (Neuman, 2014).

In contrast, interpretivism focuses on understanding and interpreting elements of the study by integrating human interest and context into the analysis. It is grounded in a subjectivist ontology (Bryman, 2008; Saunders et al., 2023), where reality is considered socially constructed and accessible only through social interactions, such as language, shared meanings, and consciousness (Myers, 2019). Interpretivism also adopts a subjective epistemology, viewing knowledge as socially constructed, interpretive, and dependent on context (Saunders et al., 2023). Interpretivist approaches aim to view the world through the perspectives of the participants, allowing them to achieve numerous viewpoints of reality and not only the one reality that a positivist researcher aims to achieve (Greener, 2008). Correspondingly, in terms of axiology, interpretivism acknowledges that researchers' values inevitably influence the study and should be openly recognised rather than eliminated. This paradigm is closely associated with qualitative research, where individual perceptions and experiences are examined in-depth such as interviews or case studies (Cohen et al., 2001). Interpretivist researchers acknowledge that their values shape the research. They actively

[24] There are other paradigms, which include critical realism, post-positivism, constructivism, pragmatism, and post-modernism (de Villiers & Fouché, 2015; Saunders et al., 2023).

engage with participants' perspectives and recognise their influence on the research process.

Following these ontological, epistemological, and axiological considerations, the appropriate method selected for collecting and analysing data, is known as a methodology (Fraser, 2014; Maharani, 2021). Methodology answers the question of "how" research is conducted (Hussey & Hussey, 1997).

5.2.3 Methodology and Paradigm Influence

Methodological decisions are guided by the underlying ontological, epistemological, and axiological assumptions of a study (Scotland, 2012). Social science research typically adopts qualitative, quantitative, or mixed approaches, each shaped by distinct philosophical assumptions (Yao, 2024). A positivist paradigm typically leads to a quantitative methodology, focusing on structured data collection, objective measurement, and statistical analysis. Conversely, an interpretivist paradigm favours qualitative methodologies that emphasise subjective meanings and contextual understanding (Fraser, 2014). As this study adopts a positivist stance, a quantitative approach was selected to ensure objectivity, replicability, and the ability to generalise findings to a broader population.

5.3 Research Design

This study adopts a quantitative research approach. Quantitative analysis is suitable for classifying and quantifying observable phenomena, constructing models to explain relationships, and generalising findings to a larger population (Bernard, 2012). As discussed earlier, this study aligns with the positivist paradigm, which assumes that the social world is an external, objective reality that can be measured. This viewpoint supports the application of quantitative methodologies, which rely on the use of standardised instruments, such as questionnaires and surveys for data collection.

In line with this approach, the study examines digital competencies among accounting graduates, as perceived by educators, employers, and graduates. Data were collected through surveys and analysed using statistical techniques to identify, explain, and predict relationships and patterns within these social elements (Burrell & Morgan, 1979, 2019; Saunders et al., 2023). In addition, this study follows a value-free approach, maintaining the researcher's objectivity and detachment to minimise bias in data collection and analysis. The use of structured surveys ensures that the researcher's values do not influence participants' responses, allowing for standardised and replicable findings.

Ethical considerations were integral to the research design. Participants were fully informed about the study's purpose, their roles, and their right to withdraw at any stage, ensuring autonomy and trust. Measures were also taken to protect participants' identities, reinforcing objectivity and value neutrality in line with the positivist paradigm.

This section begins by outlining the target population, followed by a discussion on the survey instrument used for data collection. It then provides an overview of the data collection process.

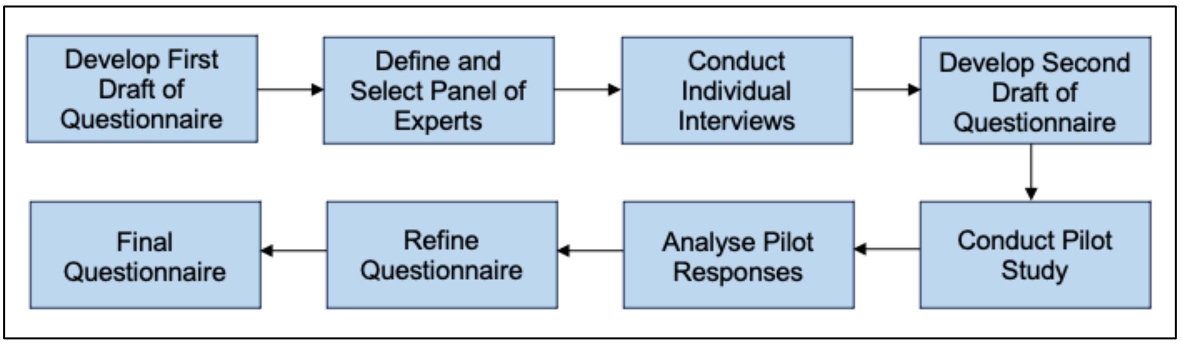
5.3.1 Population

The target population of this study involves three stakeholder groups in Malaysia: (i) accounting educators involved in teaching and curriculum design at public and private universities, (ii) employers who recruit, supervise, or assess accounting graduates across various organisations including public practices, public organisations, and private organisations, and (iii) graduates with accounting-related qualifications and approximately up to 5 years of relevant work experience in accounting roles. This study primarily used purposive sampling to target educators, employers, and graduates who met the study criteria. Due to the low response rate from graduates, snowball sampling was subsequently applied to increase participation. Section 5.3.3 *Data Collection for the Main Survey* provides detailed information about the data collection for each of these groups.

5.3.2 Survey Instrument

A carefully developed questionnaire was used as the survey instrument in this study. The questionnaire was developed following a structured process to ensure its effectiveness in gathering relevant data. Figure 5.1 illustrates each phase in the design and refinement process, from developing the first draft to distributing the final version.

Figure 5.1 *Workflow of Questionnaire Design*



The initial phase of designing the research questionnaire began with the development of the first draft, designed in alignment with the study’s objectives. Due to limited prior research on digital competencies specific to the accounting field, this study relied on established frameworks to formulate initial questionnaire items, as explained in Section 5.3.2.1. The challenges of studying modern emerging technologies, as noted by Sutton and Arnold (2013), include the scarcity of previous studies and the lack of comprehensive theoretical foundations in related phenomena.

The next phase involved identifying and selecting a panel of experts to evaluate the questionnaire. This expert review was essential to ensure the relevance and clarity of the questions, particularly within the context of accounting. Further details regarding this critical stage are discussed in Section 5.3.2.2, *Expert Interviews for Questionnaire Validation.* Interviews were conducted with selected participants to gather further insights and feedback, refining the questions. Based on these insights, a second draft of the questionnaire was developed. Subsequently, a pilot study was conducted, as detailed in Section 5.3.2.3, where a small group of respondents tested the revised questionnaire. The pilot responses were analysed to assess the clarity and interpretability of the questions. Following this analysis, the questionnaire underwent further refinement to address any identified issues and ensure its suitability for distribution to the target sample. Once all elements were finalised, the questionnaire was ready for broader distribution.

5.3.2.1 Development of Questionnaire

A set of three questionnaires, each with variations tailored to the target audience (educators, employers, and graduates), was designed to capture their perspectives on accounting graduates' digital competencies. They were structured into multiple sections, which are detailed below. The questionnaires were initially drafted and refined using Microsoft Word to finalise their structure and content. They were then developed and administered using the Qualtrics platform (https://www.qualtrics.com) to ensure ease of access and efficient data collection.

(a) Level of Graduates' Digital Competencies

This section evaluates graduates' digital competencies by capturing respondents' perceptions of the desired and acquired digital competencies of accounting graduates upon graduation. Respondents were asked to indicate the level of digital competencies expected or desired of accounting graduates and their perceptions regarding the level of digital competencies that accounting graduates have acquired upon graduation. A Likert scale format (1 = Very low competence to 5 = Very high competence) was used for measurement. To ensure data accuracy, additional response options of "Don't Know" and "Not Applicable" were included, allowing respondents to indicate when a competency was outside their expertise or irrelevant to their context (Lamberton et al., 2024). The Likert scale format was chosen for its balanced measurement approach, aligning with best practices in educational and competency assessment research (Joshi et al., 2015). This scale was applied consistently across educators, employers, and graduates to enable a comparative analysis of the perceived gap between expected and acquired competencies.

Eight essential categories of digital competencies were included in Section A: (1) Information system, (2) Data visualisation, (3) Data analytics, (4) Data governance, (5) Communication, (6) Problem-solving, (7) Critical thinking, and (8) Creativity. The inclusion of these competencies ensures that the study remains aligned with professional accounting bodies' guidelines and industry demands. Each competency was assessed using five to six items. This approach aligns with best practices in Likert scale design, which recommends using 20 to 50 items for reliable measurement (Pornel & Saldana, 2013). The competency items were adapted from established frameworks and prior studies, as discussed in Chapter Four. The selected frameworks used to devise Section A of the questionnaires include the MIA Competency Framework 2019 (MIA, 2020), CGMA Competency Framework 2019 (CGMA, 2019), IMA Management Accounting Competency Framework 2019 (IMA, 2019), ACCA Seven Professional Quotients (ACCA, 2021), South African Institute of Chartered Accountants Competency Framework 2019 (SAICA, 2019), and the AICPA Core Competency Framework (AICPA, 2018). Additionally, prior studies such as Terblanche and De Clercq (2021) and Jackson et al. (2020) were referred to enhance the measurement. The selection of items for each area of digital competencies from the original framework was carefully assessed to ensure relevance for accounting graduates in Malaysia.

Simple language was used throughout the questionnaires to ensure that the questions were practical and easy for respondents to understand, particularly for those not specialised in Accounting Information Systems (AIS). This approach enables respondents to answer in a timely and accurate manner. All items underwent validation by several accounting industry experts to ensure their alignment with Malaysian education and the working environment. These validation processes are discussed further in Section 5.3.2.2, *Expert Interviews for Questionnaire Validation* and Section 5.3.2.3, *Pilot study.* Specific measurement details for each competency are outlined below.

(1) *Information System*

Competence in Information system refers to the ability to use an accounting information system to support operational and financial processes in a digital environment (IMA, 2019). This competency is measured by using six items adapted from CGMA (2019), IMA (2019), and ACCA (2021) competency frameworks. For example, the first item, *"search for data, information, and content in digital environments,"* was adapted from CGMA Competency

Framework 2019. This ability is included because it is a fundamental skill necessary for accountants, to effectively navigate information system or technology.

(2) *Data Visualisation*

Competence in data visualisation refers to the ability to visually present data in order to explain key patterns, trends, and correlations to support decision making (IMA, 2019). Data visualisation was measured using five specific items, which were drawn from the IMA (2019) and CGMA (2019) competency frameworks to construct the data visualisation competency. Four items were adapted from the IMA Management Accounting Competency Framework under the data visualisation category. One item (item d) *"apply some basic design (e.g., colour, simple font) to develop an interactive summary of information,"* was sourced from the CGMA Competency Framework 2019.

(3) *Data Analytics*

Competence in data analytics refers to the ability to extract, transform, and analyse data to find trends and draw conclusions about the information contained (IMA, 2019; Qasim & Kharbat, 2020). This category was measured using five items derived from the IMA Management Accounting Competency Framework. Examples of the items include *"create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT)"* and *"perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel)."*

(4) *Data Governance*

Competence in data governance involves the ability to ensure the availability, integrity, and security of data. This competency was measured by five items adapted from the basic and applied knowledge levels of data governance skills in the IMA Management Accounting Competency Framework 2019.

(5) *Communication*

Competence in communication refers to the ability to convey thoughts, ideas, and information in various forms of communication, including written and spoken, using technology (IMA, 2019). This competency was adapted from the MIA (2020), IMA (2019), and ACCA (2021) competency frameworks. Accounting professional frameworks typically offer general guidance on communication skills without specific references to digital technology. Therefore, the wordings of the statements were modified for a digital context.

For example, the original MIA framework highlighted the ability to *“communicate clearly and concisely when presenting, discussing, and reporting in formal and informal situations.”* This statement was crafted into two specific items in the questionnaire: Item d, *“use appropriate modes (e.g., email, digital financial reports) for formal communication in a digital environment,”* and item e, *“use appropriate modes (e.g., web chat, social media platforms) for informal communication in a digital environment.”*

(6) *Problem-Solving*

This competency involves the ability to identify problems, gather information, develop, and implement solutions in the digital environment. Due to the limitation of the problem-solving competency framework that relates to digital technology, problem-solving skills were drawn from various sources, including the MIA (2020), ACCA (2021), AICPA (2018) competency frameworks, and prior study by Jackson et al. (2020). Some of the items were reworded for clarity and alignment with the terminology and context of digital technologies.

(7) *Critical Thinking*

Critical thinking involves purposeful and reflective judgement, generally aimed at making informed decisions (Terblanche & De Clercq, 2021). It encompasses cognitive skills such as the ability to interpret, analyse, evaluate, infer, and explain information from various sources, including financial reports, business trends, and digital data. In addition to cognitive skills, critical thinking also involves certain dispositions such as being inquisitive, self-confident, open-minded, ethical, orderly, intrinsically motivated, and having a positive attitude. Five items measuring critical thinking were adapted from Terblanche and De Clercq (2021), MIA (2020), and the SAICA (2019) competency framework. Similar to problem-solving, some of the items were reworded to align with the terminology and context of digital technologies.

(8) *Creativity*

Competence in creativity involves actively applying existing knowledge to new or challenging situations, establishing connections, exploring potential outcomes, and generating new ideas (ACCA, 2021). Recognising its significance in the evolving digital landscape, the ACCA has identified creativity as an essential competency for the accounting profession. Accordingly, this study includes creativity as a core component of the digital competencies expected of accounting graduates. While available measures of creativity are generally limited within the accounting field, the ACCA’s creative quotient serves as the foundation for developing relevant items. To ensure applicability to digital environments, the general creative quotient measures were adapted and modified to incorporate digital usage, aligning closely with ACCA's (2021) definitions and the unique demands of the accounting field.

(b) Software Proficiency Scale

This section presents a list of accounting systems and digital tools commonly used in the industry. The list of digital tools was drawn from Brink and Stoel (2019)'s study. The list was then certified by several accounting industry experts during interviews (discussed in the next section) to ensure relevance with the Malaysian working environment. The categories of tools include: (a) accounting software, (b) computer-assisted auditing tools, (c) advanced Excel features, (d) database software, (e) visualisation tools, (f) data infrastructure, (g) programming tools, and (h) statistical tools. Each category contains three specific types of software, along with an open-ended option for "Other (please specify)." This section was included only in Section B of the employer questionnaire to gather insights on current accounting technology usage and the expected proficiency required by employers. Employers were asked to indicate the required level of proficiency for each software on a scale from 1 (Novice) to 5 (Expert), with additional options for 0 (None Required) and 6 (Don't Know).

(c) Constraining Factors Scale for Developing Digital Competencies in Accounting Education

This section is specifically designed to gather educators' insights on factors that hinder the development of digital competencies in accounting education. Educators were presented with eleven statements reflecting potential constraints and asked to indicate their agreement on a Likert scale (1 = Strongly agree to 5 = Strongly disagree). To capture additional insights, an open-ended question allowed educators to identify other challenges they believe may impede the development of digital competencies among accounting graduates at the university level. The statements were primarily adapted from Kotb et al. (2019) with slight modifications to enhance relevance. In addition, the study added five new statements to the measurement, such as "*Lack of technological literacy among accounting academics*", *"Academics reluctant to change with the technology evolution", "Lack of infrastructures (e.g., internet accessibility, computer laboratory)," "Student's lack of IT knowledge,"* and *"Student's lack of confidence in using technology."* These additions were based on a literature review and expert suggestions during the interview sessions. This section was included only in Section B of the educator questionnaire to assess the barriers to developing digital competencies in accounting education at Malaysian universities.

(d) Demographic Information

The final section of the questionnaires for educators, employers, and accounting graduates was specifically designed to gather general demographic information from the respondents. This section aims to obtain details about the respondents' demographic backgrounds and assess whether their backgrounds influence their perceptions of the digital competencies of accounting graduates. Each respondent was asked about their gender, age, ethnicity, and other relevant details. Additional questions such as academic position, years of teaching experience, the primary accounting subject taught, use of technology in teaching, and the specific technologies or applications employed were included to ensure the questionnaire was relevant to the educator sample. Employers were asked to specify their organisation type, position or title in the organisation, specialisation, years of professional experience, and the primary accounting software used in their organisation. Graduates, on the other hand, were asked to indicate their highest level of education, the type of university from which they graduated, their current employment status, their main area of work, and the length of years they have been working since graduation.

(e) Open-ended Question

An open-ended question asking for additional comments was included at the end of the questionnaire, providing respondents with an opportunity to share further insights on digital competencies.

5.3.2.2 Expert Interviews for Questionnaire Validation

As discussed earlier, questionnaire items were carefully selected and refined based on established accounting professional bodies' frameworks and existing literature. The measurement items for digital competencies (Section A), the list of accounting software usage (Section B, Employers), and the list of constraining factors that impede the development of graduates' digital competencies (Section B, Educators), were validated by accounting experts through individual interviews. To ensure clarity and alignment with the Malaysian accounting context, the wording across each item was adjusted based on expert recommendations and preliminary feedback.

This study initially planned to conduct focus groups[25] to gather expert views, feedback, and recommendations on the questionnaire items. However, due to differences in the experts' schedules and challenges in finding a mutually convenient time, conducting focus

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[25] Focus groups are a particular form of group interview or discussion among selected individuals about a particular topic (Freeman, 2006; Morgan, 2012).

groups proved to be difficult. As a result, the study shifted to individual interviews to ensure that each expert's insights could still be gathered effectively. These interviews provided similar advantages, allowing for a more in-depth exploration of individual perspectives (Creswell & Poth, 2018; MacNaghten & Myers, 2004; Morgan, 2012). Individual interviews also minimise social desirability bias, which occurs when participants alter their responses to align with perceived group views (Krumpal, 2013).

The process began by defining and selecting expert panellists from three key groups: professional bodies, employers, and academics, to reflect a comprehensive range of perspectives relevant to the Malaysian accounting context. Panellists were selected based on their specialised knowledge, experience, and roles in the accounting field that related to this study. In April 2022, email invitations were sent to 11 potential experts, requesting their agreement to participate. In total, six experts agreed to be interviewed: two professionals from accounting bodies, one employer, and three educators. Table 5.1 provides a detailed list of the selected expert panellists.

Table 5.1 *List of Expert Panellists*

Group	Area of Expertise	Backgrounds	No. of Experts
1. Professional Bodies	Financial Analysis, Budgeting, Accounting Operations, Accounting Digital Technology	• The Chief Executive Officer of Malaysian Institute of Certified Public Accountants (MICPA) • The Chairman of Malaysian Institute of Accountants (MIA) Digital Economy Task Force.	2
2. Employer	Audit & Financial Accounting	• A Director in a private organisation.	1
3. Educators	AIS & Financial Accounting	• Associate Professor from a large public university.	3

After obtaining ethics approval from the Massey Human Ethics Committee, the questionnaire was emailed to participants for preliminary review. Three weeks later, a follow-up email was sent to confirm participants' availability for an interview. Once availability was confirmed, each participant received a Zoom link for the interview session. The interviews started with open-ended questions to encourage participants to share their initial thoughts on the topic, followed by specific follow-up questions to gather detailed feedback on the questionnaire items. Each interview lasted for approximately 45 minutes. In addition to verbal insights, participants also provided written feedback on the questionnaire items. Key areas of experts' feedback included rephrasing questions for clarity, adjusting the number of items per category, ensuring alignment with the Malaysian educational and professional context, removing irrelevant items, sharing information related to the current software usage in Malaysia, and suggesting additional questions where relevant. In addition, the experts encouraged the inclusion of practical examples for each questionnaire item to help respondents provide more accurate answers. These examples were derived from accounting courses and curricula, particularly the AIS course, to ensure that respondents, especially accounting graduates, could better relate to them. A summary of the expert interview feedback is presented in Appendix 5.1.

As a token of appreciation for their valuable contributions, each expert received an appreciation letter from Massey Business School acknowledging their time and effort in providing feedback and refining the questionnaire.

5.3.2.3 Pilot Study

Based on the insights and feedback of experts gathered during the interviews, a revised second draft of the questionnaire was developed. This refined version was then tested through a pilot study. A pilot study involves the use of a small sample of participants to test the appropriateness and comprehension of the questionnaires. It is important to test the survey instrument to ensure that the questions are easily understood, unambiguous and can be completed within a reasonable timeframe (Sekaran & Bougie, 2016). The pilot study commenced in late August 2022 was aimed to:

(a) Assess the comprehensibility of the English language used in the survey instrument,
(b) Identify and rectify any ambiguities within the questionnaire,
(c) Detect and address potential issues that participants might encounter,
(d) Estimate the amount of time required to complete the survey, and
(e) Gather comments and suggestions from pilot study participants

A total of 17 participants including four accounting educators from different universities, five employers, and eight accounting graduates were invited to provide feedback to the respective versions designed for their respondent groups during the pilot study. The pilot study was the first stage where the questionnaire was tested using the Qualtrics platform, a widely used web-based survey tool for research and data collection. Participants received a direct link to the questionnaire, allowing easy access to the survey page. Additionally, a soft copy was sent via email to provide an alternative means of access. Participants provided both verbal and written feedback by emailing annotated copies of the questionnaire. Overall, pilot participants reported that the Qualtrics survey was accessible and easy to navigate. Most participants completed it in approximately 20 minutes.

The pilot study informed minor revisions to the wording and the respondent instructions. Some graduates indicated difficulty in understanding certain items in the main section (Section A) relating to the digital competencies of accounting graduates. Based on this feedback, several items in Section A were rephrased for clarity. A brief introduction was added to define and distinguish “expected (desired)” versus “acquired” competencies upon graduation, and instructions were tightened to guide respondents on how to answer when unsure. Educators recommended including brief descriptions under each digital competency. Concise definitions were therefore inserted under each competency heading to standardise interpretation across respondent groups. These revisions were incorporated into the final Qualtrics instrument used for the main data collection. The revised updated version was reviewed by the supervisory team and subsequently finalised for distribution. As a gesture of appreciation, each participant received a formal letter acknowledging their valuable contribution to the pilot study.

5.3.3 Data Collection for the Main Survey

This section describes the implementation of Qualtrics as the primary survey platform. It also outlines the multi-phase data collection process, which employed various sampling strategies to enhance response rates from the three key participant groups: educators, employers, and graduates.

5.3.3.1 Implementation of Qualtrics and Survey Design

As mentioned earlier, the survey was developed and administered using Qualtrics Survey Software. Three sets of finalised questionnaires were created in Qualtrics to ensure a structured approach to data collection. To enhance accessibility, each questionnaire was made available via both a survey link and a QR code, which were distributed to respondents through email. Respondents were able to answer and submit the survey by either clicking the provided link or scanning the QR code. Qualtrics questionnaires were designed to be user-friendly, allowing respondents to access and complete them using various devices, including mobile phones and computers.

Each questionnaire was accompanied by an information sheet explaining the purpose of the survey, assuring respondents of confidentiality, and stating that the research was conducted solely to fulfil the academic requirements. Respondents were informed of their right to withdraw at any stage without consequences. The e-mail addresses of both the researcher and the researcher’s academic supervisors were provided in case the respondents required any further information or clarifications. The initial page of each survey included a consent question before proceeding to the main questions. Each questionnaire was designed to take approximately 20 minutes to complete.

In terms of Qualtrics features and appearance, the online survey was designed to maintain a consistent look across all three samples. Answer options were presented as clickable buttons, allowing respondents to simply select their responses. Navigation through the survey instrument was made easy, by including navigation buttons ("Next" and "Back") at the bottom of each page, enabling participants to move forward or return to previous questions to review or modify their answers. The “Prevent Multiple Submissions” feature in Qualtrics was activated to restrict respondents from submitting more than once using the same browser or device. These precautions helped maintain the accuracy and reliability of the collected data. To ensure privacy and confidentiality, the Qualtrics survey did not require respondents to provide identifiable information unless they voluntarily chose to do so. Most questions were configured as non-forced responses, allowing participants to skip any question they were uncomfortable answering. Additionally, the option to provide an email address for follow-up interviews or to receive survey results was entirely voluntary, ensuring that personal information was only collected with participants’ consent.

Upon completion, respondents were directed to a final page displaying a note containing the following message: *“Thank You Very Much for Your Time and Participation*.” Copies of the Word-format questionnaire and information sheet for the three groups of respondents are included in Appendix 5.2, *Questionnaires*.

Prior to launching the main survey, the researcher obtained ethics approval from the Massey Human Ethics Committee to ensure compliance with ethical research guidelines (see Appendix 5.3, *Ethics Approval*). Once approval was granted, the researcher commenced data collection. The following sections provide detailed information on the data collection process of the main survey for each group.

5.3.3.2 Data Collection from Educators

The first group consisted of educators from Malaysian universities that offered accredited accounting programmes. This study focused on individual educators rather than faculty leadership, as they are directly responsible for curriculum design, teaching, and assessment (Lamberton et al., 2024).

As of the initial phase of data collection, Malaysia had approximately 20 public universities and 50 private universities (Ministry of Higher Education, 2022). The sampling frame comprised all universities located in the Klang Valley (Kuala Lumpur, Putrajaya, and Selangor) that offered accredited accounting programmes. These three regions contained the highest concentration of HEIs, with 33 universities offering accounting programmes at various levels, including diplomas, bachelor's degrees, and professional certificates (Malaysian Qualifications Register, 2022). Across two phases, all 33 public and private universities in these regions were invited. Universities, rather than other higher education providers, were chosen to preserve comparability. These universities have more established academic and administrative structures especially for curriculum development, assessment, and staffing. Restricting the frame to universities therefore reduced institutional variability and ensured greater comparability across responses.

Before selecting universities for data collection, the study determined the required sample size using Raosoft's sample size calculation method (http://www.raosoft.com/samplesize.html). This method estimates the minimum number of responses needed to ensure statistical reliability based on specified parameters (McCrum-Gardner, 2010). Since the exact population of accounting educators in universities across Kuala Lumpur, Putrajaya, and Selangor was unknown,[26] a standard population size of 20,000 was entered into the calculator, as this is commonly used when the actual population is uncertain. The confidence level was set at 95%, and the margin of error at 5%, with the response distribution kept at 50%, as recommended for general use when variability is unknown (Raosoft Inc., 2004). Based on these inputs, the Raosoft calculator estimated that a minimum of 377 responses was required.

Following this, data collection was conducted in two phases. In the first phase, purposive sampling was used to select the ten highest-ranked universities, five of which were from public universities and five from private universities. These universities were chosen based on their rankings as top public and private universities in Malaysia (EduAdvisor, 2022; Times Higher Education, 2022). Higher-ranked universities are typically more established, have a greater number of educators and graduates, offer full degree programmes, and maintain publicly accessible and well-developed websites, making them more suitable for data collection (Quacquarelli Symonds Limited, 2025; Sowter et al., 2017; Taylor et al., 2019). To initiate data collection, the deans of the Faculty of Business and Faculty of Accountancy were contacted via email in late December 2022 to seek official permission to collect data from educators. Six out of the ten universities responded positively and agreed to assist in distributing the questionnaire to their academic staff. As the deans of the four universities did not respond after a lapse of three weeks, the heads of the faculty were contacted instead. Three of these universities responded to the email, agreeing to assist and granting permission to distribute the questionnaire to their academic staff. In total, nine

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[26] The actual number of accounting educators cannot be accurately determined, as some participating universities did not provide the figures and their websites did not include educators' information.

universities participated in the first phase, comprising five public universities and four private universities. A total of 23 responses were received from educators.

Due to low participation rates, individual email invitations were initiated and sent directly to all educators from the nine universities,[27] inviting them to participate in the survey. The contact details of educators were obtained from the universities' websites directories. The list of universities' directories indicated that approximately 350 full-time accounting educators were teaching at these universities during the 2020/2021 academic year. As some educators might have participated earlier, the email included the following statement *"Please ignore this if you have already participated in the survey. I would like to express my appreciation for your time and contribution to my research."* The first reminders were sent two months following the e-mailing of the survey to the educators, followed by a second reminder one month later. Reminders are among the most efficient individual strategies for increasing response rate especially in web-based surveys (Becker, 2023; Roose et al., 2007; Sahlqvist et al., 2011). As a result of these efforts, another 21 responses were received. Due to the initial low number of responses, the second phase of questionnaire distribution was initiated.

The second phase began in early June 2023 by extending data collection to all remaining 23 universities in Kuala Lumpur, Putrajaya, and Selangor, irrespective of their ranking. The same data collection process was followed; obtaining permission from deans and heads of faculty, sending individual email invitations, and issuing reminders. The questionnaire was distributed to accounting educators whose contact information was publicly available on the websites of universities. This approach aimed to maximise coverage and strengthen the generalisability of findings. The data collection process for the second phase lasted approximately two months. By the end of August 2023, the overall data collection process across both phases spanned eight months, resulting in 119 responses from accounting educators. Table 5.2 provides a detailed summary of questionnaire distribution and responses.

[27] No follow-up efforts were made with the tenth university that did not respond to the data collection request as educators' contact information was also unavailable on the website of this private university.

Table 5.2 *Summary of Questionnaire Distribution and Responses – Educators*

Phase	Distribution Method	Start Date	Distributed	Responses
First	Dean & Head of Faculty	End of Dec 2022	-	23
	Individual invitations	End of Feb 2023	344	21
Second	Dean & Head of Faculty	Early June 2023	-	10
	Individual invitations	Mid-June 2023	342	65
Total		Finalised Aug 2023	-	119

Note. The dash (-) indicates that the total number of questionnaires distributed is unknown, as dissemination was facilitated by the Dean and Head of Faculty without a record of the exact distribution count.

5.3.3.3 Data Collection from Employers

The second group consisted of employers responsible for hiring and compensating employees (Employment Act, 1955). Therefore, this study specifically targeted top management and senior management positions including partners, managers, and senior managers, as well as those involved in the recruitment process for accounting graduates. These individuals are best positioned to assess the digital competencies of accounting graduates they have hired.

Employers were initially selected from the 2022 MIA Member Firms Directory (Online). As of 2022, MIA had approximately 37,500 members and by 2024 it had increased to 40,142 (MIA, 2022, 2024). Their members work across four primary sectors in Malaysia, including commerce and industry, public practice, public sector, and academia (MIA, 2024). Across Malaysia there were 2,306 registered member firms, of which about 1,447 (63%) were located in Kuala Lumpur, Putrajaya, and Selangor. As discussed earlier in Chapter Two, *The Malaysian Context*, these three regions serve as the hubs for commerce and industrial activities. In light of this concentration, the employer sample focused on public practice member firms in these regions to reach the largest pool of eligible employers and maximise the number of participants**.** In this study, public practice includes both audit and non-audit MIA member firms.

Following the same approach as for educators, the employer sample size was calculated with the Raosoft calculator using a known population of 1,447 firms. Based on this, the calculator confirmed that a minimum of 304 responses was required. Prior studies indicate that surveys among accounting employers in Malaysia typically achieve a low response rate ranging from 20% to 30% (Amirul et al., 2017; Norman et al., 2018). As a result, a total of 1,216 questionnaires (i.e., 304/25%) were needed for distribution amongst the employers. To account for potentially low response rates, all 1,447 MIA member firms in the three regions were selected for the survey.

The data collection process from the employers began with formal communication to the MIA on 24 November 2022, requesting their assistance in distributing the survey to member firms in Kuala Lumpur, Putrajaya, and Selangor. However, the MIA representative indicated their inability to assist in the dissemination of the survey. Nevertheless, they granted permission to use the Member Firms Directory on their website to access the list of registered firms. This directory provided information on audit and non-audit firms covering a variety of details, including firm name, firm registration number, addresses, telephone, e-mail, website addresses, and details of managing partners. In December 2022, all 1,447 employers were then contacted through email, inviting them to participate in the survey. The first reminder was sent two months after the initial invitation, followed by a second reminder one month later, and a third reminder one month after the second. By May 2023, a total of 30 responses had been received from participating employers.

Due to the poor response rate, a second phase of data collection was initiated by expanding the employers' population to include public and private organisations in the same regions (Kuala Lumpur, Putrajaya, and Selangor). Various communication channels, including phone calls, emails, and social media platforms (e.g., LinkedIn and Facebook) were employed to contact employers. Employer contact details were obtained from multiple sources, including job advertisements on Facebook, organisations' websites (e.g., universities' bursary departments, government agencies, and the banking sector) and LinkedIn connections. Through this process, contact information for 315 employers in top management positions, such as Chief Executive Officers, Chief Financial Officers, managers, and heads of department was obtained. The questionnaire distribution in the second phase followed a similar approach to the first phase involving initial invitations followed by reminders. By the end of both phases, a total of 1,762 questionnaires were distributed. Data collection from employers was finalised in August 2023, with a final response count of 125 employers. Table 5.3 provides a summary of the questionnaire distribution, and the associated responses received.

Table 5.3 *Summary of Questionnaire Distribution and Responses – Employers*

Phase	Distribution Method	Start Date	Distributed	Responses
First	MIA member firms	End of Dec 2022	1,447	30
Second	Public & Private Organisations	Early June 2023	315	95
Total		Finalised Aug 2023	1,762	125

5.3.3.4 Data Collection from Graduates

The third group comprised accounting graduates who had recently completed their degrees, diplomas, or professional certificates and had up to five years of work experience in an accounting-related role. These individuals are referred to as early-career accountants in the same way as Jackson et al. (2023) since their study aligns with this research with the focus on graduates' reflections on their digital competencies upon graduation. All graduate respondents were instructed to report their expectation and competence levels at the time of graduation rather than at the time of the survey, to provide a consistent reference point.

To determine the graduate sample size, the same Raosoft calculation method was applied, assuming a large or infinite population. Based on this, a minimum of 377 responses was required to achieve a 95% confidence level with a 5% margin of error (McCrum-Gardner, 2010; Raosoft, 2004).

Accounting graduates were initially recruited from the same firms targeted in the employer sample. As mentioned previously, this study concentrated on employers from public practice, encompassing both audit and non-audit MIA member firms, located in Kuala Lumpur, Putrajaya, and Selangor. When sending out the survey invitations to employers, the researcher requested their assistance in distributing the questionnaire to their employees within the organisation. The invitation emails sent to the employers also included a link to a separate survey for their employees. Employees were asked to reflect on their competencies upon graduation. There were 1,447 questionnaires distributed via employers, but only five graduates responded. To enhance participation, reminders were sent to employers, encouraging them to share the survey with their employees. This process mirrored the reminder strategy implemented for the employer survey. However, the response rate remained low, possibly due to employees being busy at work, employers not forwarding the link to their employees, or some targeted firms not having recently hired accounting graduates.

The second phase of data collection among accounting graduates continued by utilising the researcher’s alumni status at one of the largest public universities in Selangor. The researcher contacted the university’s Alumni Department and formally requested their assistance in disseminating the questionnaire to the accounting graduates. This request was initiated in December 2022. Instead of assisting with distributing the questionnaire, they provided alumnus details with permission to email the questionnaire directly. However, owing to confidentiality concerns, only names and email addresses were shared. Based on the information received from the alumni department, a total of 1,659 accounting graduates who graduated with bachelor's degrees between 2019 and 2021 were contacted via email. The link to the questionnaires was sent to the accounting graduates at the end of February 2023. This initiative resulted in 43 responses.

To further increase participation, a snowball sampling method was employed. Snowball sampling is a technique in which existing respondents direct the researcher towards others who meet the study's criteria (Biernacki & Waldorf, 1981). In this study, the researcher identified and contacted other individuals such as the initial respondents, accounting lecturers, and employees working in the audit and accounting field in Kuala Lumpur, Putrajaya, and Selangor requesting their help in sharing the survey with others. After receiving their consent, the researcher provided them with the link to the survey and requested them to share it with individuals they knew who met the study criteria in these three regions. During this stage, although the sample included some graduates with more than five years' experience, the same instruction to answer retrospectively upon graduation was emphasised. As a result of these methods, a total of 230 responses had been collected by the time the survey concluded in August 2023. Table 5.4 provides a summary of the questionnaire distribution and response details.

Table 5.4 *Summary of Questionnaire Distribution and Responses – Graduates*

Phase	Distribution Method	Start Date	Distributed	Responses
First	Via employers	End of Dec 2022	1,447	5
Second	Alumnus members	End of Feb 2023	1,659	43
	Snowball sampling	Early May 2023	-	182
Total		Finalised Aug 2023	-	230

Note. The dash (-) indicates that the total number of questionnaires distributed is unknown because the snowball sampling method was used for dissemination.

This study used non-probability sampling (purposive and snowball). Therefore, the findings are descriptive of the participating educators, employers, and graduates and are not statistically generalisable to the entire population.

5.4 Data Preparation and Preliminary Analysis

A total of 474 responses were received by the conclusion of the survey in August 2023, comprising fully completed, partially completed, and consent-only responses. These included 119 from educators, 125 from employers, and 230 from graduates. Before proceeding with the analysis, the data underwent a preparation phase to ensure its quality and integrity through several essential processes. These processes included initial data screening and cleaning to identify and address missing values, data coding and input verification to ensure accuracy in data entry, and an examination of data distribution to assess normality and identify any potential outliers. The following subsections provide a detailed overview of each phase in the data preparation process.

5.4.1 Initial Data Screening and Cleaning

As a first step, the responses collected through Qualtrics were exported to Microsoft Excel for preliminary examination and data cleaning. This step was essential to ensure the accuracy of the quantitative data. Data cleaning helps meet statistical assumptions for analytic techniques and is particularly important to reduce the impact of any errors made during data collection or imputation (Field, 2015). A thorough examination of missing values was conducted to reduce potential bias (Field, 2015; Raghunathan, 2004). There are several categories of missing values including missing completely at random, missing not at random, and missing at random, with each requiring different handling techniques. Previous studies recommended various methods including the listwise deletion method (i.e., also known as case deletion) (Gilley & Leone, 1991; Pigott, 2001), pairwise deletion (Bennett, 2001; Roth, 1994), mean substitute (Field, 2015; Kang, 2013), and regression imputation (Hughes et al., 2019) to deal with missing data issue.

Incomplete responses or missing values were carefully examined to maintain data integrity. Entries that contained only consent without any further engagement were considered invalid and removed from the dataset. Similarly, responses with minimal engagement, such as answering only a few questions, were excluded to maintain data reliability. The mean substitution was utilised for items classified as missing at random (i.e., where respondents completed the primary sections but left one or two items unanswered). The mean substitute approach involves replacing missing values with the average of the available responses for each item, ensuring data remains useful without introducing any significant bias. However, if missing data could not be addressed through mean substitution, those responses were excluded.

Some missing responses resulted from respondents skipping questions due to survey length. If respondents completed the main section (Section A) but skipped the demographic section, their responses were retained, as they still provided sufficient data for key analyses.

Responses labelled *"Not Applicable"* or *"Don't Know"* were limited in number within the overall dataset and were therefore treated as missing values. In line with common practice, *"Don't Know"* responses are treated as missing data and excluded from analysis (Denman et al., 2018; Waters et al., 2013). Excluding these responses helped prevent distortions in mean variation, hence maintaining data consistency. In cases where respondents provided partial responses within Section A, the decision was made to retain these responses if respondents had fully completed all items in at least one digital competency area. This decision was carefully considered in consultation with a statistician to avoid reducing the number of usable samples.

As a result of missing data including *“Not Applicable”* and *“Don’t Know”* responses, the number of valid responses varied across digital competency categories (see Appendix 5.4, *Missing Values*). The overall missing data rate remained below 10%, based on the case processing summary for combined groups.[28] When 10% or less of data points are missing in the dataset, the issue of missing data is less critical, and most mitigation procedures are likely to produce similar results (Hair et al., 2009, 2019; Mirzaei et al., 2022).

To ensure accuracy before analysis, all data were reviewed and cross-checked. The raw data exported from Qualtrics was compared against the Excel dataset to verify consistency before final processing in SPSS. This verification step was critical in maintaining data integrity throughout the analytical process.

5.4.2 Data Coding and Input Verification

As the second step in data preparation and preliminary analysis, data coding and verification ensured accuracy and consistency before statistical analysis. After importing the data from Microsoft Excel into SPSS, a thorough check was conducted to ensure no values were missing due to formatting or transposition errors. During this stage, each variable was carefully assigned a specific name and descriptive labels to ensure clarity and consistency in the data analysis process. For example, the level of digital competencies of the information system category was labelled with IS_Exp (expected level) and IS_Acq (acquired level). The response scale was coded as follows: Very low level = 1, Low level = 2, Average level = 3, High level = 4, and Very high level = 5. Responses marked as *"Not Applicable"* and *"Don’t Know"* were treated as missing values and coded as numeric placeholders (996 and 997, respectively).

The dataset was further reviewed to confirm that the imported data from Qualtrics and Microsoft Excel aligned with the structure in SPSS. This verification process was vital to maintain data integrity and consistency before commencing any statistical analysis.

5.4.3 Examining Data Distributions

The dataset was examined for patterns in distribution, particularly in identifying outliers and extreme values. Outliers and extreme cases were filtered out using SPSS’s histogram and boxplot features. This measure was taken to prevent any potential bias in the results, as

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[28] Educators, employers, and graduates were considered together for analysis. This study applied ANOVA and t-tests, which are discussed in the next section.

recommended by Field (2015). Outliers were identified by their deviation from the main data distribution, as they represent scores which significantly differ from the rest of the data, potentially skewing parameter estimates, such as the mean (Field, 2015). Once identified, these outliers and extreme values were removed to enhance the accuracy of the analysis. In addition, response patterns were analysed to detect straightlining behaviour. Straightlining behaviour refers to the tendency of respondents to select the same response option for all items in a grid, resulting in a uniform pattern of answers in a vertical line. This behaviour led to poor data quality (Zhang & Conrad, 2014) and introduced extreme values that could distort the results (Field, 2015). Therefore, respondents who consistently provided the same rating across all items, i.e., depicted straightlining behaviour, such as selecting all *"Strongly Agree"* or all *"Don't Know"* for every question, were excluded from further analysis. A total of 15 outliers and extreme cases were removed, including five educators, five employers, and five graduates.

5.4.4 Usable Responses and Survey Challenges

After all of the data preparation and preliminary analysis, the final usable samples for further statistical analyses comprised 71 educators, 66 employers, and 132 accounting graduates. Table 5.5 presents detailed counts.

Table 5.5 *Summary of Usable Responses*

Category	Educators	Employers	Graduates
Total data collection	119	125	230
Incomplete responses[a]	(43)	(54)	(93)
Outliers and extreme cases[b]	(5)	(5)	(5)
Total for further analyses	71	66	132

Note. [a]Includes cases where respondents only answered the consent question and provided no further input. [b]Refers to responses identified as statistical outliers or containing extreme values that could skew the analysis.

The final sample sizes varied across groups. Among educators, the number of usable responses may have been influenced by time constraints and the technical nature of certain questions, especially those that relate to AIS. Similar challenges in survey participation have been observed in previous studies (Lim et al., 2016; Winstead & Weger, 2015). For employers, the lower number of usable responses aligns with previous studies highlighting challenges in obtaining survey participation from businesses (Amirul et al., 2017; Lim et al., 2016; Lim et al., 2019; Ngoo et al., 2015; Norman et al., 2018), which can be attributed to employers' time constraints.

Despite the moderate sample sizes within each group, previous research suggests that a minimum sample size of 30 and less than 500 is appropriate for most social science studies. For comparative analyses involving multiple subgroups, a minimum of 30 participants per group is generally acceptable for statistical analyses (Kwak & Kim, 2017; Memon et al., 2020; Roscoe, 1975; Sekaran & Bougie, 2016). Given that this study involves subgroup comparisons, the sample size meets these established guidelines, supporting the validity of the statistical analyses.

5.5 Further Statistical Analyses

A range of statistical analyses was conducted to enhance understanding of the data and to address the research questions. The study conducted a test of normality for residual, validity and reliability, Analysis of Variance (ANOVA) and t-tests using SPSS software.

To assess the normality of score distribution for all three groups, skewness and kurtosis values were computed based on the residual values. Values lying near to 0 indicate normality. A positive skewness value suggests a concentration of low scores, whereas a negative value indicates a build-up of high scores. For kurtosis, a positive value suggests a pointed and heavy-tailed distribution, whereas a negative value indicates a flatter and light-tailed distribution. The results confirmed that the Acquired Level data followed a normal distribution, while the Expected Level data exhibited deviations in some of the competencies, particularly in skewness and kurtosis values (see Appendix 5.5, *Normality on Residual).* These deviations in the Expected Level data are consistent with the nature of human expectations. Due to an inherent optimism bias, humans are naturally inclined to overestimate what should be achieved, which may explain why respondents rated the expected competencies higher than the actual acquired competencies (Dricu et al., 2020; Sharot, 2011). Despite these deviations, the sample size (n > 30 per group) was sufficient for the use of parametric tests (ANOVA, t-tests) based on the Central Limit Theorem (Field, 2015; Kwak & Kim, 2017).

To assess internal consistency, Cronbach's alpha (α) was calculated for each of the eight digital competencies categories. The interpretation of reliability followed the classification criteria proposed by George and Mallery (2019), where a value below .50 is considered poor, .60 to .69 is questionable, .70 to .79 is acceptable, .80 to .89 is good, and .90 and above is excellent. The results of this reliability test are discussed in detail in Chapter Six, *Findings and Discussion on Expectation and Performance.*

Descriptive statistics, including frequencies, means, and standard deviations, were computed to assess accounting graduates' digital competencies, both the expected level and the perceived acquired level. Cross tabulations were also performed on demographic information, including technology usage, type of software, accounting software across organisational size, and other relevant variables. Additionally, these descriptive statistics were computed for constraining factors (for educators) and accounting software proficiency (for employers).

To identify significant differences across demographic groups, a one-way ANOVA was conducted to analyse differences in the level of digital competencies desired and acquired scores across educators' demographic subgroups categorised by type of university, years of teaching experience, and academic positions. T-tests were employed for technology usage. For employers, demographic subgroups were categorised by employers' position, organisation types, organisation size, and years of work experience. Accounting graduates were categorised based on their level of education, type of organisation, position in the organisation, employment status, and years of work experience. These analyses aimed to identify significant differences across the subgroups based on their demographic characteristics. The results are discussed in detail in Chapter Six, *Findings and Discussion on Expectation and Performance.*

To further investigate the expectation gap, performance gap, constraints gap, and expectation-performance gap, independent samples ANOVA and t-tests were conducted to examine significant differences. ANOVA was applied to compare differences between groups, reducing the risk of Type I errors (Field, 2015). Post-hoc analyses were performed to examine specific pairwise group differences, while t-tests were used for within-group comparisons. Analyses decisions, including which specific tests to apply, were finalised following consultation with Massey University's statistical consultancy service. This consultation, facilitated by a senior lecturer in Statistics and attended by the research supervisor, ensured the robustness of the selected analyses. All findings for gaps are presented in Chapter Seven, *Findings and Discussion on Gaps.*

5.6 Summary of the Chapter

This chapter outlined the research methodology employed in the study, which adopted a quantitative approach within the positivist paradigm. This perspective views the social world as an objective reality that can be measured and quantified. The study population included educators from both public and private universities, employers, and accounting graduates across various sectors in the Selangor, Kuala Lumpur, and Putrajaya regions. The chapter also detailed the development of the questionnaire for the three stakeholder groups. The questionnaire comprised several sections: three sections for educators and employers and two sections for graduates. The first section assessed the level of expected digital competencies and the level of acquired digital competencies of graduates (Section A: Level of Digital Competencies). For educators, a section was dedicated to elicit their views on constraining factors that impede the development of graduates' digital competencies (Section B: Constraining Factors). For employers, a section was dedicated for them to assess accounting software proficiency (Section B: Accounting Software Proficiency). The last section is on demographic information for all groups (Section C: General Information for educators and employers, Section B: General Information for graduates). The data collection spanned approximately eight months for educators and eight to nine months for employers and graduates. This chapter further describes the data collection procedures, including expert interviews and a pilot study conducted to validate the questionnaire. The collected quantitative data were analysed using SPSS, employing statistical techniques such as descriptive statistics, cross tabulation, ANOVA, and t-tests. The detailed results of these analyses are discussed in the following chapter, Chapter Six, *Findings and Discussion on Expectation and Performance* and Chapter Seven, *Findings and Discussion on Gaps.*

Chapter Six: Findings and Discussion on Expectation and Performance

6.1 Overview

This study examines the level of digital competencies expected of accounting graduates and the competencies they have acquired, as perceived by three groups of respondents: educators, employers, and accounting graduates. Section 6.2 focuses on educators, Section 6.3 on employers, and Section 6.4 on accounting graduates. Each section provides demographic information and explores the expected and acquired levels of digital competencies. ANOVA and t-tests were conducted to determine whether there were significant differences in expected and acquired digital competencies across different demographic subgroups. Additionally, the employers' section extends the discussion on their perceptions of accounting software proficiency levels. The chapter concludes with Section 6.5, which summarises the key findings.

6.2 Educators' Perception of Graduates' Digital Competencies

This section begins with an overview of educators' demographic information, including gender, ethnicity, level of education, and other relevant characteristics. It also examines the technology usage within accounting subjects, presented through cross tabulation. Additionally, a bar chart visualises the types of software applications educators use across different accounting subjects. The section then explores educators' perceptions of accounting graduates' digital competencies, presented in two parts: expected and acquired competencies. Following this, the section explores how these digital competencies vary across different demographic groups.

6.2.1 Demographic Information

Out of the seventy-one respondents, five did not provide any demographic information, and another respondent did not indicate their ethnicity. As shown in Table 6.1, the majority of the participating educators (84.9%) were female, while 13.6% were male, and 1.5% preferred not to mention their gender. This finding is not surprising as it aligns with national statistics showing that females have consistently outnumbered males in universities and the academic workforce in Malaysia (Azman, 2013; Department of Statistics Malaysia [DOSM], 2024b; Muzafar & Hamid, 2024; Wan, 2018).

Table 6.1 *Demographic of Educators*

Variable	Category	*N*	%
Gender	Male	9	13.6
	Female	56	84.9
	Prefer not to mention	1	1.5
	Total	66	100.0
Age	Under 30 years	1	1.5
	30 to below 40 years	22	33.3
	40 to below 50 years	30	45.5
	50 to below 60 years	12	18.2
	60 years and above	1	1.5
	Total	66	100.0
Ethnicity	Malay	58	89.2
	Non-Malay	7	10.8
	Total	65	100.0
Level of Education	Bachelor's Degree	1	1.5
	Master's Degree	37	56.1
	Doctor of Philosophy	27	40.9
	Professional Certificate	1	1.5
	Total	66	100.0
Type of university	Public university	41	62.1
	Private university	25	37.9
	Total	66	100.0
Academic Position	Lecturer	20	30.3
	Senior Lecturer	35	53.0
	Associate Professor	10	15.2
	Professor	1	1.5
	Total	66	100.0
Years of teaching Experience	1 to less than 10 years	15	22.7
	10 to less than 20 years	26	39.4
	20 years and above	25	37.9
	Total	66	100.0
Employment status	Full time	63	95.5
	Part-time	3	4.5
	Total	66	100.0
Main Accounting Subject[a]	Financial Accounting	34	31.2
	Management Accounting	25	22.9
	Taxation	12	11.0
	Auditing	13	11.9
	Accounting Information systems	11	10.1
	Other	14	12.8
	Total	109	100.0

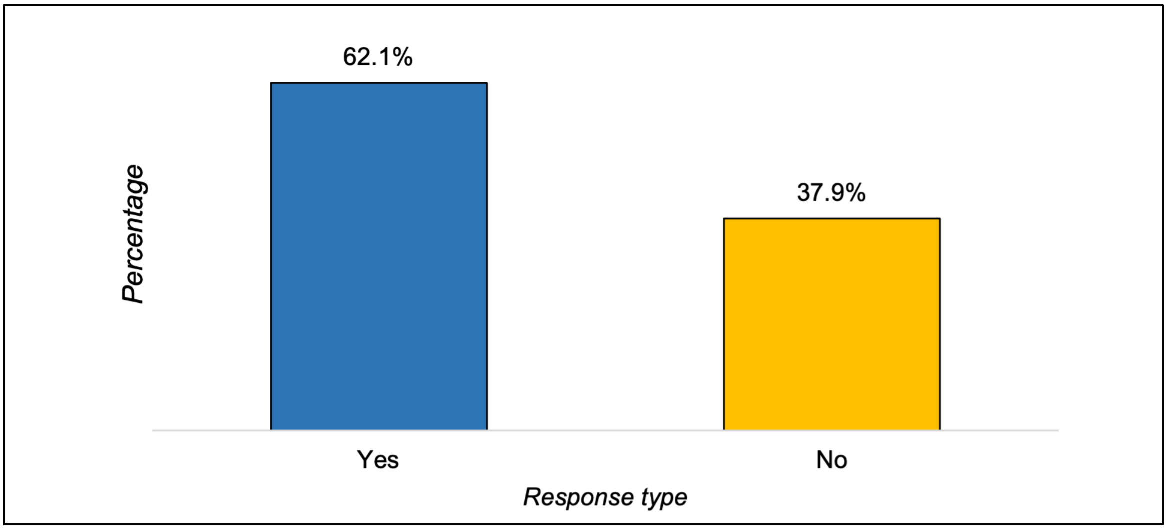
Note. [a] Multiple response item.

Most of the educators were aged between 40 and 50 (45.5%), followed by 30 to 40 (33.3%). About 89.2% of the educator respondents were Malays, with the remaining 10.8% being non-Malays. This demographic dominance aligns with the broader population distribution, as discussed in Chapter Two. Previous studies (Ali, 2016; Lee, 2012; Nasir et al., 2021) have also reported that the Malay community holds significant influence and representation in various sectors, including education. A higher proportion of the educators held a master's degree (56.1%) or PhD degrees (40.9%). Most educators (62.1%) were from public universities, while 37.9% were from private universities. Approximately 53% of educators were senior lecturers, 30.3% lecturers, 15.2% associate professors, and 1.5% professors. The majority of respondents (77.3%) had at least 10 years of teaching experience, placing them in a strong position to assess students' digital competencies. The vast majority (95.5%) were full-time employees. These demographics suggest that educators are well positioned to provide valuable insights into graduates' digital competencies.

The educators taught a variety of subjects, with many covering multiple areas. About 54.1% of educators were involved in core subjects like Financial and Management Accounting, while others specialised in Auditing (11.9%), Accounting Information Systems (AIS) (10.1%), Taxation (11.0%), and other areas such as Forensic Accounting, Strategic Management, Economics, Public Sector Accounting, Finance, E-commerce, Ethics and Governance (12.8%). This diversity in teaching responsibilities reflects the broad expertise among educators, which may contribute to a better understanding of their expectations of graduates' digital competencies.

The study also examined educators' use of technology in teaching. Respondents were asked about their use of accounting-related software. As shown in Figure 6.1, 62.1% of educators reported using technology, while 37.9% did not.

Figure 6.1 *Use of Technology*



Following this general overview of technology usage by educators, the use of accounting-related software in specific subjects was analysed. Table 6.2 illustrates this usage across different accounting subjects. Technology usage was most prevalent in the teaching of AIS (100.0%) and auditing (76.9%). This is expected, as AIS courses typically involve hands-on training with accounting software, and Auditing requires technology for efficient data analysis and anomaly detection. Similarly, a substantial proportion of Management Accounting educators (68.0%) employed technology due to the analytical nature of the subject, such as budgeting, forecasting, and performance analysis. In contrast, technology was used less frequently in Financial Accounting (52.9%) and Taxation (58.3%) compared to other subjects, although over half of the educators still incorporated it in their teaching. These variations in technology adoption may reflect educators' personal preferences, their familiarity with digital tools (Watty et al., 2016), and the perceived ease of use of the technology (Dangi & Saat, 2021; Man & Zainuddin, 2024).

Table 6.2 *Technology Usage Across Main Accounting Subjects*

	Technology Usage	
Main Accounting Subject	Yes % (*N*)	No % (*N*)
Financial Accounting	52.9% (18)	47.1% (16)
Management Accounting	68.0% (17)	32.0% (8)
Taxation	58.3% (7)	41.7% (5)
Auditing	76.9% (10)	23.1% (3)
Accounting Information Systems	100.0% (11)	0.0% (0)
Other	64.3% (9)	35.7% (5)

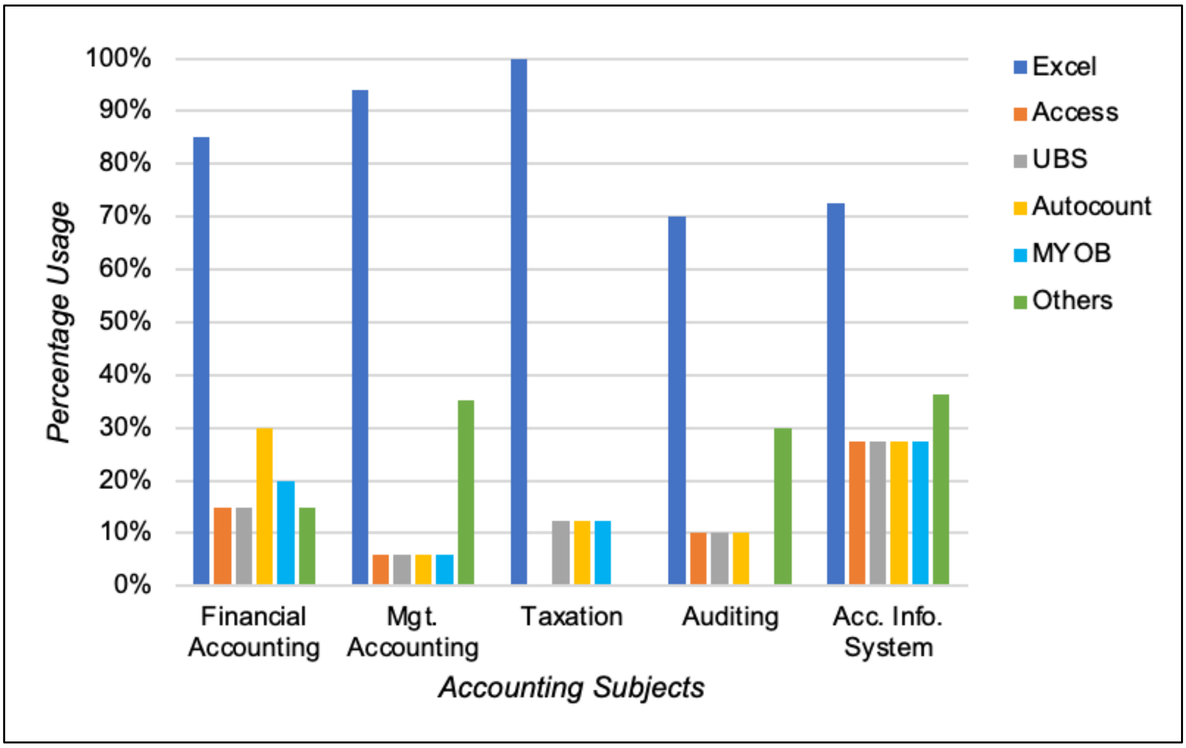
Table 6.3 provides a detailed breakdown of the specific applications used by the educators who incorporated technology in their teaching. Some educators used more than one application. Notably, nearly half of the educators (48.6%) reported using Microsoft Excel, followed by AutoCount (9.7%). Other notable applications include Microsoft Access, UBS Accounting Software, and MYOB which accounted for 8.3% each. Apart from these five applications, 16.7% of educators specified using other tools such as SAP, ERP Systems, SQL Accounting, Audit SME, University Learning Management System, HighBond ACL, and Microsoft Project.

Table 6.3 *List of Applications Used by Educators*

Applications	*N*	%
Microsoft Excel	35	48.6
AutoCount	7	9.7
Microsoft Access	6	8.3
UBS Accounting Software	6	8.3
MYOB	6	8.3
Others	12	16.7
Total	72	100.0

Building on this information, further analysis was conducted to understand the prevalence and distribution of software usage across different accounting subjects. Figure 6.2 shows that Excel is the dominant tool used across all main subjects, reflecting it as a common tool in accounting education. This finding is consistent with previous studies (Banasik & Jubb, 2021; Ghazali et al., 2022). However, the reliance on other software tools varies by subject. The AIS subject, for example, showed a wider range of software usage, indicating a broader scope of software applications required for this subject. In contrast, taxation relies more heavily on Excel, probably due to educators' preferences and the absence of specific curricular requirements for specialised software.

Figure 6.2 *Type of Software Usage Across Accounting Subjects*



In addition to the structured responses, six educators provided open-ended comments at the end of the demographic section. These insights offer additional context to the quantitative findings, allowing educators to share views not captured through fixed-response questions. Some of the specific remarks are incorporated into the discussion in Chapter Seven to further enrich the interpretation of the results.

6.2.2 Expected Digital Competencies

Educators were surveyed to assess their perceptions of the desired competence levels accounting graduates should attain upon completion of their accounting degree. This study grouped digital competencies into eight categories: (1) Information system, (2) Data visualisation, (3) Data analytics, (4) Data governance, (5) Communication, (6) Problem-solving, (7) Critical thinking, and (8) Creativity. The following five-point Likert scale with mean score ranges were used to interpret the results: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence: 4.50 to 5.00. This categorisation establishes clear boundaries, enhances interpretation, and avoids unwarranted assumptions about the means (Lindner & Lindner, 2024; Pornel & Saldana, 2013).[29]

Table 6.4 shows educators consistently rated the expected level of most competencies as high to very high levels. In information system, educators anticipated very high competence, particularly in critical areas such as searching for data in digital environments, working with the general ledger (GL) module, and understanding different data types. Within the data visualisation category, four of the five items were rated very high. For example, graduates' ability to create simple charts and graphs, along with applying basic design to develop interactive summaries, were highly desired competencies. This reflects educators' views that these skills are fundamental for the effective presentation of financial data. Data analytics showed a similar pattern, with very high expectations for basic tasks such as spreadsheet creation, data manipulation, and performing basic descriptive statistics to reveal trends using digital tools. In data governance, high expectations were placed on safeguarding information, indicating the importance of data security and privacy protection.

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[29] This categorisation was initially proposed by Pornel and Saldana (2013), with a similar scale interpretation later proposed by Lindner and Lindner (2024). The use of defined mean score ranges provides clear numerical boundaries for each level, ensuring precise and consistent interpretation of results. This approach also addresses the ambiguity of vague quantifiers, which may be interpreted differently by individuals (Dillman et al., 2014).

Table 6.4 *Descriptive Statistics of the Expected Level of Digital Competencies*

		M	*SD*
1.	**Information System**		
a.	Search for data, information, and content in digital environments.	4.69	0.57
b.	Understand different types of data (e.g., numeric, text).	4.54	0.77
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	4.69	0.52
d.	Understand accounting databases (e.g., customers', suppliers' information).	4.47	0.62
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	4.46	0.67
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	4.42	0.69
2.	**Data Visualisation**		
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	4.77	0.45
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	4.30	0.81
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	4.59	0.59
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	4.64	0.61
e.	Select the best presentation approach for the targeted audience.	4.56	0.77
3.	**Data Analytics**		
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	4.71	0.53
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	4.64	0.58
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	4.60	0.59
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	4.28	0.78
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	4.17	0.82
4.	**Data Governance**		
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	4.42	0.79
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	4.60	0.64
c.	Understand the need to protect the security and privacy of stakeholder data.	4.67	0.58
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	4.70	0.62
e.	Know how to communicate the potential data errors and weaknesses.	4.47	0.63
5.	**Communication**		
a.	Use a range of different digital communication methods (e.g., email, webinars).	4.78	0.44
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	4.61	0.66

c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	4.52	0.67
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	4.67	0.63
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	4.72	0.53
6.	**Problem-Solving**		
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	4.52	0.67
b.	Formulate an appropriate inquiry to diagnose the problem.	4.50	0.69
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	4.43	0.75
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	4.44	0.67
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	4.49	0.69
7.	**Critical Thinking**		
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	4.60	0.62
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	4.33	0.83
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	4.39	0.66
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	4.50	0.69
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	4.46	0.75
8.	**Creativity**		
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	4.57	0.77
b.	Apply existing knowledge innovatively to a new situation.	4.47	0.81
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	4.39	0.84
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	4.50	0.81
e.	Use technology creatively to explore potential outcomes for visualisation (e.g., reduce cost, increase profitability).	4.48	0.84

The highest expectations in communication competency highlighted the need for graduates to be adept in various digital communication methods, such as email and webinars. Educators expected graduates to be highly competent in problem-solving, particularly in retrieving relevant information using technology and formulating appropriate inquiries to diagnose problems. For the critical thinking category, educators emphasised the ability to analyse information using ratio analysis and digital tools to support decisions. They also highly valued the integration of ideas from various sources to solve problems. While other abilities such as performing computations were important, the focus on analysing and synthesising information was seen as the most crucial. Lastly, in the creativity category, educators emphasised the ability to use appropriate digital tools to creatively execute tasks.

Overall, the high to very high expectations across these categories indicate that educators believed accounting graduates should be well-equipped with strong digital competencies, particularly in fundamental areas. The expected high level of advanced and emerging technologies suggests that educators recognise their growing importance and expect graduates to be proficient in these areas as well.

6.2.3 Expected Competencies Ranking

Evaluating the reliability of these findings was crucial to establishing a ranking of the eight digital competencies. Cronbach's alpha was used to evaluate internal consistency as it is a measure used to assess the internal consistency or reliability of a set of items within a given construct (Sekaran & Bougie, 2016). As indicated in Table 6.5, the calculated Cronbach's alpha coefficients for all variables within this dataset exceeded .80, suggesting a reliable level of internal consistency, ranging from good to excellent, within each category (Field, 2015; George & Mallery, 2019).

Table 6.5 *Ranking of Expected Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach's α	*M*	*SD*	Rank
1. Communication	5	.926	4.66	0.52	1
2. Data Visualisation	5	.855	4.57	0.52	2
3. Data Governance	5	.906	4.57	0.56	2
4. Information System	6	.868	4.54	0.50	4
5. Data Analytics	5	.852	4.48	0.52	5
6. Creativity	5	.960	4.48	0.76	5
7. Problem-solving	5	.957	4.48	0.64	5
8. Critical Thinking	5	.932	4.46	0.63	8

Table 6.5 shows that communication holds the top spot as rated by educators. This finding aligns with prior literature (Abu Asabeh et al., 2023; Albrecht & Sack, 2000; Howcroft, 2017; Maali & Al-Attar, 2020; Tan et al., 2004), which has consistently highlighted the significance of communication in graduates' professional success over the last two decades. While previous studies primarily focused on communication within the context of generic/soft skills, this study indicates that it is also important within the domain of digital competencies and technology usage. Recent literature suggests that educators now stress the importance of integrating communication competency with emerging technologies, such as automation and artificial intelligence, and the ability to convey processes and results involving big data and analytics (De Villiers, 2021; Dzuranin et al., 2018; Mcbride & Philippou, 2022).

In addition to communication, data visualisation and data governance were also highly rated. Other studies have also shown data visualisation is a crucial competency for accounting graduates, while cybersecurity knowledge in data governance is recognised as essential for future accountants (Al-Htaybat et al., 2018; Don et al., 2023; Dzuranin et al., 2018; Zolkifli et al., 2022). These studies emphasise that accounting graduates need to be competent in data visualisation and have a solid understanding of information system security. The findings of this study are in line with this strand of literature, reflecting the broader recognition of data visualisation and data governance as critical for future accountants in the modern technology-driven accounting era.

Although critical thinking and problem-solving were ranked lower than other categories, educators in this study still considered these competencies essential for accounting graduates. Previous generic or soft skills studies have demonstrated that educators perceive critical thinking and problem-solving as important skills (e.g., Albrecht & Sack, 2000; Howcroft, 2017; Tan et al., 2004; Terblanche & De Clercq, 2021). Additionally, research indicates that these competencies are crucial for effectively utilising technology (De Villiers, 2021; Dzuranin et al., 2018; McBride & Phillippou, 2022). In the Malaysian context, there is a pressing need for accounting graduates to demonstrate critical thinking and problem-solving competencies, particularly in the application of technology (Razak et al., 2022).

Overall, the findings of this study indicate that educators expected accounting graduates to achieve a very high level of competence in communication, data visualisation, data governance, and information system. Additionally, a high level of competence is required in data analytics, creativity, problem-solving, and critical thinking. These expectations highlight the importance of a diverse set of digital competencies to meet the evolving demands of the accounting profession in the digital age.

6.2.4 Acquired Digital Competencies

Educators were also asked to indicate their perceptions regarding the level of digital competencies accounting graduates have acquired upon completion of their studies. The categorisation of acquired digital competencies mirrors that of expected digital competencies and the interpretation of the results is also based on a five-point Likert scale with the following mean score ranges: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence: 4.50 to 5.00.

Table 6.6 shows that educators generally perceived that accounting graduates have acquired an average to a high level of digital competencies upon completing their studies. Graduates are seen as having acquired high competence in five out of six areas of the information system category, including searching for data in digital environments and working with GL modules. However, understanding emerging technologies such as cloud computing and artificial intelligence was perceived as average. In the data visualisation category, educators perceived graduates acquired a high level of competence in four out of five areas, especially in creating simple charts and graphs and applying basic design for interactive summaries. On the other hand, competence in advanced visualisation tools was rated as average.

Table 6.6 *Descriptive Statistics of the Acquired Level of Digital Competencies*

	M	*SD*
1. Information System		
a. Search for data, information, and content in digital environments.	3.97	0.76
b. Understand different types of data (e.g., numeric, text).	3.85	0.88
c. Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	4.02	0.85
d. Understand accounting databases (e.g., customers, suppliers' information).	3.62	0.85
e. Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as ERP).	3.64	0.92
f. Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	3.48	0.97
2. Data Visualisation		
a. Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	4.15	0.79
b. Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	3.31	1.09
c. Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	3.61	1.05
d. Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	4.17	1.02
e. Select the best presentation approach for the targeted audience.	3.84	0.94
3. Data Analytics		
a. Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	3.90	1.10
b. Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	3.75	1.02
c. Understand the basics of business intelligence (e.g., costing & revenue analysis).	3.77	0.98
d. Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	3.21	1.09
e. Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	2.97	1.11
4. Data Governance		
a. Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	3.55	1.06
b. Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	3.76	0.98
c. Understand the need to protect the security and privacy of stakeholder data.	3.94	0.92
d. Understand the importance of data security (e.g., protect data from unauthorised access).	3.94	0.92
e. Know how to communicate the potential data errors and weaknesses.	3.44	0.90

5.	**Communication**		
a.	Use a range of different digital communication methods (e.g., email, webinars).	4.36	0.89
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	3.81	0.97
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	3.59	1.03
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	4.05	0.92
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	4.40	0.88
6.	**Problem-Solving**		
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	3.72	0.84
b.	Formulate an appropriate inquiry to diagnose the problem.	3.23	0.93
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	3.36	1.02
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	3.38	0.82
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	3.42	0.86
7.	**Critical Thinking**		
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	3.95	1.02
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	3.15	1.04
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	3.23	0.99
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	3.35	1.00
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	3.41	0.90
8.	**Creativity**		
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	3.97	0.91
b.	Apply existing knowledge innovatively to a new situation.	3.60	0.93
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	3.47	0.99
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	3.38	0.97
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	3.46	1.04

Educators viewed graduates as having acquired high competence in data analytics, particularly in spreadsheet manipulation, understanding the basics of business intelligence, and performing basic descriptive statistics. However, their abilities with more advanced skills, such as using statistical methods and performing data extraction, transformation, and querying, were rated at an average level. The area of data governance showed high ratings, especially for data security, privacy and protecting stakeholder information. This indicates that graduates are well-prepared to manage data integrity and security. Competency in communication was notably high, with graduates perceived as being adept at using various digital communication methods and tools, both formal and informal.

Graduates have acquired high competence in problem-solving, especially in retrieving relevant information to address issues, while the other four skills were rated at average level particularly skills in formulating inquiries and identifying creative solutions that needed improvement. Similarly, graduates have acquired high competence in critical thinking, particularly in analysing information for decision-making, but more complex tasks such as computations and integrating diverse ideas were rated as average. Lastly, in creativity, educators viewed graduates as having high competence in using appropriate digital tools creatively and applying existing knowledge to new situations, while their ability to recommend improvements to existing processes was perceived as average.

Overall, graduates were perceived to have a solid foundation in fundamental digital competencies. Educators generally view graduates as having acquired a high level of proficiency in fundamental digital competencies area. However, competencies related to the use of advanced tools, problem-solving, and critical thinking were seen as less thoroughly acquired by graduates, achieving only an average proficiency compared to fundamental competencies.

6.2.5 Acquired Competencies Ranking

In line with the previous analysis on the ranking of expected competencies, Cronbach's alpha was utilised to ensure the reliability of the findings and establish a ranking of the acquired digital competencies. As shown in Table 6.7, Cronbach's alpha coefficients for all variables exceed .80, confirming a good to excellent level of internal consistency across the categories (Field, 2015).

Table 6.7 *Ranking of the Acquired Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach's α	*M*	*SD*	Rank
1. Communication	5	.896	4.04	0.79	1
2. Data Visualisation	5	.870	3.82	0.79	2
3. Information System	6	.869	3.76	0.67	3
4. Data Governance	5	.914	3.73	0.83	4
5. Creativity	5	.916	3.58	0.84	5
6. Data Analytics	5	.897	3.53	0.89	6
7. Critical Thinking	5	.910	3.42	0.85	8
8. Problem-solving	5	.920	3.42	0.78	8

Table 6.7 presents the ranking of the acquired level of digital competencies among accounting graduates as perceived by educators. Communication competency ranked the highest among eight categories, indicating that graduates were perceived as highly competent in using various digital communication methods and tools. For over two decades, communication skills have been considered crucial for students and recent studies show that educators are generally satisfied with graduates' communication abilities, particularly in traditional or generic communication contexts (Howcroft, 2017; Maali & Al-Attar, 2020). Recent findings by Asonitou and Hassall (2019) further suggest that students also demonstrated strong communication skills through the use of visual aids in presentations, which closely aligns with the context of this study. This outcome is not surprising, given the widespread use of technology in communication channels nowadays.

Data visualisation ranked second amongst the competencies rated by educators. Most accounting students are knowledgeable in using basic functions of Microsoft Excel such as charts and graphs (Rackliffe & Ragland, 2016), as Excel has already been integrated into the accounting curriculum by most Malaysian institutions (Ghazali et al., 2022). However, while graduates were highly competent in basic data visualisation, their skills in advanced visualisation such as using Microsoft Power BI or Python, were only at an average level. This suggests that they only had limited exposure to these tools in the current curriculum (Birt et al., 2023; Zolkifli et al., 2022).

Information system, though ranked third, also indicate that graduates demonstrated high levels of competence in this area. This is consistent with the findings of some studies (e.g., Asonitou & Hassall, 2019; Rackliffe & Ragland, 2016). In contrast, a recent Malaysian study by Zolkifli et al. (2022) showed that academics perceived students' Information technology competency as low. However, the limited focus on accounting students and the small sample size involving interviewing only two audit academics from two Malaysian public universities are the major caveats of the study conducted by Zolkifli et al. (2022), and which might be the reason for the inconsistent findings.

Critical thinking and problem-solving ranked the lowest among the competencies acquired by graduates, suggesting that graduates possess only an average level of competence in these areas, compared to the higher proficiency demonstrated in other competencies. Notably, this study focuses on competencies related to technology. These competencies include advanced tasks, such as "formulate an appropriate inquiry to diagnose the problem" for problem-solving, while critical thinking includes "perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools such as Microsoft Power BI." These advanced competencies may be harder for graduates to grasp, as they require both a strong foundation in digital tools and the ability to integrate these tools effectively into the decision-making process. Moreover, it is possible that educators also face challenges in teaching these advanced technological competencies with those generic thinking skills in their teaching methods. As suggested by the findings in Table 6.3, educators tend to rely on simple and commonly used software such as Microsoft Excel, which may limit their ability to equip graduates with the necessary skills for more advanced tasks.

Overall, the rankings suggest that graduates are well-prepared in communication, data visualisation, and information system. However, critical thinking and problem-solving ranked seventh and last, respectively, with graduates demonstrating only an average level of competence in these areas compared to other competencies. A detailed comparison of educators' perceptions regarding the desired level of digital competencies that accounting graduates should acquire upon completion of their studies, and the level of digital competencies acquired by graduates (i.e., identifying the constraint gaps) is discussed in Chapter Seven.

6.2.6 Digital Competencies Variation by Demographics

Following the examination of rankings, it is essential to explore how educators' perceptions of digital competencies vary across different demographic subgroups,[30] such as type of university, academic position, and years of teaching experience. The purpose of these analyses was to determine whether there were significant differences in educators' perceptions based on these demographic factors. Other subgroups such as gender, ethnicity, level of education, and employment status were not analysed due to significant disparities in group sizes. Regrouping into median splits or broad cohorts would lead to unmeaningful comparisons and would not resolve the issue of very small subgroups, which can produce unreliable statistical results. In addition, age was not analysed because it is closely associated with experience; the analysis therefore focuses on years of teaching, which is more meaningful.

T-tests were conducted to compare means[31] based on the type of university and technology usage, while one-way ANOVA was used to investigate differences by academic position and years of teaching experience. Preliminary checks confirmed that assumptions for ANOVA and t-tests were met, including acceptable skewness and kurtosis values, indicating normally distributed data (Pallant, 2020). Levene's test assessed the homogeneity of variances; if violated, t-test results were reported under "Equal variances not assumed."

[30] Only responses who provided demographic information were included in the analyses.
[31] Mean values indicate the perceived level of expected or acquired digital competencies, with higher scores reflecting stronger perceptions. In this context, "lower" and "higher" scores are relative; for instance, 3.65 is lower than 3.75, though both indicate high competency. Small differences in means can still be statistically significant.

For ANOVA, when significant differences were identified, post hoc tests were conducted to determine which specific groups differed. The post hoc Tukey test was used when the homogeneity assumption was met, and Welch's test, with the Games-Howell post hoc test, was applied for unequal variances (Field, 2015; Stevens, 2001). Detailed results are provided in Appendix 6.1, *Digital Competencies Variation by Educators' Demographics.*

6.2.6.1 Expected Digital Competencies

The findings revealed no statistically significant difference in the mean scores across most groups. Educators from both public and private universities generally agreed on the expected digital competencies, including information system, data visualisation, data analytics, communication, problem-solving, critical thinking, and creativity. However, a significant difference was observed for data governance, with public university educators having higher expectations ($M = 4.72$, $SD = 0.45$) than those at private universities ($M = 4.44$, $SD = 0.59$; $t(64) = 2.11$, $p = .038$). This difference may reflect institutional variations in curriculum emphasis, with public universities potentially placing greater emphasis on data governance in their curriculum.

Although public universities in Malaysia have some autonomy, they are required to adhere to accreditation processes and curriculum guidelines established by the MQA and relevant professional bodies. These guidelines often prescribe specific learning outcomes, activities, and assessments (Chang et al., 2019). Similarly, private universities must also comply with MQA and other regulatory bodies, as discussed in Chapter Two, *The Malaysian Context*. This shared regulatory framework may explain why educators at both public and private universities generally have similar expectations, with the exception of data governance.

Similarly, no significant differences were found in expectations based on years of teaching experience for most digital competencies, except for data analytics, data governance, and problem-solving competencies. Specifically, educators with 10 to less than 20 years of experience had lower expectations in data analytics ($M = 4.43$, $SD = 0.36$) than those with 20 or more years ($M = 4.72$, $SD = 0.35$, $p = .015$). A similar trend was observed in data governance ($M = 4.59$ vs. $M = 4.84$, $p = .030$) and problem-solving ($M = 4.40$ vs. $M = 4.79$, $p = .011$). Experienced or senior educators with 20 years and above may often participate in curriculum reviews or policymaking which heighten their expectations for these competencies in preparing graduates to meet evolving workplace requirements. In addition, senior academics are often assigned to teach advanced or capstone courses, which typically emphasise complex and applied learning (MQA, 2024). These courses frequently integrate data-driven decision-making, data governance, and problem-solving tasks. Such exposure to advanced-level content could influence their expectations, as they may perceive these competencies as essential for graduate readiness. This may explain why educators with 20 or more years of experience demonstrated significantly higher expectations in data analytics, data governance, and problem-solving compared to their counterparts with fewer years of teaching experience.

Regarding technology use, no significant differences were found between technology users (tech users) and non-technology users (non-tech users) for most digital competencies, except for data visualisation. However, even though both groups had very high expectations in data visualisation, non-tech users had significantly higher expectations (M = 4.75, SD = 0.31) compared to tech users (M = 4.54, SD = 0.53, t (63) = -2.00, p =.049). Finally, academic positions showed no significant differences in expectations, indicating uniform expectations across ranks, including lecturers, senior lecturers, and associate professors/professors.

In summary, educators' demographics did not significantly influence their expectations regarding most digital competencies. This consistent finding may be attributed to shared compliance requirements, such as the accounting standards set by the MQA, which ensure broad alignment in educators' expectations while allowing for subtle variations shaped by institutional and experiential contexts. Nevertheless, a few notable differences were observed. Educators from public and private universities generally held similar expectations for most digital competencies, although those from public universities placed greater emphasis on data governance. Academic position and years of teaching experience did not significantly affect expectations for most competencies, although more experienced educators had higher expectations for data analytics, data governance, and problem-solving. Similarly, both tech users and non-tech users held comparable expectations overall, except that non-tech users reported higher expectations for data visualisation.

6.2.6.2 Acquired Digital Competencies

Educators from both public and private universities generally perceived similar levels of digital competencies acquired by graduates. However, public university educators rated graduates' critical thinking significantly lower (M = 3.29, SD = 0.78) than private university educators (M = 3.74, SD = 0.87; t (63) = -2.17, p =.034). While this difference was statistically significant, it contrasts with the overall trend, as no significant variations were observed across the other competencies.

Across academic positions, no significant differences were found in perceived levels of graduates' acquired digital competencies. This suggests that academic rank did not influence educators' perceptions, indicating a shared perspective regardless of position. Similarly, no significant differences emerged based on years of teaching experience, implying regardless of teaching experience, educators held similar views on graduates' acquired competencies. Additionally, technology usage did not significantly impact these perceptions; both tech users and non-tech users reported comparable views on graduates' digital competencies.

In summary, educators' perceptions of graduates' acquired digital competencies were largely consistent across different factors such as university type, academic position, years of teaching experience, and technology usage. The only notable exception was critical thinking, where public university educators rated graduates lower compared to those from private universities.

6.3 Employers' Perception of Graduates' Digital Competencies

This section begins with outlining employers' demographic information, such as position in the organisation, gender, ethnicity, type of organisation, number of employees, and years of work experience. It then examines software usage, illustrated through a bar chart, and includes a cross tabulation analysis to highlight variations in accounting software usage based on organisational size. The section further explores employers' perceptions of graduates' digital competencies, both expected and acquired. Lastly, the discussion examines how these digital competencies vary across different demographic groups.

6.3.1 Demographic Information

Out of the 66 respondents, 10 did not provide demographic information. Table 6.8 shows that 39.3% of the employers held top management positions such as a Partner, Chief Executive Officer, and Chief Finance Officer, while 41.1% were in middle management including senior managers. Most of the employers were male (71.4%), with men predominantly occupying upper managerial positions.[32] This reflects the gender gap in Malaysia, where men largely dominate upper managerial positions (Muzafar & Hamid, 2024). Most employers were aged between 30 to 40 years and 40 to 50 years, each making up 35.7% of the respondents. This indicates that most employers are in their mid-career stage, with significant experience and holding leadership roles within their organisations. Hence, they are in a good position to assess the digital competencies of accounting graduates. Malay ethnicity dominated as they represent 75% of employers in this study. This

[32] The additional cross tabulation analysis was conducted and revealed 86.4% of top management roles and 73.9% of middle management roles held by men. The detailed result is provided in Appendix 6.2, *Cross tabulation of Employer Gender by Position in the Organisation*.

representation is consistent with the overall population distribution in Malaysia (DOSM, 2024a).

Table 6.8 *Demographic of Employers*

Variable	Category	*N*	%
Position in the Organisation	Top Management	22	39.3
	Middle Management	23	41.1
	Lower / Operating Management	11	19.6
	Total	56	100.0
Gender	Male	40	71.4
	Female	15	26.8
	Prefer not to mention	1	1.8
	Total	56	100.0
Age	Below 30 years	7	12.5
	30 to below 40 years	20	35.7
	40 to below 50 years	20	35.7
	50 to below 60 years	9	16.1
	Total	56	100.0
Ethnicity	Malay	42	75.0
	Non-Malay	14	25.0
	Total	56	100.0
Type of Organisation	Public Practice - Audit	17	30.4
	Public Practice - Non Audit	20	35.7
	Private Sector	13	23.2
	Public Sector	6	10.7
	Total	56	100.0
Number of Employees	Less than 50	23	41.1
	50 and above	33	58.9
	Total	56	100.0
Specialisation	Accounting	23	41.1
	Audit	18	32.1
	Taxation	6	10.7
	Other	9	16.1
	Total	56	100.0
Years of work	Less than 10 years	31	55.3
	10 years and above	25	44.7
	Total	56	100.0

The majority of employers were from non-audit public practices (35.7%), followed by audit public practice (30.4%), with the rest from the private sector (23.2%) and public sector

(10.7%). Regarding organisational size,[33] 58.9% of respondents worked in firms with 50 or more employees, indicating a prevalence of employers from large enterprises, while 41.1% were from smaller firms, categorised as small and medium sizes (SMEs). Therefore, there is a good representation of employers from both SMEs and large enterprises. Regarding specialisation, 41.1% of employers were in accounting, 32.1% in audit, and 10.7% in taxation, with the remaining 16.1% in areas like consulting and advisory. Additionally, 55.3% of employers have been with the organisation for less than 10 years, while 44.7% have 10 or more years of experience. Therefore, there is a good mix of experienced employers who can offer valuable perspectives on the digital competencies of graduates they have hired.

Figure 6.3 shows the distribution of primary accounting software used by employers.[34] The majority of the respondents (61.8%) selected the "Other" category, specifying various software such as SAP, Sage UBS, MYOB, Oracle, CCH Axcess, and Microsoft Navision ERP. Autocount and SQL Accounting were each used by 14.5% of respondents, Xero by 7.3%, and QuickBooks by 1.8%, reflecting the diversity of software preferences among these organisations.

Figure 6.3 *Accounting Software Usage by Employers*

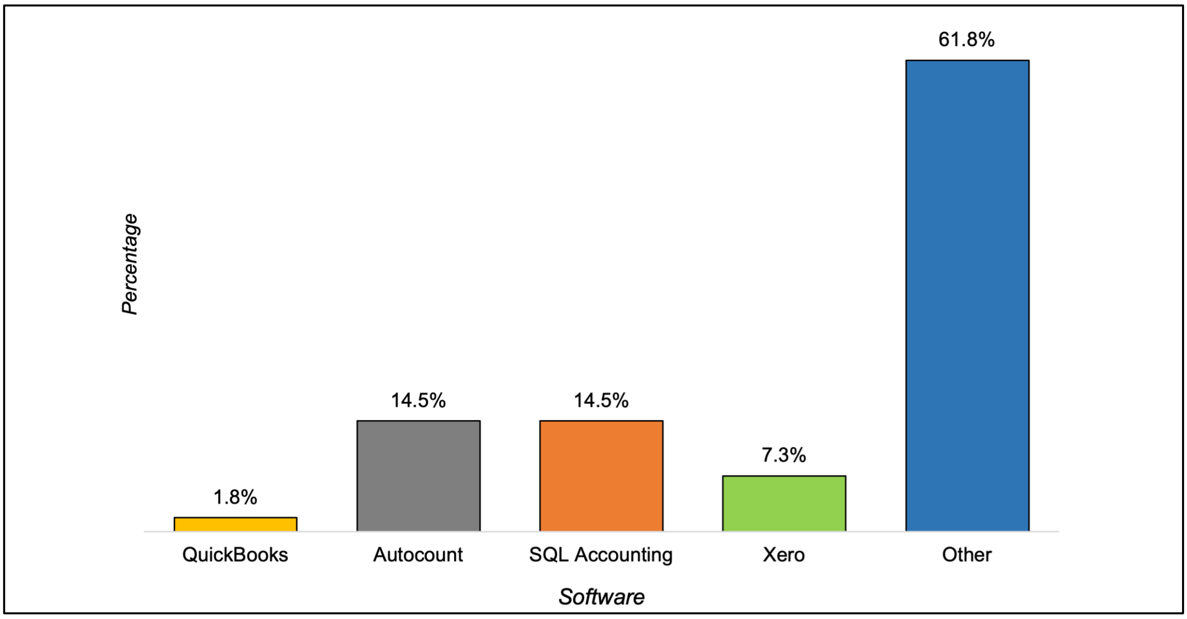


Table 6.9 provides a comparison of software usage across different organisational sizes, revealing distinct patterns in software preferences between SMEs and large

[33] Organisation size was categorised based on the number of employees, with the following classifications: small enterprises are characterised by having 5 and 19 employees, while medium sized enterprises range from 20 and 50 employees (Ministry of Investment, Trade, and Industry, 2015).
[34] One employer did not indicate the software used in the organisation.

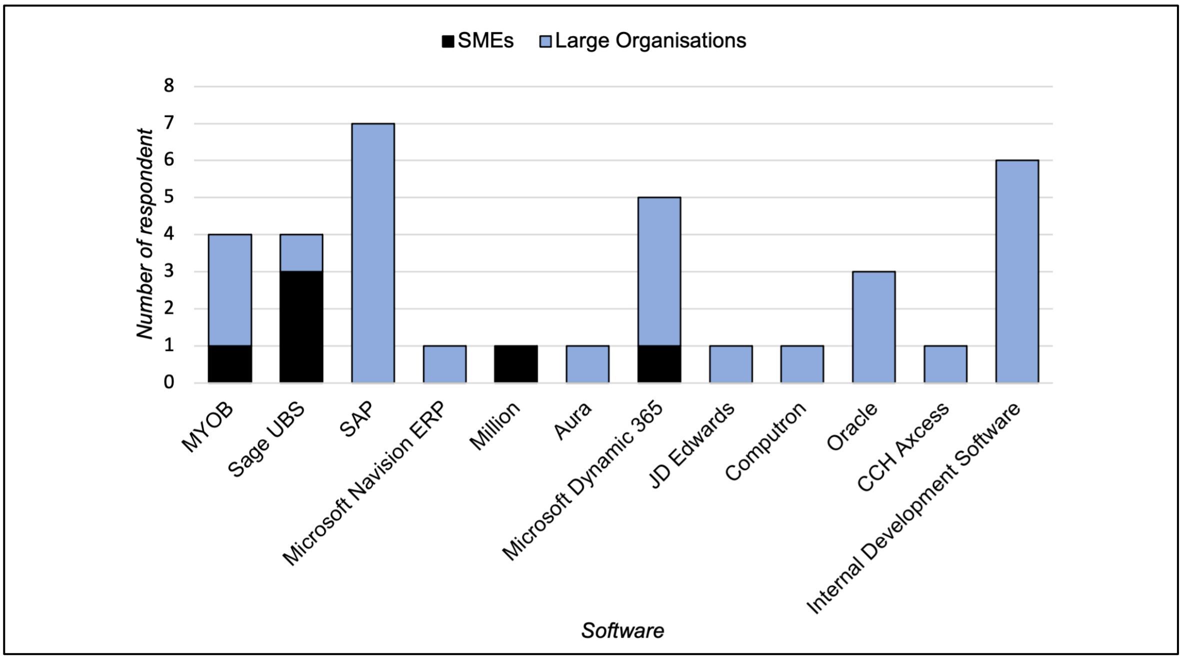
organisations. SMEs predominantly use Autocount (30.4%), followed by SQL Accounting (21.7%), with 26.1% choosing 'Other' software options. In large organisations, the 'Other' category dominates (87.5%), with minimal use of Autocount and SQL Accounting. QuickBooks and Xero are rarely used, particularly in large firms.

Table 6.9 *Accounting Software Across Organisational Size*

	Accounting Software Usage				
	QuickBooks	Autocount	SQL Acc.	Xero	Other
Organisation size	% (N)	% (N)	% (N)	% (N)	% (N)
SMEs	4.3% (1)	30.4% (7)	21.7% (5)	17.4% (4)	26.1% (6)
Large Organisations	0.0% (0)	3.1% (1)	9.4% (3)	0.0% (0)	87.5% (28)

To better understand the 'Other' software choices among employers, Figure 6.4 presents a bar chart detailing these specific software options. SAP is predominantly used by large organisations, while Sage UBS is more commonly used by SMEs. Internal Development Software and Oracle also show significant usage among large organisations. Internal Development Software refers to custom-built solutions designed specifically for an organisation, rather than commercially available software.

Figure 6.4 *Other Accounting Software Usage Across Organisational Size*



In addition to the structured responses, nine employers provided valuable open-ended feedback, offering insights that complemented the quantitative data. These comments gave a deeper understanding of the employers' perspectives, highlighting aspects of digital competencies that were not fully captured by the fixed-response questions. Some of the specific comments are incorporated into the discussion in Chapter Seven to support the findings and provide a more comprehensive interpretation of the results.

6.3.2 Expected Digital Competencies

Similar to educator respondents, employers were asked to indicate their perceptions of the level of digital competencies expected of accounting graduates. The following five-point Likert scale was used for interpreting the results: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence: 4.50 to 5.00.

Table 6.10 presents the mean scores for each digital competency, showing that employers generally expected a high level of competence across digital competencies. Employers placed a strong emphasis on the ability to search for data and understand different types of data within the information system category. They also expected graduates to be able to work well with general ledger modules, indicating that these foundational abilities as highly important. Although competencies related to emerging technologies, such as cloud computing and artificial intelligence, were expected, they were slightly less emphasised compared to more basic abilities. For data visualisation, creating simple charts and graphs using tools such as Excel was highly expected of graduates. However, expectations were slightly lower for creating more advanced visualisations, though employers still expected a high level of competency in using tools such as Power BI or Python. Applying basic design and the ability to effectively communicate results through visualisations were also considered crucial. Regarding data analytics, proficiency in creating spreadsheets, data manipulation, and performing basic descriptive statistics was expected, but there was less emphasis on advanced analytical tasks, such as using statistical methods to predict business outcomes. This might have reflected the fact that advanced analytics are usually handled by specific experts or professionals within the organisation.

Table 6.10 *Descriptive Statistics of the Expected Level of Digital Competencies*

	M	*SD*
1. Information System		
a. Search for data, information, and content in digital environments.	4.28	0.62
b. Understand different types of data (e.g., numeric, text).	4.22	0.69
c. Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	4.19	0.84
d. Understand accounting databases (e.g., customers', suppliers' information).	3.98	0.81
e. Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as ERP.	3.93	0.92
f. Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	3.78	0.88

2. Data Visualisation		
a. Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	4.28	0.79
b. Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	3.53	1.03
c. Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	3.82	0.87
d. Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	3.88	0.88
e. Select the best presentation approach for the targeted audience.	3.81	0.89
3. Data Analytics		
a. Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	4.06	0.85
b. Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	3.85	0.83
c. Understand the basics of business intelligence (e.g., costing & revenue analysis).	3.71	0.91
d. Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	3.46	0.97
e. Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	3.32	0.99
4. Data Governance		
a. Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	4.08	0.75
b. Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	4.04	0.89
c. Understand the need to protect the security and privacy of stakeholder data.	4.24	0.82
d. Understand the importance of data security (e.g., protect data from unauthorised access).	4.21	0.79
e. Know how to communicate the potential data errors and weaknesses.	3.93	0.95
5. Communication		
a. Use a range of different digital communication methods (e.g., email, webinars).	4.29	0.68
b. Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	4.04	0.80
c. Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	3.95	0.84
d. Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	4.16	0.75
e. Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	4.21	0.72
6. Problem-Solving		
a. Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	4.08	0.75
b. Formulate an appropriate inquiry to diagnose the problem.	3.68	0.78
c. Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	3.83	0.84
d. Analyse the impact (e.g., pros & cons) of potential solutions.	3.70	0.90
e. Use rational and logical reasoning to arrive at an acceptable conclusion.	3.73	0.85

7. Critical Thinking		
a. Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	4.01	0.74
b. Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	3.78	1.03
c. Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	3.88	0.96
d. Combine ideas and information from a variety of sources to understand issues and solve problems.	3.70	1.03
e. Recommend a solution or an opinion based on an integrative view of the information and analysis.	3.68	1.03
8. Creativity		
a. Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	3.91	0.92
b. Apply existing knowledge innovatively to a new situation.	3.78	0.84
c. Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	3.66	0.95
d. Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	3.70	1.03
e. Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	3.73	1.00

Data governance is another area of high expectation, particularly regarding data security, stewardship, and understanding the impact of poor-quality data on business decisions. These competencies were critical as data integrity and security had become increasingly important in the digital age. Effective digital communication is also highly valued. Employers expected graduates to use a range of digital communication methods effectively and to tailor both formal and informal communications to different contexts and audiences. For problem-solving category, employers expected the ability to retrieve relevant information and identify solutions using creative thinking and digital tools at a high level. Similarly, in critical thinking, there were high expectations particularly in analysing information effectively using ratio analysis and digital tools. Lastly, for creativity, employers also expected graduates' ability to creatively use digital tools and innovatively apply existing knowledge to a new situation at a high level.

Overall, while employers generally expected a high level of digital competencies across all areas, there was some variation. Most advanced digital competencies were rated at high levels. However, two items in data analytics, specifically extracting, transforming, and querying data using tools such as Microsoft Access or SQL and using statistical methods like regression analysis, were rated at an average level. This suggests that while basic and many advanced competencies were highly required, certain advanced competencies may have been more role-specific or developed over time within the workplace.

6.3.3 Expected Competencies Ranking

This section discusses the expected digital competencies based on their ranking. Similar to the educators' sample, Cronbach's alpha was used to evaluate the internal consistency of each of the eight expected digital competencies. As shown in Table 6.11, all Cronbach's alpha coefficients exceeded .80, indicating a strong internal consistency across the rankings, with reliability ranging from good to excellent (Field, 2015).

Table 6.11 *Ranking of Expected Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach' α	*M*	*SD*	Rank
1. Communication	5	.887	4.12	0.64	1
2. Data Governance	5	.920	4.10	0.73	2
3. Information System	6	.907	4.07	0.66	3
4. Data Visualisation	5	.869	3.87	0.73	4
5. Critical Thinking	5	.931	3.81	0.85	5
6. Problem-solving	5	.942	3.81	0.74	5
7. Creativity	5	.930	3.76	0.84	7
8. Data Analytics	5	.921	3.69	0.79	8

Table 6.11 presents the ranking of expected digital competencies based on mean scores, with communication emerging as the highest-ranked. This indicates that employers consider communication the most important competency category. This finding aligns with prior studies on generic skills (Albrecht & Sack, 2000; Ilias et al., 2023) and digital technologies (ACCA, 2016, 2023; Daff, 2021; Hood, 2020; Jackson et al., 2020, 2022; Kokina et al., 2021; Suarta et al., 2024). Effective interpersonal communication via various channels is an essential competency in today's global business environment (John, 2009). ACCA (2016) also notes that technology is shifting expectations, requiring accountants to "look beyond the numbers" and provide broader insights. In the digital age, graduates must effectively use technology to analyse data, interpret findings, and communicate insights. Employers expect graduates to communicate, visually present data, interpret it accurately, and draw meaningful insights for decision-making (Daff, 2021; Hood, 2020).

Data governance and information system were ranked second and third, respectively. These findings resonate with Jackson et al. (2023) and MIA (2023b) surveys on employers, emphasising the importance of data governance in the digital age, especially on data security and privacy. They also align with prior studies (Amirul et al., 2017; Daff, 2021; Ismail et al., 2020; Spraakman et al., 2015; Yigitbasioglu et al., 2023), supporting the importance of information system competency among accounting graduates as viewed by employers. Data visualisation was also among the top competencies expected by employers. Its relevance is supported by previous studies (Birt et al., 2023; CPA Australia, 2023; Daff, 2021; Jackson et al., 2023; Kokina et al., 2021; Perkhofer et al., 2019; Suarta et al., 2024; Zin et al., 2022).

However, data analytics was not rated as highly as other competencies, though it was still expected to be a key competency for accounting graduates. The importance of data analytics in the digital age is supported by several studies (e.g., Ballou et al., 2018; Birt et al., 2023; Daff, 2021; Hussin et al., 2024; Lee et al., 2018; Vitali & Giuliani, 2024; Yigitbasioglu et al., 2023; Zin et al., 2022). Fundamental skills such as understanding and manipulating data (Tschakert et al., 2016) and performing descriptive statistics (IMA, 2019, 2023) are highlighted as essential for accounting professionals.

In terms of ranking, these findings are consistent with Ballou et al. (2018), who found that employers prioritised communication and problem-solving over data analytics. This may be because employers believe data analytics competency can be developed on the job (Jackson et al., 2023) or handled by specialised teams (Oesterreich & Teuteberg, 2019; Vitali & Giuliani, 2024).

Overall, employers expected accounting graduates to possess strong digital competencies, with the highest importance placed on communication, followed by data governance and information system. Although data analytics is valued, employers often view it as a competency that can be further developed within the workplace or in specialised roles. More importantly, they expect graduates to acquire basic data analytics upon graduation, with more advanced skills to be honed through specific roles within their organisations.

6.3.4 Acquired Digital Competencies

Employers were asked to indicate their perceptions regarding the level of digital competencies acquired by accounting graduates they had hired. The categorisation of these acquired digital competencies aligns with the expected competencies, using a five-point Likert scale with the following ranges for interpreting the results: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence, 4.50 to 5.00.

Table 6.12 presents the mean scores across each digital competency, showing that employers generally rated accounting graduates' digital competencies as average. Graduates demonstrated high competence in basic information system, particularly in understanding and searching for different types of data. However, they exhibited only average proficiency in more advanced tasks, such as understanding accounting processes in integrated systems and the applications of emerging technologies. In data visualisation, graduates were rated to be highly competent in creating simple charts and graphs using tools like Excel. In comparison, they found graduates to have an average proficiency in other areas such as in using advanced visualisation tools like Power BI or Python. Similarly, employers perceived graduates to have average competence in all data analytics skills. Graduates performed better in basic tasks such as spreadsheet creation and descriptive statistics but showed lower average competence in advanced tasks, such as extracting and querying data using tools and statistical analysis.

Table 6.12 *Descriptive Statistics of the Acquired Level of Digital Competencies*

		M	*SD*
1.	**Information System**		
a.	Search for data, information, and content in digital environments.	3.53	0.94
b.	Understand different types of data (e.g., numeric, text).	3.57	1.01
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	3.30	1.12
d.	Understand accounting databases (e.g., customers', suppliers' information).	3.30	0.96
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as ERP.	3.13	1.01
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	2.97	1.03
2.	**Data Visualisation**		
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	3.58	1.21
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	2.79	1.14
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	3.03	1.09
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	3.29	1.09
e.	Select the best presentation approach for the targeted audience.	3.06	1.09
3.	**Data Analytics**		
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	3.25	1.20
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	3.15	1.02
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	2.93	1.16
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	2.58	1.13
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	2.72	1.22
4.	**Data Governance**		
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	3.46	1.12
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	3.40	1.22
c.	Understand the need to protect the security and privacy of stakeholder data.	3.48	1.27
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	3.50	1.19
e.	Know how to communicate the potential data errors and weaknesses.	3.27	1.17

5.	**Communication**		
a.	Use a range of different digital communication methods (e.g., email, webinars).	3.77	0.93
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	3.39	0.98
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	3.37	1.03
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	3.50	1.12
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	3.72	1.01
6.	**Problem-Solving**		
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	3.45	0.97
b.	Formulate an appropriate inquiry to diagnose the problem.	3.08	1.13
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	3.18	1.05
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	3.06	1.01
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	3.16	1.11
7.	**Critical Thinking**		
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	3.36	1.10
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	3.10	1.11
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	3.13	1.15
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	3.00	1.15
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	3.01	1.17
8.	**Creativity**		
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	3.36	1.02
b.	Apply existing knowledge innovatively to a new situation.	3.25	1.06
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	3.08	1.06
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	3.05	1.18
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	3.08	1.27

Data governance competency was rated as average, with graduates showing high competence in understanding the importance of data security and privacy. Comparatively, their ability to communicate potential data errors and weaknesses was less developed. Employers noted that graduates had high competence in using various digital communication methods and selecting appropriate modes for both informal and formal communication, which is increasingly crucial in today's business environment. In problem-solving, graduates' level of competence was considered average across all areas, including analysing the impact of solutions and formulating an appropriate inquiry to diagnose the problem. Employers also rated graduates' critical thinking skills as mostly average. This includes analysing information with ratio analysis, ensuring data reliability, and performing computations using digital tools. Similarly, graduates demonstrated average competence in creativity. They were able to use digital tools to creatively execute tasks and innovatively apply existing knowledge to a new situation.

Overall, employers perceived accounting graduates as having average to high competence in basic digital competencies, particularly in information system, data visualisation, data governance, and communication. Employers also observed that graduates demonstrated average competence in all areas of data analytics, problem-solving, critical thinking, and creativity.

6.3.5 Acquired Competencies Ranking

This section further discusses employers' perceptions of graduates' acquired digital competencies based on their rankings. Cronbach's alpha was used to evaluate the internal consistency of each of the eight acquired digital competencies. As shown in Table 6.13, the calculated Cronbach's alpha coefficients for all variables within this dataset exceeded .90, suggesting a reliable level of internal consistency was excellent, within the group (Field, 2015).

Table 6.13 *Ranking of the Acquired Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach's α	*M*	*SD*	Rank
1. Communication	5	.927	3.55	0.89	1
2. Data Governance	5	.958	3.42	1.11	2
3. Information System	6	.938	3.30	0.88	3
4. Problem-solving	5	.953	3.19	0.97	4
5. Creativity	5	.946	3.16	1.02	5
6. Data Visualisation	5	.918	3.15	0.97	6
7. Critical Thinking	5	.952	3.11	1.03	7
8. Data Analytics	5	.940	2.93	1.03	8

Communication emerged as the highest-ranked digital competency acquired by accounting graduates. These results align with previous studies, which suggest that employers generally view graduates as having strong communication competency using digital tools (Asonitou & Hassall, 2019). In addition to generic communication skills (Howcroft, 2017), this study suggests that HEIs have helped graduates develop communication competency to a high level during their studies, including using various digital methods and selecting appropriate modes for formal and informal communication in the digital environment.

Data governance, ranked second, reflects employers' perceptions that graduates have acquired competencies, particularly in understanding the importance of data security such as protecting data from unauthorised access. Despite being rated at an average level overall, its relatively high ranking suggests that HEIs have introduced aspects of data security and protection in the accounting curricula. This indicates some progress in fostering these competencies, with HEIs acknowledging the importance of data governance in preparing graduates for the workforce.

Employers perceived graduates' competence in information system as average. This finding is also consistent with some studies (Awang et al., 2023; Maali & Al-Attar, 2020; Zolkifli et al., 2022). However, in contrast to these results, some studies highlighted that information system and accounting software are the areas where employers find graduates typically excel (Daff, 2021; Howcroft, 2017; Norman et al., 2018). The differences in findings might be due to the varying types of information systems used across organisations, which can influence how employers perceive graduates' proficiency in this competency (Jackson et al., 2023; Zolkifli et al., 2022).

Additionally, employers generally perceived graduates to have average levels of advanced competencies, particularly working with integrated systems such as ERP and applying emerging technologies such as AI and cloud computing. This is consistent with the findings of some studies highlighting that even though Malaysian graduates possess foundational competencies, they have limited knowledge of complex accounting systems (Awang et al., 2023; Ku Bahador et al., 2018).

Data analytics was ranked last by the employers. Although graduates were perceived to have average levels in data analytics, this category emerged as the least proficient competency acquired by accounting graduates. In the Malaysian context, many SMEs still heavily rely on Microsoft Excel for data analytics tasks (Jacky & Sulaiman, 2022; Sastry et al., 2021). In large firms, data analytics tasks are often outsourced to specialised teams (Oesterreich & Teuteberg, 2019; Vitali & Giuliani, 2024). Due to the relatively recent emergence of data analytics in the industry, it is likely that HEIs have not yet placed significant emphasis on this competency in their curricula (MIA, 2021; Zin et al., 2022), which may explain why it is viewed as less developed compared to other competencies.

Overall, employers perceived graduates to have high levels of competency in communication. In contrast, graduates have average levels of competencies in the other seven categories. Data analytics is an area where graduates are least proficient as it had the lowest mean score. A detailed comparison of employers' perceptions regarding the desired level of digital competencies that accounting graduates should acquire upon completion of their studies, and the level of digital competencies acquired by graduates (i.e., identifying the expectation-performance gaps) is discussed in Chapter Seven.

6.3.6 Digital Competencies Variation by Demographics

Additional analyses were conducted to examine whether demographic variations within the employer group affect their perceptions of digital competencies acquired by accounting graduates. ANOVA was utilised to compare means across employers' positions, types of organisations and specialisations, while t-tests assessed differences related to the number of employees (i.e., organisations' size) and years of work experience. Preliminary analyses (e.g., normality and homogeneity of variances) were performed to ensure the assumptions for the t-tests and ANOVAs were met. When significant differences were identified in ANOVA, post hoc tests were conducted to determine which specific groups differed. The Tukey test was used when the homogeneity of variances assumption was met, while Welch's test with the Games-Howell post hoc test was applied when this assumption was violated. Variables with very unbalanced subgroup sizes (e.g., ethnicity, gender) were not analysed. Age was also not analysed because it is closely associated with experience; the analysis therefore focuses on years of work experience. Detailed results are provided in Appendix 6.3, *Digital Competencies Variation by Employers' Demographics*.

6.3.6.1 Expected Digital Competencies

The findings revealed no significant differences in expectations for accounting graduates' digital competencies across employer positions (e.g., top, middle, and lower management), except for data visualisation. Although ANOVA indicated a significant effect for data visualisation, post hoc tests did not identify specific group differences, suggesting that any differences might be too subtle to detect, possibly due to variability within the groups influencing the ANOVA results.

Similarly, the findings showed no significant differences in expectations based on organisation sizes, with both SMEs and large organisations holding similar views. Previous studies suggest firm size can influence expectations, particularly in specialised areas such as IT and data analytics (Oesterreich & Teuteberg, 2019; Vitali & Giuliani, 2024). This is because large firms may rely on specialised teams or hire specialists, while SMEs being unable to afford such specialists expect a broader range of competencies. However, this contrasts with the current study's findings. This inconsistency may be due to differences in focus; Vitali and Giuliani (2024) interviewed specifically on auditing firms, while Oesterreich and Teuteberg (2019) focused on specialised roles and experienced hires. In contrast, this study examined employers' expectations of accounting graduates, which could explain the lack of significant differences in employers' expectations across organisation sizes. Regarding specialisation, no significant differences were found, indicating consistency in expectations across areas such as accounting, auditing, taxation, and other areas (e.g., consulting, advisory, marketing and strategy).

However, years of experience significantly influenced expectations. Employers with less than 10 years of experience had relatively lower expectations compared to those with 10 or more years of experience in data visualisation (M = 3.67 vs. M = 4.10, p = .039), data analytics (M = 3.47 vs. M = 4.00, p = .011), communication (M = 3.88 vs. M = 4.36, p = .006), critical thinking (M = 3.55 vs. M = 4.06, p = .027), and creativity (M = 3.48 vs. M = 4.06, p = .010). The most pronounced differences were in data analytics and creativity, where less experienced employers expected only average proficiency levels. This is consistent with Lee et al.'s (2018) findings which suggest that experienced employers may have a deeper understanding of workplace requirements. They recognised the importance of digital competencies in addressing current business challenges, leading to their higher expectations. In contrast, less experienced employers may lack these perspectives, resulting in lower expectations in five out of the eight categories.

In addition, significant differences emerged across organisation types (e.g., public practice-audit, public practice-non-audit, private sector, and public sector), except for communication. Public practice non-audit employers had relatively higher expectations of digital competencies compared to those in the private sector. These differences were evident in information system (M = 4.34 vs. M = 3.63, p .013), data visualisation (M = 4.20 vs. M = 3.40, p = .015) , data analytics (M = 4.13 vs. M = 3.18, p = .004), problem-solving (M = 4.05 vs. M = 3.33, p = .043), critical thinking (M = 4.11 vs. M = 3.25 p = .025), and creativity (M = 4.05 vs. M = 3.23 p = .032). This discrepancy might be due to different operational priorities. Public practice non-audit often engages in consulting and advisory roles and may prioritise broader digital competencies to meet diverse client needs. In contrast, the private sector requires graduates to focus on specific or specialised areas based on their organisational needs, resulting in average expectations for certain digital competencies. Public sector employers also had relatively higher expectations than private sector employers in information system (M = 4.52 vs. M = 3.63, p = .025) and data governance (M = 4.80 vs. M = 3.75, p = .022). This is more likely attributable to the regulatory requirements placed on public sector organisations, which include government agencies, statutory authorities, and government-linked companies. The public sector serves as a link between the public and the government, representing the public in managing their trust and providing essential services (Manaf et al., 2022). Operating under stringent regulatory frameworks (Accountant General's Department of Malaysia, 2023), these organisations necessitate advanced information systems for transparency and robust data governance.

6.3.6.2 Acquired Digital Competencies

There were no significant differences in the perceived digital competencies acquired by graduates between employers with less than 10 years of experience and those with 10 years or more. Similarly, no significant differences between SMEs and large organisations, suggesting a consensus among employers, regardless of experience or organisation size, on the digital competencies graduates possess. Furthermore, results indicated no significant differences in the perceived level of digital competencies acquired by accounting graduates across different employer positions (top, middle, and lower/operating management).

However, significant differences emerged across various types of organisations, except for problem-solving. Public practice-audit employers perceived graduates' digital competencies as relatively lower than those in public practice-non-audit, including information system (M = 2.77 vs. M = 3.68, p = .007), data visualisation (M = 2.60 vs. M = 3.63, p = .009), data analytics (M = 2.32 vs. M = 3.46, p = .005), data governance (M = 2.74 vs. M = 3.80, p = .018), communication (M = 3.01 vs. M = 3.89, p = .017), critical thinking (M = 2.57 vs. M = 3.62, p = .012), and creativity (M = 2.52 vs. M = 3.64, p = .006). Public practice-audit employers rated most competencies as average, except for data analytics, which was rated at a low level. Employers from public practice-audit firms had relatively lower ratings could be attributed to the specific, routine nature of their work in auditing. The tools and systems used in audit practices often differ significantly from those taught in universities (Jackson et al., 2023), potentially leading to challenges in aligning graduates' acquired competencies with workplace requirements. In contrast, public practice-non-audit, focused on consulting and advisory services such as tax filings and bookkeeping, emphasise broader competencies which are more aligned with academic settings. Employers in this sector may find the assessed competencies more applicable to their operational requirements, resulting in higher ratings of graduates' acquired competencies. Additionally, public practice-audit employers rated graduates lower compared to those in the public sector specifically in information system (M = 2.77 vs. M = 4.08 p = .007) and data governance (M = 2.74 vs. M = 4.30, p = .015).

Employers' specialisations also significantly influenced their perceptions in five out of eight competency categories. Auditing employers, in particular, perceived graduates relatively lower in information system (M = 2.83 vs. M = 3.61, p = .026) and creativity (M = 2.61 vs. M = 3.46, p = .040) compared to accounting employers. Auditing employers rated graduates at average levels in information system, while accounting employers rated them at high levels. This discrepancy may reflect the differing requirements in relation to information system competency required in the two roles. Auditing roles often demand specialised audit procedures and tools, to which graduates may have limited exposure during their education. In contrast, accounting roles emphasise the routine application of AIS for financial reporting and operational tasks. Accounting curricula often provide more exposure to these routine systems or applications (Ghazali et al., 2022), which could explain why accounting employers perceive graduates as having higher proficiency in information system compared to auditing employers. This is further supported by the study's findings (see Figure 6.2), which show that auditing subjects utilise a limited range of software, whereas AIS subjects cover a broader range of software, reflecting the diverse applications required in accounting education.

Auditing employers also perceived graduates' competencies as relatively lower compared to those in other fields, specifically in information system (M = 2.83 vs. M = 3.87, p = .020), data visualisation (M = 2.67 vs. M = 4.33, p < .001), data analytics (M = 2.43 vs. M = 3.66, p = .021), data governance (M = 2.86 vs. M = 4.22, p = .015), and creativity (M = 2.61 vs. M = 3.80, p = .022). Similarly, accounting (M = 3.26, p = .01) and taxation (M = 2.80, p = .007) employers perceived graduates as less competent in data visualisation compared to employers in other specialisations (M = 4.33). This difference highlights that core accounting areas (e.g., accounting, auditing, and taxation) perceived graduates' digital competencies lower as compared to other specialisations (non-accounting fields) such as consulting, advisory, marketing, and strategy. Employers in non-accounting fields may view graduates as more proficient because they assess these competencies based on broader and general applications, while major accounting employers, who require more specialised competencies, may perceive graduates as less proficient due to the specific technical demands of the field.

6.3.7 Accounting Software Proficiency Level

The questionnaire also provides a list of accounting software and tools that employers use. Employers were asked to rate the proficiency level expected of graduates in using these software and tools on a scale of 1 (Novice) to 5 (Expert). The software and tools were categorised into eight groups: (1) Accounting software, (2) Computer Assisted Auditing Tools, (3) Advanced Excel Features, (4) Database Software, (5) Visualisation Tools, (6) Data Infrastructure, (7) Programming Tools, and (8) Statistical Tools. Employers were also asked to indicate any other relevant software for each category.

Table 6.14 summarises the mean scores for these expected proficiency levels across the different categories. In the accounting software category, employers expressed that graduates need to be competent in Autocount, SQL Accounting, and QuickBooks. This aligns with Wistead and Wenger (2015), who found that public accountant employers require graduates to be competent in using accounting software for reporting. Other studies highlight varying competency requirements (e.g., Amirul et al., 2017; Ismail et al., 2020; Pan & Seow, 2016; Suarta et al., 2024; Tan & Laswad, 2018). For example, Daff (2021) noted that employers expect moderate proficiency in accounting software, while Spraakman et al. (2015) found that employers seek intermediate competency. Twenty-two employers further identified several other software packages, which included MYOB, UBS, SAP, Xero, Million, Oracle, ACCPAC, ECOUNT, Inhouse development, JE Edwards, and Navision.

Table 6.14 *Accounting Software Proficiency*

Software	*N*	*M*	*SD*	Proficiency
1. Accounting Software				
QuickBooks	34	2.82	0.93	Competent
Autocount	36	3.02	1.10	Competent
SQL Accounting	41	2.90	1.06	Competent
2. Computer-Assisted Auditing Tools				
Audit Express	35	2.71	1.07	Competent
Interactive Data Extraction and Analysis (IDEA)	29	2.34	0.89	Adv. Beginner
CCH Axcess	29	2.48	0.91	Adv. Beginner
3. Advanced Excel Features				
PowerQuery	37	2.29	1.02	Adv. Beginner
Visual Basic in Applications (VBA) & Macros	36	2.33	1.09	Adv. Beginner
Advanced Formula	45	2.64	1.13	Competent
4. Database Software				
Microsoft Access	40	2.30	0.99	Adv. Beginner
Structured Query Language (SQL)	30	2.46	1.22	Adv. Beginner
NoSQL	24	2.12	0.94	Adv. Beginner
5. Visualisation Tools				
Microsoft Power BI	45	2.37	1.23	Adv. Beginner
Microsoft Excel	55	3.50	1.08	Proficient
Tableau	32	2.34	1.12	Adv. Beginner
6. Data Infrastructure				
Hadoop	16	2.18	0.83	Adv. Beginner
Oracle	28	2.53	1.03	Competent
Systems Application and Products (SAP)	31	2.51	0.99	Competent
7. Programming Tools				
R, Java, Python	23	2.08	0.94	Adv. Beginner
8. Statistical Tools				
SAS	23	1.91	0.90	Adv. Beginner
SPSS	23	1.82	0.93	Adv. Beginner
Microsoft Excel	54	3.50	1.16	Proficient

Note. Scale *1 = Novice, 2 = Advanced Beginner, 3 = Competent, 4 = Proficient, 5 = Expert.*

In computer-assisted auditing tools, employers expected graduates to be competent in audit express and advanced beginners in IDEA and CCH Axcess. Audit Express is a simpler, user-friendly tool, which perhaps explains the higher expectations, while IDEA and CCH Axcess are more complex, requiring more advanced skills. Additionally, Data3Sixty was mentioned by two employers as a relevant tool. Advanced Excel features were also highly valued, with advanced formulas rated at a competent level, while Visual Basic in Applications (VBA) & Macros and PowerQuery were rated at the advanced beginner level. The importance of Advanced Excel skills was also highlighted by employers in prior studies (Suarta et al., 2024; Yigitbasioglu et al., 2023). Four employers mentioned they also use Advanced Toolpak and PIVOT and indicated that graduates need to know how to use these features at the novice level. For database software like Microsoft Access, SQL, and NoSQL, employers expected graduates to have skills at an advanced beginner level. No other software was suggested for this category.

Employers emphasised the critical importance of acquiring a proficient level in Microsoft Excel within the data visualisation category. Other tools, such as Microsoft Power BI and Tableau, were evaluated at an advanced beginner level, deemed necessary for graduates to acquire. Other studies (e.g., Kokina et al., 2017; Zin et al., 2022) also pointed out that accounting graduates should be familiar with visualisation tools, including Excel, Power BI, and Tableau. Two employers suggested the inclusion of KNIME as another visualisation software. For data infrastructure, employers expected graduates to demonstrate competence in using Oracle and Systems Applications and Products (SAP) with Hadoop at an advanced beginner level. SAP is notably one of the most widely used accounting systems by employers (see Figure 6.4). Programming software like R, Java, and Python was also expected at the advanced beginner level. Finally, in statistical tools, Excel was again highlighted as crucial, with proficient level expected, whereas SAS and SPSS were deemed necessary at the advanced beginner level. KNIME was also suggested by some employers as an additional tool.

In summary, none of the employers expected graduates to be experts in any of the above-mentioned accounting software and tools. Overall, Microsoft Excel is the only tool that employers expect graduates to be proficient in. Prior studies (e.g., Daff, 2021; Eilifsen et al., 2020; Liew et al., 2022; Spraakman et al., 2021) have also indicated that Excel is preferred alongside advanced technologies for data analytics in audit tasks. It has also been identified as a dominant tool used in accounting and auditing practice in Malaysia (Jacky & Sulaiman, 2022; Jusoh & Ahmad, 2019).

The next section presents the results and discussions focused on graduate respondents.

6.4 Graduates’ Perception of Graduates’ Digital Competencies

This section outlines graduates' demographic information, including gender, ethnicity, education level, employment status, position, and organisation size. It then analyses accounting software usage with a bar chart and cross tabulation to show variations by organisational size. The section also explores graduates' self-assessed digital competencies, both expected and acquired, and examines how these competencies differ across various demographic groups.

6.4.1 Demographic Information

Out of 132 graduates, eleven did not provide any demographic information. Table 6.15 shows that the majority of graduates were female (71.9%). This gender distribution aligns with the prevailing trend in Malaysia, where female students increasingly outnumber males in tertiary education (Muzafar & Hamid, 2024; Saadat & Sultana, 2024; The Sun, 2023b; Tienxhi, 2017). Most of the respondents were below the age of 35 (93.4%), with over half of them (53.7%) being under the age of 25. In terms of ethnicity, the majority (95.9%) were Malay, reflecting the broader demographic composition of Malaysia (similar to the demographic of educators and employers). Regarding education, 43.8% held a bachelor’s degree, 42.1% had a diploma, and 12.4% had obtained a master’s degree. The majority of these graduates (93.4%) were from public universities.

Table 6.15 *Demographic of Graduates*

Variable	Category	*N*	%
Gender	Male	30	24.8
	Female	87	71.9
	Prefer not to mention	4	3.3
	Total	121	100.0
Age	Below 25 years	65	53.7
	25 to below 35 years	48	39.7
	35 to below 45 years	6	4.9
	45 to below 55 years	2	1.7
	Total	121	100.0
Ethnicity	Malay	116	95.9
	Non-Malay	5	4.1
	Total	121	100.0
Highest level of education	Diploma	51	42.1
	Bachelor’s Degree	53	43.8
	Master’s Degree	15	12.4
	Professional Certificate	2	1.7
	Total	121	100.0
Type of university	Public university	113	93.4
	Private university	8	6.6
	Total	121	100.0
Years of work	Up to five years	84	69.4
	More than five years	37	30.6

	Total	121	100.0
Employment status	Working	60	49.6
	Not working	61	50.4
	Total	121	100.0
Position in the Organisation	Senior Level	16	26.7
	Executive Level	38	63.3
	Entry level	6	10.0
	Total	60	100.0
Type of Organisation	Public practice – Audit firm	6	10.0
	Public practice – Non-audit firm	4	6.7
	Private sector	38	63.3
	Public sector	12	20.0
	Total	60	100.0
Number of Employees	Less than 50	20	33.3
	50 and above	40	66.7
	Total	60	100.0
Work main area	Accounting	35	58.3
	Audit	11	18.3
	Taxation	7	11.7
	Other	7	11.7
	Total	60	100.0

Regarding work experience, 30.6% of graduates had more than five years of experience since graduation. The remaining 69.4% had up to five years of experience. Nearly half of the graduates (49.6%) were currently employed, while the remaining 50.4% were not, mainly comprising diploma graduates.[35] Despite the high number of unemployed graduates, they were included in this group as it is likely they gained some work experience through internships.[36] Among those employed, 63.3% occupied executive level positions, 26.7% were in senior level positions, and 10.0% were in entry level positions. Most employed graduates worked in the private sector (63.3%), followed by the public sector (20.0%), audit firms (10.0%), and non-audit public practice firms (6.7%). Additionally, 66.7% were employed in large organisations, while 33.3% worked in SMEs. Employment areas were varied, with 58.3% in accounting roles (which include Financial Accounting and Management

[35] Cross tabulation analyses revealed that 80.3% of graduates who are not currently employed completed a diploma qualification. Of the 49 unemployed diploma graduates, 46 reported that they are pursuing bachelor's degree. Among employed graduates, 71.7% hold a bachelor's degree, and 21.7% hold a master's degree (see Appendix 6.4). In Malaysia, a diploma qualification is recognised as sufficient for direct entry into the accounting workforce.

[36] Accounting student must undergo six months internship or industrial training during their sixth or seventh or final semester (of the eight-semester programme), as discussed in Chapter Two, *The Malaysian Context.* This is in line with the requirement by the Education Ministry and MQA (Sani, 2018).

Accounting), 18.3% involved in audit, 11.7% in Taxation, and the remaining working in other areas such as Banking, Business Management, Information Systems, and Project management.

Most respondents were recent graduates or in the early stages of their careers defined by Jackson et al. (2023), making them well-suited to reflect and provide insights on their expectations and perceptions of digital competencies acquired upon graduation.

Figure 6.5 illustrates the accounting software usage among graduates in their workplaces. The data shows that a significant majority (63.3%) of graduates reported using accounting software categorised as "Other," indicating their exposure to a wide variety of software tools such as SAP, Autoline, Hits, and Sage UBS. Among the specified software options, SQL Accounting software is the most commonly used, followed by Autocount.

Figure 6.5 *Accounting Software Usage by Graduates*

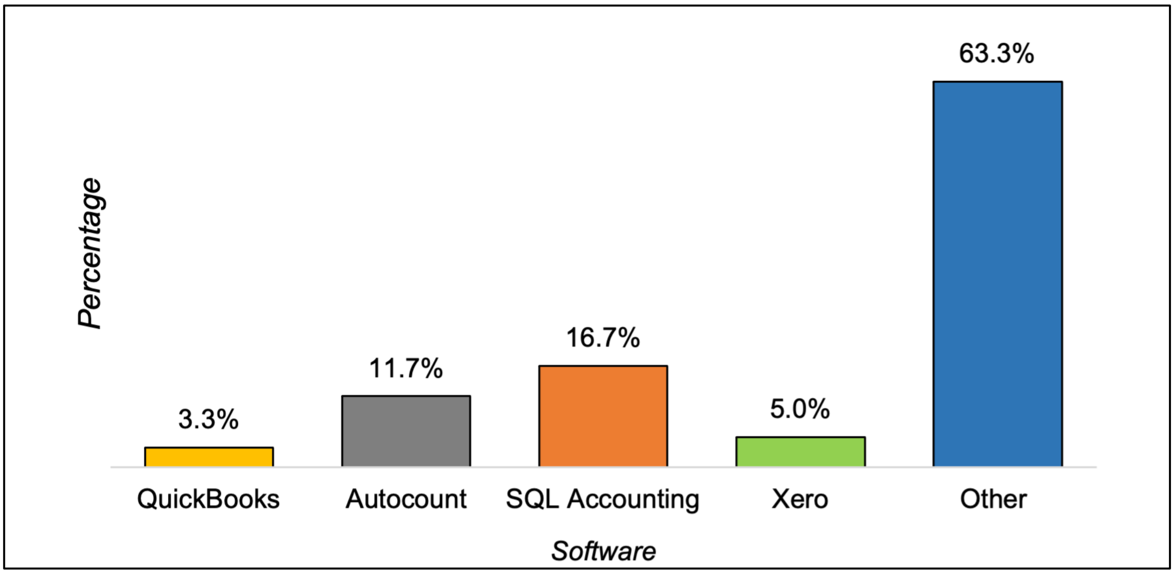


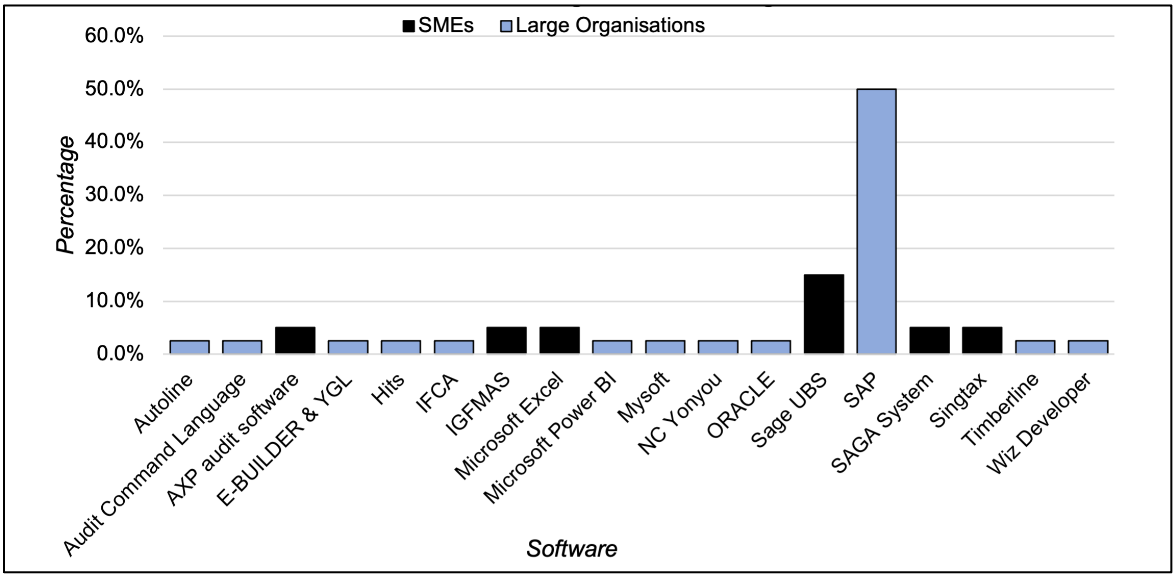
Table 6.16 presents the usage of accounting software across different organisational sizes. SMEs tend to favour specific tools, with SQL Accounting software being the most popular. Additionally, 40% of these organisations use software categorised as “Other.” In contrast, large organisations predominantly use software from the “Other’” category (75.0%), with minimal use of SQL Accounting and Xero.

Table 6.16 *Accounting Software Usage Across Organisational Size*

	Accounting Software Usage				
	QuickBooks	Autocount	SQL Acc.	Xero	Other
Organisation size	% (N)	% (N)	% (N)	% (N)	% (N)
SMEs	10.0% (2)	10.0% (2)	35.0% (7)	5.0% (1)	40.0% (8)
Large organisations	0.0% (0)	12.5% (5)	7.5% (3)	5.0% (2)	75.0% (30)

The prevalence of “Other” software usage highlights the variety of accounting tools used across different organisational sizes. Figure 6.6 indicates that large organisations prefer SAP, while SMEs tend to use Sage UBS. These findings align with studies by Aziz et al. (2022) and Jacky and Sulaiman (2022), which identified high usage of SQL, Sage UBS, and SAP. SQL Accounting and Sage UBS are popular among SMEs in Malaysia, whereas SAP is more commonly used in large organisations (SAGE, n.d.). This pattern is also consistent with employers’ responses discussed in Section 6.3.1, *Employers’ Demographic Information.*

Figure 6.6 *Other Accounting Software Usage Across Organisational Size*



Seven graduates also shared their thoughts through open-ended responses at the end of the survey, which helped to clarify their personal experiences and perceptions. These comments provided deeper context that went beyond the structured questions. Some of the specific remarks from these graduates are incorporated into the discussion in Chapter Seven to support the findings, enriching the interpretation of their expectations and acquired digital competencies.

6.4.2 Expected Digital Competencies

Similar to the approach used with educators and employers, graduates were surveyed to indicate their perceptions of the desired level of competence they should attain upon completion of their accounting degree. The interpretation of the results was based on the following five-point Likert scale ranging from: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence: 4.50 to 5.00.

Table 6.17 indicates that graduates are generally expected to achieve a high level of competence across all digital competency areas upon graduation. In the information system category, they placed the highest expectation on working with general ledger modules and understanding accounting databases. While they recognised the growing importance of emerging technologies such as cloud computing and AI, these were considered less critical than foundational information system competency. Graduates expected to attain a high level of competence in data visualisation, particularly in creating simple charts and graphs and selecting the best presentation methods for the targeted audience. In the data analytics category, graduates viewed the ability to create and manipulate spreadsheets and perform basic descriptive statistics as highly important. While competency in extracting and querying data using tools like SQL were valued, more advanced statistical methods for predictive analytics were acknowledged but not heavily emphasised.

Table 6.17 *Descriptive Statistics of the Expected Level of Digital Competencies*

		M	*SD*
1.	**Information System**		
a.	Search for data, information, and content in digital environments.	4.15	0.78
b.	Understand different types of data (e.g., numeric, text).	4.24	0.75
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	4.28	0.83
d.	Understand accounting databases (e.g., customers', suppliers' information).	4.26	0.84
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as ERP.	4.08	0.85
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	3.85	0.95
2.	**Data Visualisation**		
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	4.33	0.88
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	3.88	1.07
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	4.10	0.88
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	4.14	0.87
e.	Select the best presentation approach for the targeted audience.	4.19	0.87
3.	**Data Analytics**		
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	4.19	0.86
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	4.07	0.88
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	4.00	0.93

d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	4.00	0.93
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	3.88	0.97
4.	**Data Governance**		
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	3.96	0.92
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	4.12	0.83
c.	Understand the need to protect the security and privacy of stakeholder data.	4.27	0.76
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	4.35	0.75
e.	Know how to communicate the potential data errors and weaknesses.	3.95	0.94
5.	**Communication**		
a.	Use a range of different digital communication methods (e.g., email, webinars).	4.31	0.80
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	4.08	0.89
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	4.03	0.91
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	4.20	0.87
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	4.23	0.83
6.	**Problem-Solving**		
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	4.14	0.85
b.	Formulate an appropriate inquiry to diagnose the problem.	3.98	0.91
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	4.00	0.94
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	4.05	0.91
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	4.13	0.89
7.	**Critical Thinking**		
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	4.23	0.84
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	4.00	0.99
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	4.09	0.89
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	4.09	0.90
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	4.04	0.97
8.	**Creativity**		
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	4.09	0.92
b.	Apply existing knowledge innovatively to a new situation.	4.07	0.92
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	3.95	0.96

d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	4.03	0.92
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	4.08	0.96

Within the data governance category, there was a strong emphasis on data security and privacy. Graduates understood the importance of protecting stakeholder information and ensuring data accuracy to maintain business reputation. They recognised the need to comply with data policies and effectively communicate any potential data issues, highlighting a proactive approach to data stewardship. In terms of communication, graduates prioritised the effective utilisation of digital communication methods, such as email, webinars, and social media platforms and tailoring both formal and informal communications to different contexts and audiences. In the problem-solving category, there was a strong emphasis on retrieving relevant information through digital technologies to solve problems and use rational and logical reasoning to arrive at an acceptable conclusion. For the critical thinking category, graduates are expected to analyse information using ratio analysis techniques and digital tools to support decisions. Finally, in the creativity category, graduates highly anticipated using digital tools to execute tasks creatively and valued the ability to use technology to explore potential organisational outcomes, such as cost reduction and increased profitability.

Overall, the high expectations across these categories indicate that graduates believed they should be well-equipped with all these digital competencies upon the completion of their studies.

6.4.3 Expected Competencies Ranking

This section discusses the expected digital competencies based on their ranking. As shown in Table 6.18, all Cronbach's alpha coefficients surpassed .80, suggesting a reliable internal consistency level, ranging from good to excellent (Field, 2015).

Table 6.18 *Ranking of Expected Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach's α	*M*	*SD*	Rank
1. Communication	5	.927	4.16	0.76	1
2. Information System	6	.904	4.14	0.68	2
3. Data Visualisation	5	.890	4.13	0.77	3
4. Data Governance	5	.893	4.13	0.70	3
5. Critical Thinking	5	.928	4.09	0.81	5
6. Problem-solving	5	.921	4.06	0.79	6
7. Creativity	5	.930	4.04	0.83	7
8. Data Analytics	5	.910	4.02	0.78	8

Table 6.18 ranks expected digital competencies, showing that graduates rated communication competency as the most important in the digital environment. This finding aligns with results from other groups discussed earlier and is consistent with studies focused on technology competencies, such as those by Brink and Stoel (2019), Jackson et al. (2022) and the ACCA's (2023b) survey. The significance of communication competency has also been highlighted by other studies on generic skills (Al Mallak et al., 2020; Dolce et al., 2020; Krikorian et al., 2020). This result is an indication of the pivotal role of communication competency in navigating digital environments and also highlights its universal importance for accounting graduates' success in the workforce. Following communication, information system emerged as the second most important competency as perceived by accounting graduates. This finding aligns with several previous studies which emphasised the importance of acquiring this competency (Dolce et al., 2020; Jackson et al., 2022). This is particularly relevant in the accounting context, where familiarity with accounting systems and databases is increasingly critical for handling financial data and ensuring accuracy.

Data visualisation was also identified as an important competency, consistent with prior studies (Brink & Stoel, 2019; Chiang et al., 2021; Harrast et al., 2023; Lee et al., 2018). This result highlights the importance of clear and effective data presentation skills which is critical in data-driven decision-making processes. Consistent with Brink and Stoel's (2019) study, data visualisation has been ranked lower than communication. This suggests that while graduates expect to acquire data visualisation competency, the ability to effectively convey data and insights is crucial. In a similar rank, data governance was also perceived as crucial and aligned with prior studies (e.g., ACCA, 2020b; Harrast et al., 2023; Jackson et al., 2022). Interestingly, data analytics was perceived as less important compared to other digital competencies in this study. However, there was still a high expectation for accounting graduates to acquire proficiency in data analytics. This aligns with several studies (e.g., Chiang et al., 2021; Harrast et al., 2023) indicating that the importance of data analytics is recognised as essential for future success in the accounting profession.

Overall, the ranking of these competencies reflects graduates' well-balanced expectations across the eight categories of digital competencies. In addition to communication and information system, graduates also value competencies that support data-driven decision-making, such as data visualisation and data governance. These expectations indicate that graduates want accounting education to help them develop the essential competencies needed to succeed in the modern accounting profession so that they are well prepared to handle the complexities and demands of the digital environment.

6.4.4 Acquired Digital Competencies

Graduates were asked to reflect on the level of digital competencies they had achieved upon graduation. The categorisation of these acquired digital competencies aligns with the expected competencies, and the following five-point Likert scale is used for interpretation purposes: (a) Very low competence, 1.00 to 1.49; (b) Low competence, 1.50 to 2.49; (c) Average competence, 2.50 to 3.49; (d) High competence, 3.50 to 4.49; and (e) Very high competence, 4.50 to 5.00.

Table 6.19 shows that graduates generally rated themselves as having achieved a high level of competence across all digital competencies. In the information system category, graduates felt most confident in understanding different types of data and working with general ledger. However, their competency in emerging technologies was less pronounced. In data visualisation, graduates perceived high competence, particularly in creating simple charts and graphs using visualisation tools and applying some basic design to develop interactive summaries. Similarly, in data analytics, graduates rated themselves as highly competent, with their strongest skills in creating spreadsheets, manipulating data, and performing basic descriptive statistics. However, their proficiency in more advanced areas, such as applying statistical methods for predictive analysis, was slightly lower.

Table 6.19 *Descriptive Statistics of the Acquired Level of Digital Competencies*

	M	*SD*
1. Information System		
a. Search for data, information, and content in digital environments.	3.97	0.81
b. Understand different types of data (e.g., numeric, text).	4.13	0.70
c. Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	4.06	0.87
d. Understand accounting databases (e.g., customers', suppliers' information).	4.03	0.89
e. Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as ERP.	3.89	0.95
f. Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	3.63	1.01
2. Data Visualisation		
a. Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	4.13	0.97
b. Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	3.54	1.24
c. Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	3.91	0.90
d. Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	4.01	0.95
e. Select the best presentation approach for the targeted audience.	3.86	0.98

3. Data Analytics		
a. Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	4.08	0.98
b. Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	3.90	0.87
c. Understand the basics of business intelligence (e.g., costing & revenue analysis).	3.81	0.93
d. Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	3.67	1.12
e. Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	3.58	1.10
4. Data Governance		
a. Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	3.70	0.97
b. Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	4.00	0.81
c. Understand the need to protect the security and privacy of stakeholder data.	4.14	0.78
d. Understand the importance of data security (e.g., protect data from unauthorised access).	4.16	0.91
e. Know how to communicate the potential data errors and weaknesses.	3.75	1.06
5. Communication		
a. Use a range of different digital communication methods (e.g., email, webinars).	4.11	0.86
b. Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	3.88	0.97
c. Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	3.75	0.99
d. Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	4.08	0.88
e. Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	4.19	0.83
6. Problem-Solving		
a. Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	3.98	0.86
b. Formulate an appropriate inquiry to diagnose the problem.	3.74	0.98
c. Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	3.68	1.03
d. Analyse the impact (e.g., pros & cons) of potential solutions.	3.81	0.96
e. Use rational and logical reasoning to arrive at an acceptable conclusion.	3.96	0.96
7. Critical Thinking		
a. Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	4.02	0.95
b. Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	3.75	1.02
c. Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	3.83	1.07
d. Combine ideas and information from a variety of sources to understand issues and solve problems.	3.94	1.03
e. Recommend a solution or an opinion based on an integrative view of the information and analysis.	3.89	1.05

8.	**Creativity**		
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	3.96	0.90
b.	Apply existing knowledge innovatively to a new situation.	3.83	0.98
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	3.73	1.07
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	3.82	1.02
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	3.90	0.99

Graduates perceived that they have acquired high competence in data governance, especially in data security, privacy, and the impact of poor data quality on business reputation. In the area of communication, graduates expressed high competence in using appropriate modes for both formal and informal communication and using a range of different digital communication methods. They believed they had acquired the skills to utilise digital technologies effectively to tailor communication to different audiences. Graduates also rated their problem-solving as high, particularly in retrieving relevant information, analysing potential solutions, and applying logical reasoning to reach sound conclusions. Similarly, in critical thinking, graduates reported high competence in skills such as analysing information using ratio analysis and combining information from various sources to understand issues and make recommendations. Lastly, in creativity, graduates rated themselves as having high competence, particularly in using appropriate digital tools to execute tasks creatively and leveraging technology creatively to explore potential outcomes for an organisation.

Overall, graduates perceived they have attained a high level of competence across all digital competencies upon completing their studies.

6.4.5 Acquired Competencies Ranking

This section discusses the acquired digital competencies as perceived by graduates, based on their ranking. Table 6.20 reports Cronbach's alpha coefficients above 0.80 across all variables, indicating strong internal consistency (Field, 2015). This high level of reliability underscores the robustness of the data concerning graduates' self-assessment of their digital competencies.

Table 6.20 *Ranking of Acquired Level of Digital Competencies*

Digital Competencies	No. of items	Cronbach's α	*M*	*SD*	Rank
1. Communication	5	.911	4.00	0.78	1
2. Information System	6	.897	3.95	0.71	2
3. Data Governance	5	.887	3.95	0.75	2
4. Critical Thinking	5	.925	3.89	0.91	4
5. Data Visualisation	5	.859	3.88	0.82	5
6. Creativity	5	.918	3.85	0.85	6
7. Problem-solving	5	.902	3.84	0.81	7
8. Data Analytics	5	.860	3.80	0.81	8

Table 6.20 shows that communication was perceived as the top digital competency acquired by accounting graduates. Other previous studies (e.g., Taib et al., 2023; Zulkarnain et al., 2021), also had similar findings where graduates believe they have the ability to communicate and interact with others using technology. In Malaysia, over 90% of the population are active internet users (Malaysian Communications and Multimedia Commission, 2022), indicating the pervasive use of digital communication technologies in the country. Furthermore, a notable increase has been reported in technology-driven communication across both accounting education and practice, especially post-COVID era (MIA, 2021). It is, therefore, not surprising that graduates perceived that they have attained proficiency in digital communication competency, which is likely developed through extensive use of digital tools and platforms.

Competency in information system was perceived by graduates as the second-highest digital competency they had acquired. The graduates' self-perception of high competence in this area aligns with several studies (Asonitou & Hassall, 2019; Busulwa et al., 2024; Taib et al., 2023; Zulkarnain et al., 2021). However, some studies have reported lower self-assessed information systems skills among graduates (e.g., Heang et al., 2019; Zolkifli et al., 2022) and students (Purnamasari et al., 2019; Wahab et al., 2017). This discrepancy may be due to factors such as differences in access to the latest technology across institutions, varying levels of student engagement, and exposure during internships or industry placements with different types of organisations. In line with their proficiency in information system, accounting graduates also rated data governance as one of the top digital competencies they have acquired. This finding is consistent with Zulkarnain et al. (2021), who reported that graduates have strong knowledge of data security issues such as identity theft, computer viruses, and cyber fraud. However, this contradicts other studies (e.g., CIMA, 2020; Ku Bahador et al., 2018) which indicated that accounting employees exhibited limited competency in data governance and security. The discrepancy may be due to the gap between theoretical knowledge acquired during studies and the practical application of these skills in the workplace. Additionally, it could be attributed to differences in organisational priorities, which may differ from what is taught at the tertiary levels, particularly regarding emerging data security threats.

Overall, graduates rated communication as their top acquired digital competency, closely followed by information system and data governance, showing strong confidence in these areas. Critical thinking and data visualisation also received high ratings. Although creativity, problem-solving, and data analytics ranked slightly lower, they still indicated high proficiency, suggesting graduates viewed that they are well-prepared across essential digital competencies for the accounting profession. A comparison of the perceptions of graduates regarding the desired level of digital competencies and the level of digital competencies they have acquired on graduation (i.e., identifying constraint gap) is discussed in Chapter Seven.

6.4.6 Digital Competencies Variation by Demographics

Additional analyses were conducted using ANOVA and t-tests to examine differences in the mean score of expected and acquired competencies among graduates across various demographic subgroups. ANOVA has been used to examine variations by organisation types, work area, position, and level of education, while t-tests were used to compare competencies by employment status, years of experience, and organisation size. Similar to educators and employers, preliminary analyses (e.g., normality and homogeneity of variances) were employed to ensure that the assumptions for the ANOVA and t-tests were met. For ANOVA, Tukey post hoc tests were used when variances were homogeneous, and Welch’s test with Games-Howell post hoc tests was applied for unequal variances. Variables with very unbalanced subgroup sizes were excluded (e.g., ethnicity, gender) and age was omitted because it closely tracks experience; analyses therefore focus on years of work experience.

Detailed findings are provided in Appendix 6.6, *Digital Competencies Variation by Graduates’ Demographics.*

6.4.6.1 Expected Digital Competencies

Comparison of expectations across employment status (working vs. not working) revealed no significant differences, indicating no evidence of differences in graduates' perceptions of desired competencies in this sample. Similarly, no significant differences were found based on organisation size, with graduates from SMEs (less than 50) and large organisations (50 and above), exhibiting similar expectations. Regarding work experience after graduation, no significant differences were found between those with less experience (up to five years) and those with more experience (more than five years). This consistency could be attributed to both groups being similarly exposed to workplace expectations during internships or early work experiences.

Analyses across various organisation types, such as public practice (audit and non-audit), private sector, and public sector, revealed no significant differences in digital competencies expectations. Similarly, no significant differences were observed based on graduates' positions, including entry, executive, and senior levels. Differences in expectations based on education level were also generally insignificant, except for data analytics and communication. Diploma holders (*M* = 4.09, *SD* = 0.61) had relatively higher expectations in data analytics compared to master's degree holders[37] (*M* = 3.55, *SD* = 0.91, *p* = .036). Similarly, bachelor's degree holders demonstrated higher expectations than those with master's degrees in data analytics (*M* = 4.12 vs. *M* = 3.55, *p* = .023). These differences may reflect varying levels of academic exposure. Diploma graduates may have had fewer opportunities to engage with data analytics tools during their studies, which could lead them to perceive data analytics as especially important based on industry expectations rather than direct experience. A similar pattern is observed among bachelor's degree holders, who may also have limited applied exposure. In contrast, master's degree holders, who are likely to have encountered data analytics in more advanced or applied academic contexts, may possess a clearer understanding of its complexity, resulting in more moderate expectations. For communication skills, bachelor's degree holders had higher expectations compared to master's degree holders (*M* = 4.26 vs. *M* = 3.72, *p* = .03). The reason for this difference remains unclear and warrants further investigation.

6.4.6.2 Acquired Digital Competencies

No significant differences were observed in accounting graduates' perception of their acquired digital competencies across levels of education (diploma, bachelor's degree, master/professional certificate). Likewise, no significant differences were found based on graduates' job positions (senior level, executive level, entry level), types of organisations (e.g., public practice audit, non-audit, private sector, and public sector) or years of work experience after graduation (graduates up to five years vs. more experienced graduates with more than five years). Organisation size (SMEs vs. large organisations) also did not significantly influence graduates' perceptions of acquired competencies. However, an exception was observed for the communication competency, where graduates in SMEs rated themselves higher than those in large organisations (*M* = 4.29 vs. *M* = 3.73, *p* = .029).

[37] For the purpose of this analysis, the master's degree and professional certificate groups were combined due to low number of professional certificate (*n* = 2).

The lack of significant differences across these demographic subgroups could be attributed to the standardised education curriculum in Malaysia set by MQA, as discussed earlier, fostering consistency in graduate performance upon completion of their studies. Graduates are likely exposed to the same digital trends and expectations during their academic years.

Additionally, no significant differences were found between employed and unemployed graduates across most digital competencies, except for creativity. Unemployed graduates (M = 4.06) rated themselves higher in creativity compared to employed graduates (M = 3.65, p = .009). These differences could be linked to the age profile of most unemployed graduates, who are predominantly under 25 years old[38] and part of Generation Z, often referred to as digital natives (Al-Htaybat et al., 2018; Vassilakaki, 2015). This age is known for its comfort with and frequent use of digital tools, particularly creative applications such as social media and content creation platforms (Slepian et al., 2024). Their generational familiarity with digital creativity may contribute to their higher self-ratings in creativity, as they leverage these tools to build such skills. In contrast, employed graduates may rate themselves more "modestly" in creativity, as they evaluate their skills within the context of workplace requirements rather than broader personal development.

6.5 Summary of the Chapter

This chapter presented descriptives focusing on respondents' demographics and their perceptions of both the expected and actual levels of digital competencies among graduates, as perceived by educators, employers, and the graduates themselves. The chapter started with educators' demographic information, which revealed that most of the educators were Malay, aged between 40 and 50 years old, and had a master's or PhD degree, with many of them being employed at public universities. They were mainly senior lecturers with at least 10 years of teaching experience and worked full-time. Educators largely specialised in Financial and Management Accounting. This demographic profile positions them well to assess graduates' digital competencies. Most educators incorporated technology into their teaching, especially in AIS and Auditing, where it was fully integrated. In contrast, Financial Accounting and Taxation showed moderate adoption. Excel was the most widely used tool, with other software tools varying by subject, especially in AIS, which utilised a broader range of tools. Educators had high expectations for accounting graduates to be well-equipped with digital competencies, particularly in communication, data visualisation, data governance, and

[38] Cross tabulation analyses showed that 96.7% of unemployed graduates are below 25 years of age, while 78.3% of employed graduates are aged between 25 to below 35 years (see Appendix 6.5).

information systems. Expectations for digital competencies were largely consistent among educators, regardless of their academic position, technology usage or university type.

However, more experienced educators placed greater importance on data analytics, data governance, and problem-solving competencies, while non-tech users expressed higher expectations in data visualisation compared to tech users. Additionally, public university educators expected or desired higher levels of competencies in data governance. In terms of acquired competencies, consistency was observed across demographic subgroups, except in critical thinking, where public university educators rated graduates lower compared to their private university counterparts. This could be linked to differences in institutional characteristics or practices. Although the reason for these differences is beyond the scope of this study, the finding highlights the need for future research to explore how institutional characteristics or practices might shape educators' expectations and acquisition of specific digital competencies among graduates.

Employer respondents were predominantly male, holding middle and top management positions, and were aged between 30 to below 50 years, indicating they were in their mid-career stages with substantial leadership experience. Most were Malay, and they represented various sectors, including non-audit public practices, audit firms, private sectors, and public sectors. Most of these employers primarily worked in SMEs to large enterprises, specialising in accounting and auditing. A variety of accounting software was used, with large organisations favouring SAP and custom-built software, while SMEs preferred Autocount and Sage UBS. Employers generally expected high levels of digital competencies from accounting graduates, although expectations for advanced skills were slightly lower. Expectations did not significantly vary by management position or organisation size but differed across organisation types and years of experience. Significant differences were found in expectations based on years of experience, with employers having less than 10 years of experience rating competencies lower. Differences were also noted across organisation types, particularly between employers in public practice non-audit, the private sector, and the public sector. While employers largely agreed on the perceived acquired competencies of graduates, significant differences emerged by organisation type. Specialisation also influenced perceptions, with auditing and taxation employers rating graduates' competencies lower in data analytics, data visualisation, and information system. Regarding expectations for specific features or software, proficiency in Microsoft Excel and the competent use of accounting software such as Audit Express, SAP, and Oracle were commonly expected. Additionally, competence with advanced formula functions in spreadsheet tools was also anticipated.

Demographic analysis showed that the majority of graduates were female, under 35 years old, and predominantly Malay. Most held a bachelor's degree or diploma, and nearly all were from public universities. About half were employed, mainly in executive roles, with the private sector being the largest organisation. Key employment areas included accounting, audit, and taxation. Most of the respondents were in the early stages of their careers. Employed graduates commonly used a wide range of accounting software such as SAP, Sage UBS, SQL Accounting, and Autocount. There was also a clear preference for SAP among large organisations, while SMEs favoured Sage UBS and SQL Accounting, consistent with employer feedback. Graduates had high expectations across digital competency categories, believing they should be well-equipped with these competencies upon graduation. Despite these expectations, they also generally rated themselves as having acquired a high level of competence in these areas. Variations across demographic groups were minimal, except that diploma and bachelor's degree holders had higher expectations for data analytics and communication skills compared to master's degree holders. Additionally, graduates from SMEs rated their communication competency higher, while unemployed graduates rated themselves higher in creativity compared to their employed counterparts.

Educators and graduates generally had similar expectations and perceptions of acquired competencies across their demographic subgroups, which may be due to the consistent standards in accounting programmes adopted by the universities in Malaysia. However, employers' expectations and perceptions of acquired competencies varied across subgroups, particularly by organisation type, years of experience, and specialisation, possibly reflecting differing organisational and field-specific needs. The next chapter (Chapter Seven) will focus on comparing the perspectives of the three groups, particularly in the context of determining the existence of an expectation gap, performance gap, constraints gap, and expectation-performance gap.

Chapter Seven: Findings and Discussion on Gaps

7.1 Overview

This chapter addresses the research questions by examining the different types of gaps across groups and within the groups. Section 7.2 analyses the expectation gap by comparing the perspectives of educators, employers, and graduates. Section 7.3 examines the performance gap using the same group comparisons. Section 7.4 explores the constraints gap within groups, focusing on differences between expected and actual competencies as perceived by educators and graduates. This section also explains the constraints gap by discussing factors that constrain the development of digital competencies in accounting education. Section 7.5 discusses the expectation-performance gap, focusing on the discrepancies between expected and acquired competencies as perceived by employers. The chapter concludes with Section 7.6 summarising the key findings related to these gaps.

7.2 Expectation Gap

This section begins by addressing expectation gaps, which reflect differing views among educators, employers, and graduates regarding the digital competencies required of graduates entering the workforce. The analysis focuses on the following research questions:

Gap 1: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies desired of accounting graduates?

Gap 2: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies desired of accounting graduates?

Gap 3: Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies desired of accounting graduates?

Table 7.1 presents a summary of the overall mean scores for digital competencies expected among educators, employers, and graduates. The results show that all three stakeholder groups ranked communication as the most important competency expected of graduates. Information system, data visualisation, and data governance were also rated highly by all three groups, though their ranking order differs.

Table 7.1 *Expected Level of Digital Competencies – All Groups*

Digital Competencies	Educator		Employer		Graduate	
	M	Rank	*M*	Rank	*M*	Rank
1. Information System	4.54	4	4.07	3	4.14	2
2. Data Visualisation	4.57	2	3.87	4	4.13	3
3. Data Analytics	4.48	5	3.69	8	4.02	8
4. Data Governance	4.57	2	4.10	2	4.13	3
5. Communication	4.66	1	4.12	1	4.16	1
6. Problem-solving	4.48	5	3.81	5	4.06	6
7. Critical Thinking	4.46	8	3.81	5	4.09	5
8. Creativity	4.48	5	3.76	7	4.04	7

To further explore these findings, a one-way ANOVA was conducted to assess differences in the expectations of digital competencies among educators, employers, and graduates. Significant differences in mean expectations would indicate the presence of an expectation gap among these groups. Tests for kurtosis and skewness confirmed the normality of residuals within groups, with values between -1.0 and +1.0, indicating normal distribution. Levene's test confirmed the homogeneity of variances ($p > .05$), validating the ANOVA results. For post hoc comparisons, Tukey HSD[39] was applied for competencies that met the homogeneity of variances assumption. Welch's test and Games-Howell[40] post hoc tests were applied to those that did not meet the assumptions, as these methods are robust against assumption violations (Howell, 2010; Klockars, 2010).

Table 7.2 shows the one-way ANOVA results. The results indicate significant differences in the expectations of the three groups regarding all the digital competencies. These findings suggest that the desired level of digital competencies varies significantly among educators, employers, and graduates, indicating the existence of expectation gaps.

Table 7.2 *One-Way ANOVA on the Level of Digital Competencies Expected*

Expected	*df 1*	*df 2*	*F*	*p*
Information System	2	151	15.750***	.000
Data Visualisation	2	147	23.766***	.000
Data Analytics	2	146	26.222***	.000
Data Governance	2	141	14.086***	.000
Communication	2	149	19.954***	.000
Problem-Solving	2	248	13.938***	.000

[39] Tukey's Honestly Significant Difference (HSD) is known for its reliability and is particularly effective when comparing a large number of means. It maintains a strong control over Type I error rates, although it may be somewhat conservative (Field, 2015).

[40] The Games-Howell test is ideal for situations with unequal sample sizes, as it accounts for variance differences, enhancing accuracy in these cases (Field, 2015).

Critical Thinking	2	248	10.229***	.000
Creativity	2	248	13.386***	.000

Note. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed).

Table 7.3 presents the post hoc analysis, offering a detailed comparison that identifies specific groups with significant differences in digital competencies expectations. The Games-Howell test applied to information system, data visualisation, data analytics, data governance, and communication, while the Tukey HSD applied to problem-solving, critical thinking, and creativity.

Table 7.3 *Post Hoc Multiple Comparisons Between Groups – Expected*

Digital competencies	Group (a)	Group (b)	*MD* (a - b)	*SE*	*p*
Information System	Educator	Employer	.478***	.101	.000
	Graduate	Educator	-.399***	.084	.000
	Employer	Graduate	-.079	.101	.717
Data visualisation	Educator	Employer	.705***	.111	.000
	Graduate	Educator	-.449***	.092	.000
	Employer	Graduate	-.255	.115	.070
Data Analytics	Educator	Employer	.792***	.117	.000
	Graduate	Educator	-.459***	.093	.000
	Employer	Graduate	-.332*	.121	.019
Data Governance	Educator	Employer	.471***	.115	.000
	Graduate	Educator	-.443***	.092	.000
	Employer	Graduate	-.027	.113	.968
Communication	Educator	Employer	.540***	.103	.000
	Graduate	Educator	-.492***	.091	.000
	Employer	Graduate	-.048	.105	.893
Problem-Solving	Educator	Employer	.671***	.131	.000
	Graduate	Educator	-.417**	.112	.001
	Employer	Graduate	-.254	.117	.077
Critical Thinking	Educator	Employer	.650***	.137	.000
	Graduate	Educator	-.364**	.117	.006
	Employer	Graduate	-.286	.123	.053
Creativity	Educator	Employer	.725***	.144	.000
	Graduate	Educator	-.437**	.123	.001
	Employer	Graduate	-.288	.128	.066

Note. **p* < .05, ***p* < .01, ****p* < .001 (two-tailed). *MD* = Mean Difference.

To provide a clearer understanding of the post hoc findings, the discussion is divided into three main sections, each comparing expectations between two different groups. Section

7.2.1 focuses on educators versus employers, Section 7.2.2 covers graduates versus educators, and Section 7.2.3 examines employers versus graduates.

7.2.1 Educators versus Employers

The findings revealed significant differences in the expectations of educators and employers across all eight digital competencies, indicating the presence of an expectation gap between the two groups. The largest expectation gap is in data analytics followed by creativity, data visualisation, problem-solving, critical thinking, communication, information system, and data governance. These findings align with most of the prior studies reporting expectation gaps from various countries, for example, the United States (Novin et al., 1997), New Zealand (Bui & Porter, 2010; Wells et al., 2009), Sri Lanka (Abayadeera & Watty, 2014) United Kingdom and Ireland (Howcroft, 2017), Tunisia (Khouloud & Tahar, 2020), and Malaysia (Ali et al., 2016; Ghani et al., 2024). However, this strand of prior studies primarily focuses on broader generic skills. In contrast, some studies found no significant differences between educator and employer perspectives on certain generic and technical skills, such as those in New Zealand (Tan et al., 2004) and Jordan (Abu Asabeh et al., 2023). The difference in findings may be attributed to the specific scope and context of these studies. For example, Tan et al.'s study focused on educators teaching management accounting courses, thus limiting direct comparison.

The largest expectation gap was in data analytics, with educators placing higher importance on this competency than employers. This finding suggests that educators recognise the growing significance of data analytics in accounting education (Dzuranin et al., 2018; MIA, 2021). However, employers, particularly from larger firms, may place less emphasis on data analytics as compared to other digital competencies, as they often employ specialised staff for these tasks (Oesterreich & Teuteberg, 2019; Vitali & Giuliani, 2024). As one senior manager stated:

> Some organisations practice having different units within their main governance function, namely audit, compliance, integrity, [and] data analytic etc… To avoid [spending] time… when analysing financial data for audit purposes, the audit team often requires [a] data analyst from [the] data analytic team to extract and [manage] the data and provide only practical information to them prior to audit fieldworks. This seems to be more effective. (Employer [EMP] 44, Senior Manager)

Smaller firms also have limited involvement in data analytics due to limited expertise and resources (Jacky & Sulaiman, 2022; Krieger et al., 2021; Perdana et al., 2022), which may explain why their expectations in this area are comparatively lower than those of educators.

The second largest gap was in creativity, highlighting differences in how educators and employers prioritise the importance of this competency. Educators place a higher emphasis on creativity, aiming to equip graduates with the ability to use digital tools effectively and execute tasks in innovative ways. On the other hand, employers tend to prioritise competencies that are directly applicable to day-to-day job tasks and immediate business needs, placing greater importance on critical thinking and problem-solving over creativity. With critical thinking and problem-solving competencies sharing a similar ranking (see Table 7.1), this further indicates that employers need graduates who can quickly analyse and solve practical problems. Additionally, critical thinking plays a crucial role in effective decision-making and workplace efficiency, particularly within today's digital landscape (Daff 2021; Mcbride & Philippou, 2022). As a result, this divergence contributes to the gap in expectations, with employers valuing immediate and applicable competencies that fulfil their business requirements.

Educators also generally had higher expectations regarding data visualisation, problem-solving, critical thinking, communication skills, information system, and data governance than employers. This trend is consistent with previous studies on generic skills, where educators tend to hold higher expectations than employers (Abayadeera & Watty, 2014; Al Mallak, 2018; Ghani et al., 2024). This emphasis likely reflects educators' focus on preparing students in accordance with the rigorous educational and certification requirements, such as Certified Public Accountant and Chartered Accountant certifications, which demand high standards (Chang et al., 2019; Ghani et al., 2024). Additionally, educators face pressure to meet accreditation and international standards, such as those set by the MQA, as discussed in Chapter Two, *The Malaysian Context.* These pressures prompt them to have higher expectations in various digital competencies to meet these standards (Ellington & Williams, 2017). Educators also may look beyond the minimum entry-level requirements and seek to provide graduates with a long-term competitive edge through higher competency levels (Lamberton et al., 2024). Conversely, employers may view that specific competencies can be developed through targeted training within the firms (Bui & Porter, 2010; Jackling & De Lange, 2009; Jackson et al., 2023). Furthermore, some of these competencies may continue to develop as graduates gain more work experience (Busulwa et al., 2024). Their evaluation of required competencies may also depend on the needs and organisational settings, leading them to prioritise these competencies differently. Another interesting comment made by one employer refers to the attitudes of graduates:

> I believe it's not so much [about] the skills in the use of IT tools, but [rather] the attitude that recently graduated new joiners bring toward understanding why those tools are needed that needs improvement. I don't mind them not knowing how to use because

> we will train them, but I do mind if they don't want to understand why [the] firm needs them to know how to use [these] tools. (EMP 11, Partner)

Although not the focus of this study, positive attitudes of graduates are valued by employers. Tan and Laswad's study (2018) on job advertisements found that a positive attitude is one of the most frequently cited skills criteria for recruits in Australia and New Zealand. Similarly, Jackson et al. (2022) highlight that managers value a positive attitude toward learning among early-career accountants, especially regarding technology. This emphasis on attitude is also reflected in the MIA Competency Framework, which includes it under the personal skills category as a key professional quality (MIA, 2020). Additionally, critical thinking is not limited to cognitive skills but also encompasses dispositions including a positive attitude (Terblanche & De Clercq, 2021).

7.2.2 Graduates versus Educators

Significant differences were also found in the expectations of graduates and educators across all digital competencies, indicating the existence of an expectation gap in these areas. The biggest gap was in communication competency followed by data analytics, data visualisation, data governance, creativity, problem-solving, information system, and critical thinking. This expectation gap between graduates and educators is consistent with previous studies that have identified similar gaps in generic and professional skills (e.g., Anis, 2017; Asonitou & Hassall, 2019).

Both graduates and educators ranked communication as the most important competency for accounting graduates (see Table 7.1). However, this area showed the largest expectation gap, with educators placing significantly higher importance on digital communication than graduates. This finding aligns with earlier studies on generic skills (e.g., Baker & McGregor, 2000) yet contrasts with other studies that found no gap in communication expectations between accounting graduates and educators (e.g., Abu Asabeh et al., 2023; Al Mallak, 2018). The discrepancy could stem from this study's emphasis on technology-based communication, as opposed to traditional communication skills. Carvalho and Almeida (2022) similarly identified gaps in communication skills needed for the technological landscape, further supporting this study's findings.

The smallest expectation gap between graduates and educators appeared in critical thinking. This finding contrasts with previous studies that found consensus on critical thinking among educators, students, and graduates as part of generic skills (Abu Asabeh et al., 2023) and transversal skills required of accounting graduates (Calvalho & Almeida, 2022). Educators emphasise critical thinking due to its importance in a technology-driven environment (Al-Htaybat et al., 2018; Dzuranin et al., 2018). Graduates are also aware of the value of critical thinking in the workplace (see Table 7.1), likely reflecting their understanding of its importance for professional success, particularly in a technology-intensive environment. This awareness could be attributed to the practical experience gained by many graduates, including through internships, which provide them with first-hand insights into workplace expectations. Despite this shared recognition, a gap still exists, with educators placing more emphasis on critical thinking. As mentioned above, this could be due to the need to comply with educational goals and accreditation standards, which emphasise higher-order thinking skills (Razak et al., 2022; IFAC, 2019; MIA, 2021; MQA, 2024).

Overall, the findings indicate that educators generally had higher expectations than graduates regarding the level of all digital competencies accounting graduates should acquire upon completion of their studies. This could be attributed to the fact that educators often aim to instil a high standard of excellence in their students encouraging them to acquire a level of proficiency to fulfil the demands of the job market (Johnston et al., 2024; Lamberton et al., 2024).

7.2.3 Employers versus Graduates

This study found no significant expectation gaps between employers and graduates for most digital competencies, including information system, data visualisation, data governance, communication, problem-solving, critical thinking, and creativity. This alignment may result from graduates' awareness of employers' expectations, often gained through employment or internships, which provide practical insights into workplace demands (Abayadeera & Watty, 2016; Kapareliotis et al., 2019; Ng et al., 2021; Zolkifli et al., 2022). This study's findings closely align with Jackson et al. (2022) and Awayiga et al. (2010), who found that employers and graduates share similar views on key digital and IT-related competencies, including digital literacy, data security, Excel, and technology management.

In contrast, studies on generic skills have reported significant gaps, noting that graduates' views only partially matched employers' expectations (Dolce et al., 2020; Kavanagh & Drennan, 2008), including Malaysian studies (Ngoo et al., 2015). These variations may be attributed to differences in research focus, as previous studies primarily examined generic or soft skills, whereas this study specifically examined digital competencies.

The only competency area with an expectation gap between employers and graduates was data analytics, where graduates expected more emphasis on this competency. Employers, however, view data analytics as important for their business needs but not as immediate or necessary for graduates to acquire this competency at a higher level (Ghani et al., 2024; Jacky & Sulaiman, 2022). As previously discussed, some employers may view that graduates do not require high levels of competency in data analytics, as they often engage specialised or experienced staff to perform these tasks. Graduates, however, placed greater importance on data analytics, aiming to be better prepared for the evolving digital workplace.

The next section discusses the performance gap, exploring the three groups' views on the competencies acquired by graduates.

7.3 Performance Gap

The performance gap reflects discrepancies between graduates' actual capabilities as perceived by educators, employers, and graduates themselves. This study aimed to answer the following research questions:

Gap 4: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies that accounting graduates have acquired upon graduation?

Gap 5: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies that accounting graduates have acquired upon graduation?

Gap 6: Are there any differences in perceptions of employers and graduates regarding the level of digital competencies that accounting graduates have acquired upon graduation?

Table 7.4 provides a summary of the overall mean scores for each group. The results show that communication is consistently rated as the top competency acquired by accounting graduates. Information system and data governance are also ranked highly although the exact ranking order varies. Employers and graduates ranked data governance as the second competency acquired by graduates, whereas educators placed it lower, in the fourth position. Additionally, educators ranked data visualisation higher than both employers and graduates.

Table 7.4 *Acquired Level of Digital Competencies – All Groups*

Digital Competencies	Educator		Employer		Graduate	
	M	Ranked	*M*	Ranked	*M*	Ranked
Information System	3.76	3	3.30	3	3.95	2
Data Visualisation	3.82	2	3.15	6	3.88	5
Data Analytics	3.53	6	2.93	8	3.80	8
Data Governance	3.73	4	3.42	2	3.95	2
Communication	4.04	1	3.55	1	4.00	1
Problem-solving	3.42	8	3.19	4	3.84	7
Critical Thinking	3.42	8	3.11	7	3.89	4
Creativity	3.58	5	3.16	5	3.85	6

Similar to expectation gaps, a one-way ANOVA was conducted to examine significant differences in mean scores between educators, employers, and graduates. Table 7.5 presents the ANOVA findings, with *p*-values indicating significant differences in stakeholders' perceptions across all competency areas. These findings suggest that the perceived level of acquired digital competencies in graduates varies significantly among educators, employers, and graduates, indicating the presence of performance gaps.

Table 7.5 *One-Way ANOVA on the Level of Digital Competencies Acquired*

Acquired	*df 1*	*df 2*	*F*	*p*
Information System	2	140	11.628***	.000
Data visualisation	2	138	11.903***	.000
Data Analytics	2	135	15.884***	.000
Data Governance	2	126	5.441**	.001
Communication	2	254	7.369**	.001
Problem-Solving	2	247	12.886***	.000
Critical Thinking	2	247	13.261***	.000
Creativity	2	247	9.666***	.000

Note. *p<.05, **p<.01, ***p<.001(two-tailed).

While the ANOVA results indicate significant differences across groups, Table 7.6 provides detailed post hoc analyses, showing which specific groups significantly differ in the perceived acquisition of digital competencies. For the same reasons explained in Section 7.2 (p. 165), the Games-Howell test was used for information system, data visualisation, data analytics, and data governance, while communication, problem-solving, critical thinking, and creativity were analysed using the Tukey test.

Table 7.6 *Post Hoc Multiple Comparisons Between Groups – Acquired*

Digital competencies	Group (a)	Group (b)	*MD* (a - b)	*SE*	*p*
Information System	Educator	Employer	.466**	.136	.002
	Graduate	Educator	.183	.102	.177
	Employer	Graduate	-.649***	.126	.000
Data Visualisation	Educator	Employer	.671***	.155	.000
	Graduate	Educator	.060	.119	.872
	Employer	Graduate	-.731***	.143	.000
Data Analytics	Educator	Employer	.596**	.167	.001
	Graduate	Educator	.277	.128	.082
	Employer	Graduate	-.873***	.148	.000
Data Governance	Educator	Employer	.305	.173	.187
	Graduate	Educator	.220	.121	.166
	Employer	Graduate	-.525**	.156	.003
Communication	Educator	Employer	.495**	.142	.002
	Graduate	Educator	-.043	.122	.932
	Employer	Graduate	-.452**	.126	.001
Problem-Solving	Educator	Employer	.236	.150	.257
	Graduate	Educator	.414**	.129	.004
	Employer	Graduate	-.650***	.133	.000
Critical Thinking	Educator	Employer	.310	.164	.145
	Graduate	Educator	.462**	.140	.003
	Employer	Graduate	-.772***	.146	.000
Creativity	Educator	Employer	.414*	.159	.026
	Graduate	Educator	.273	.136	.112
	Employer	Graduate	-.687***	.141	.000

Note. **p* < .05, ***p* < .01, ****p* < .001 (two-tailed).

The discussion is organised as follows: Section 7.3.1 focuses on educators versus employers, Section 7.3.2 covers graduates versus educators, and Section 7.3.3 examines employers versus graduates.

7.3.1 Educators versus Employers

The findings revealed significant differences between educators' and employers' perceptions of graduates' acquired competencies in five out of the eight competencies assessed. The largest mean score differences appeared in data visualisation followed by data analytics, communication, information system, and creativity, indicating the existence of a substantial performance gap across most digital competencies. These findings align with previous studies that identified gaps in employability skills (Oliver et al., 2011) and vocational skills (Howcroft, 2017). However, these results differ from other studies which reported no significant differences between educators and employers concerning generic skills (Abayadeera & Watty, 2014; Al Mallak, 2018) and IT skills (Maali & Al-Attar, 2020). These prior studies, however, primarily addressed broader employability or generic skills rather than digital competencies emphasised in this study, limiting direct comparison.

Among all digital competencies assessed, data visualisation exhibited the largest performance gap. Educators rated graduates' acquired competency higher in this area than employers did on average, possibly due to differing views on the competency relevance in the workplace. Educators may see graduates as well-prepared because the curriculum often includes basic tools such as Microsoft Excel in Accounting Information System (AIS) courses. This tool is widely used in academic settings, as shown in this study and other studies (e.g., Banasik & Jubb, 2021; Birt et al., 2023; Ghazali et al., 2022; Lamberton et al., 2024; Sarkar et al., 2021). In these structured learning environments, graduates may perform well when using familiar software and tools for controlled tasks. However, different organisations may have varying needs, requiring more advanced data visualisation competencies or proficiency in tools such as Microsoft Power BI or Python, which may not be emphasised equally at the universities (Daff, 2021; MIA, 2021; Zin et al., 2022). While courses such as AIS introduce students to technology, there are limitations on the number of tools a single course can reasonably cover (Lamberton et al., 2024).

Data analytics showed the second-largest gap, with educators perceiving graduates as more proficient than employers. Similar to data visualisation, employers often rate graduates based on their ability to apply data analytics competencies effectively in real-world scenarios involving large data and practical business insights (Daff, 2021), whereas educators' views are rooted in educational settings. Information system also displayed a notable performance gap, likely due to the diverse systems used by organisations compared to the specific software taught in universities (Heang et al., 2019; Jackson et al., 2023; Zolkifli et al., 2022). Such diversity can lead to employers' views that graduates are not as well prepared for different systems in the workplace as educators might have thought. While educators focus on controlled tasks using specific tools, employers assess graduates on their ability to adapt to a wide range of information system in different organisational needs and settings. In Malaysia, AIS courses commonly employ software such as Microsoft Access, Excel, MYOB, and UBS (Ghazali et al., 2022; Heang et al., 2019), which is also consistent with the applications most frequently reported by educators in this study (see Table 6.3). However, these courses tend to emphasise information system in general and/or business analytics rather than specialised accounting job-related topics and tools (Birt et al., 2023).

Overall, educators consistently perceived graduates as having achieved a higher level of digital competencies than employers acknowledged. This difference also could be attributed to the assessment approaches. Educators typically assess students' competencies on an average basis across a cohort, while employers evaluate the specific competencies of individual graduates they have hired.

7.3.2 Graduates versus Educators

This study found no significant differences between graduates and educators in the perceived levels of digital competencies acquired in six out of eight categories, including information system, data visualisation, data analytics, data governance, communication, and creativity. This alignment suggests that graduates' self-assessment closely mirrors educators' evaluations, indicating no major performance gap across most of the digital competencies. These findings are consistent with previous studies, which reported similar perceptions between educators and graduates regarding professional skills (Asonitou & Hassall, 2019) and applied skills (Tanius et al., 2019).

One possible explanation for this alignment is the close educator-graduate relationship developed during their studies. Educators often engage with students in face-to-face settings, provide hands-on guidance, and monitor their academic progress throughout the programme (Winstone & Carless, 2019). Frequent communication through consultations and continuous coursework assessments allows educators to offer detailed feedback, while graduates receive assessment marks and performance-based input, enhancing their awareness of their own competencies (Yan & Carless, 2021).

Another contributing factor could be the internship component, as discussed in Chapter Two, *The Malaysian Context*. Educators are typically involved in supervising these internships, including communicating with host organisations and reviewing students' progress through written reports. These structured interactions provide both parties with a clearer understanding of the students' practical abilities by the end of their studies (MQA, 2024; Rosli & Yahya, 2017).

Despite the general alignment, a significant difference was found in the mean scores for problem-solving and critical thinking, with graduates rating themselves higher than educators, who assessed them at an average level. As higher-order thinking competencies, critical thinking and problem-solving are cognitively complex and context-dependent, which may make them more difficult for both groups to evaluate consistently (Brookhart, 2010; Terblanche & De Clerq, 2021; Thomas & Lok, 2015). This discrepancy may also reflect graduates' greater confidence in their higher-order thinking abilities, potentially stemming from a strong sense of self-efficacy (Al Mallak, 2018; Dehghani et al., 2011). In contrast, educators, drawing on their teaching experience and broader perspective, possess a more general view of these competencies acquired by graduates.

7.3.3 Employers versus Graduates

The findings reveal significant differences between employers' and graduates' perceptions of the digital competencies acquired by graduates. The most substantial differences in mean scores were observed in data analytics, followed by critical thinking, data visualisation, creativity, problem-solving, information system, data governance, and communication, indicating a considerable performance gap across all digital competencies. These gaps may arise from differences in the development of digital competencies in universities and their application in the workplace.

The existence of the performance gaps between this group is consistent with earlier studies on generic skills (Kavanagh & Drennan, 2008) and IT skills (Ragland & Ramachandran, 2014). In contrast, other studies reported no performance gaps in professional skills, particularly accounting-related IT skills and spreadsheets (Awayiga, 2010). The variation in previous findings may stem from differences in study focus. Earlier studies primarily examined generic and professional skills, whereas this study specifically assessed digital competencies in the context of accounting, thus limiting direct comparison.

Among all digital competencies, data analytics showed the largest performance gap. Graduates rated themselves highly in this area, likely due to their training and familiarity with common tools such as Microsoft Excel in academic settings. Employers, on the other hand, generally perceived graduates as having only an average ability to apply this competency, particularly in real-world scenarios that involve more complex data and practical business insights. While graduates are comfortable using basic analytical tools such as Excel, employers often utilise advanced software. Without hands-on experience with these more complex tools, graduates may be perceived by employers as having lower competence compared to their self-assessments. This finding is consistent with the earlier discussions of the performance gap between educators versus employers, where educators rated this competency higher compared to employers.

Other digital competencies such as critical thinking, data visualisation, creativity, problem-solving, information system, data governance, and communication also display a notable gap, with graduates rating themselves higher than employers. Graduates' self-assessments appeared to be more aligned with academic settings, as reflected in the general consistency between their responses and those of educators as discussed in the previous section. Employers, on the other hand, may have a more holistic view of proficiency in digital competencies, shaped by industry standards, organisational needs, and a broader understanding of workplace challenges. For example, in firms with sophisticated information system and data visualisation tools, employers often find that graduates do not have a high level of the necessary digital competencies required in their organisations. Most universities would also not have covered the specific tools and technologies used in workplaces. As discussed, and shown in Chapter Six, a number of software proficiencies expected by employers of graduates (see Table 6.14) are not included in the list of applications used by educators in their curriculum (see Table 6.3).

7.4 Constraints Gaps

The constraints gap was identified by comparing respondents' perceptions of expected digital competencies levels with the actual competencies acquired by graduates. This gap considered factors that may limit the development of digital competencies in accounting education at universities. This study aimed to answer the following research questions:

Gap 7: Are there any differences in the perceptions of educators regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?

Gap 8: Are there any differences in the perceptions of graduates regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?

A paired sample t-test was conducted to examine significant differences in mean scores between the expected and acquired levels of digital competencies, as perceived by educators and graduates. Only responses from individuals who completed both the expectation and acquisition sections were included in the analysis of the constraints gap. The discussion is structured as follows: Section 7.4.1 focuses on educators' perceptions, Section 7.4.2 covers graduates' perceptions, and Section 7.4.3 discusses the factors constraining the development of graduates' digital competencies.

7.4.1 Educators' Perceptions

Table 7.7 shows a significant difference between the mean scores for expected and acquired digital competencies, as perceived by educators, across all eight categories. These findings indicate the existence of constraints gaps in digital competencies, suggesting that educators believed that graduates had not met their expectations.

Table 7.7 *Paired Sample T-Tests for Expected and Acquired Level of Competence Perceived by Educators*

	Level of Expected		Level of Acquired			95% CI			
Digital Competencies	*M*	*SD*	*M*	*SD*	*MD*	Lower	Upper	*t*	*p*
Information System	4.54	0.50	3.77	0.68	0.77	0.60	0.94	9.04***	.000
Data Visualisation	4.57	0.52	3.82	0.79	0.75	0.58	0.91	9.07***	.000
Data Analytics	4.48	0.53	3.53	0.89	0.96	0.76	1.16	9.72***	.000
Data Governance	4.57	0.56	3.73	0.83	0.84	0.64	1.04	8.47***	.000
Communication	4.66	0.53	4.04	0.79	0.63	0.46	0.79	7.38***	.000
Problem-Solving	4.48	0.65	3.42	0.79	1.06	0.86	1.26	10.60***	.000
Critical Thinking	4.46	0.64	3.42	0.85	1.04	0.84	1.23	10.67***	.000
Creativity	4.48	0.77	3.58	0.84	0.90	0.70	1.11	8.86***	.000

Note. * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed). *MD* = Mean Difference, CI = Confidence Interval.

The results highlight a significant constraints gap across all graduates' competencies, aligning with most previous studies that identified such gaps among educators (Abayadeera & Watty, 2014; Al Mallak, 2018; Howcroft, 2017; Khouloud & Tahar, 2020; Maali & Al-Attar, 2020; Rackliffe & Ragland, 2016). Again, most of these prior studies focused on generic or professional skills, limiting a direct comparison of prior findings with this study's findings on digital competencies.

The largest gap was identified in problem-solving and critical thinking. The findings of this study show that educators expected a high level of competence, but accounting graduates only attained an average level of competence in these areas. This issue is not new, as the gap in higher-order thinking competencies has long been discussed in academic discourse (Terblanche & De Clercq, 2021). Although educators wish to develop an entire range of competencies areas, including critical thinking and problem-solving, they struggle to do so due to constraints that limit their ability to implement them effectively (Howcroft, 2017).

In addition, traditional teaching methodology, which prioritises rote learning and procedural knowledge, may further inadvertently hinder the development of these competencies (Rodzalan & Saat, 2018). Over the years, concerns have been raised regarding the overemphasis on technical content knowledge in university accounting programmes, with insufficient focus on cultivating critical thinking and problem-solving competencies (Howcroft, 2017; Kavanagh & Drennan, 2008; Van Romburgh & Van der Merwe, 2015). Developing these competencies necessitates hands-on experience, exposure to diverse scenarios, and opportunities for experimentation and reflection (Mcbride & Philippou, 2022). As acknowledged by one educator respondent, "to enhance the level of digital competence, more hands-on assessment should be given to the students. Involved *[sic]* the industry experts for the curriculum review so that more up to date digital evolution can be captured in the syllabus" (Educator [EDU] 76).

In addition, the integration of digital technologies, such as virtual case studies, online discussion forums, and computer simulations, has been suggested as a way to bridge these gaps. These tools can enhance the development of critical thinking and problem-solving competencies, which remain underemphasised in accounting education (Al-Hashimy et al., 2023; Huang et al., 2023; Kroon et al., 2021). However, educators often face constraints that limit their ability to implement these approaches effectively.

Other digital competencies including data analytics, creativity, data governance, information system, and data visualisation show a notable gap, with expectations exceeding the actual skills demonstrated by graduates. Despite educators' strong emphasis on these competencies, various constraints may impede their efforts to fully integrate them into the curriculum. For example, while some universities have taken steps to incorporate data analytics and data visualisation, others are still in the early stages, and some have yet to make concrete plans (MIA, 2021; Zin et al., 2022). This inconsistency may limit graduates' exposure to modern and updated accounting tools, contributing to the observed competency gaps. Educators do recognise the importance of preparing students for industry demands, but challenges such as resource limitations and institutional constraints may hinder the full implementation of these competencies in the classroom.

Communication competency, on the other hand, exhibited the smallest gap between expectations and actual competency. This finding reflects the strong emphasis placed on communication in educational settings, where graduates develop this competency through activities such as presentations, group discussions, and written assessments (MQA, 2024). Additionally, graduates' frequent use of digital communication tools, such as email and messaging platforms, further supports their communication development. While communication competency aligns more closely with educators' expectations compared to other digital competencies, a gap persists. Although graduates demonstrate strong foundational communication competency, certain aspects of digital communication such as professional online etiquette, tone adaptation for different audiences, and effective collaboration using digital tools, remain areas for improvement. Given the increasing reliance on digital interactions in professional environments, further emphasis on these skills would enhance graduates' ability to meet workplace demands more effectively.

The constraining factors that limit the development of digital competencies among accounting graduates, contributing to the constraints gap perceived by educators, are discussed further in the next section.

7.4.2 Graduates' Perceptions

Similar to educators, the constraints gap for graduates was identified by comparing their expected digital competency levels with their self-assessed acquired levels. Table 7.8 shows that graduates rated their expected competency levels higher than the levels they actually achieved, with significant differences across all digital competencies. This indicates that their acquired competencies did not meet their expectations, highlighting constraints gaps.

Table 7.8 *Paired Sample T-Tests for Expected and Acquired Level of Competence Perceived by Graduates.*

	Level of Expected		Level of Acquired			95% CI			
Digital Competencies	*M*	*SD*	*M*	*SD*	*MD*	Lower	Upper	*t*	*p*
Information System	4.14	0.69	3.95	0.72	0.19	0.05	0.35	2.64**	.009
Data Visualisation	4.13	0.77	3.88	0.82	0.25	0.10	0.38	3.46**	.001
Data Analytics	4.02	0.78	3.80	0.81	0.22	0.07	0.38	2.82**	.006
Data Governance	4.13	0.70	3.95	0.76	0.18	0.04	0.32	2.56*	.012
Communication	4.16	0.74	4.00	0.78	0.17	0.03	0.30	2.37*	.015
Problem-Solving	4.06	0.79	3.84	0.82	0.22	0.07	0.38	2.90**	.004
Critical Thinking	4.09	0.81	3.89	0.91	0.20	0.04	0.38	2.48*	.014
Creativity	4.04	0.83	3.85	0.86	0.19	0.03	0.36	2.29*	.024

Note. *p < .05, **p < .01, ***p < .001 (two-tailed). *MD* = Mean Difference, CI = Confidence Interval.

The study identified constraints gaps across all eight digital competencies. These findings are consistent with several previous studies that reported similar gaps in relation to generic skills and employability skills (Al Mallak et al., 2020; Awayiga et al., 2010; Dolce et al., 2020; Elo et al., 2024; Kavanagh and Drennan, 2008; Krikorian et al., 2020; Towers-Clark, 2015).

The study's findings suggest that graduates believe HEIs should do more to help them develop digital competencies so as to thrive in the modern digital workplace (Dolce et al., 2020). This perception may be influenced by the increasing digitalisation of the accounting profession and the continued emphasis on traditional academic measures at universities, which graduates felt did not sufficiently prioritise the application of digital competencies in real-world settings.

Communication exhibited the smallest gap among digital competencies and was the area in which graduates felt they had acquired the most. The finding suggests that graduates recognise its significance in today's technologically driven workplace and perceived that their accounting course had helped them to acquire this competency better than the other digital competency categories. This is not surprising given much of the communication nowadays relies on technology. The COVID-19 pandemic further accelerated this shift, reshaping both accounting education and professional practices. Remote work and online learning became the norm, making video conferencing tools, collaboration platforms, and email essential for effective communication (MIA, 2021). Platforms such as Zoom and Microsoft Teams have become primary methods for interaction, reinforcing graduates' confidence in their communication abilities. Despite this, a small gap still exists, indicating room for improvement in integrating this competency more effectively. Other digital competencies, such as information system, data visualisation, data analytics, data governance, problem-solving, critical thinking, and creativity, show significant gaps, with graduates' expectations surpassing their actual acquired competencies. Data visualisation, data analytics, problem-solving, and critical thinking had the largest gaps. This highlights the need for further development in both technical and generic digital competencies.

Although graduates recognise that they possess basic technical digital competencies, they often lack the advanced and complex digital competencies needed to meet industry-specific requirements and applications in the workplace (Awang et al., 2023; Heang et al., 2019; Zolkifli et al., 2022). Many acknowledged that their education training may not fully equip them to meet these demands, highlighting the need for further development, particularly in digital competencies. This perception was reflected in several graduate participants' comments. One participant commented, "as an accounting student that just graduated, I have to learn various aspects of accounting and upgrade my skills in order to transition into the professional accounting field *[sic]*" (Graduates [GRAD] 99). Another participant added:

> Real working environment in Malaysia, most of *[sic]* accounting activity only uses specific software to record basic transactions and generates them into the accounting statement. Other software like Microsoft Power BI is used to present the report generated by accounting software. Based on my experience studied in Malaysian university, most of what we learn is what we use in *[sic]* working field, but presenting the outcome is quite different *[sic].* For me, we need to enhance our accounting course by adding more subject using certain software to adapt with *[sic]* digital era. (GRAD 72)

7.4.3 Constraining Factors

This section discusses the constraining factors contributing to the constraints gap. Educators were asked to indicate their level of agreement with factors that may hinder the development of graduates' digital competencies in accounting education at universities. The questionnaire included 11 statements of constraining factors using a five-point Likert scale (1 = Strongly Agree to 5 = Strongly Disagree). For analysis, responses were grouped into three categories: educators who selected “Strongly Agree” and/or “Somewhat Agree” were classified as the “Agree” group. Those who responded, “Neither Agree nor Disagree” were categorised as “Neutral”, and those who selected “Somewhat Disagree” and/or “Strongly Disagree” were placed into the “Disagree” group. This is followed by an open-ended question allowing the respondents to indicate any other constraints not mentioned in the questionnaire. A total of 20 respondents provided written responses, and some of the specific comments were used to support and enrich the interpretation of the findings in the subsequent discussion.

The constraining factors are ranked by the percentage of agreement with the statements and are presented in Table 7.9. The highest agreement was observed for curriculum overload (78.8%), followed by lack of qualified accounting academics to teach IT (65.7%), lack of infrastructures such as internet accessibility and computer laboratory (63.6%), and lack of institutional support (61.2%). Other factors, including a lack of accounting academics interested in teaching IT (58.2%), lack of teaching materials (56.7%), and lack of technological literacy among accounting academics (53.0%), are also seen as notable barriers. In contrast, there are mixed views on factors such as academics’ reluctance to change with the technology evolution and students' lack of IT knowledge. While some educators accepted these as constraints, their responses leaned more towards disagreement, indicating that they were not the major obstacles. Additionally, lack of student interest (47.7% disagree) and students' lack of confidence in using technology (55.4% disagree) were perceived as not critical barriers by the majority of the educators.

Table 7.9 *Constraining Factors that Impede the Development of Digital Competencies*

Constraining Factors	Agree %	Neutral %	Disagree %
1. Curriculum overload	78.8	6.1	15.2
2. Lack of qualified accounting academics to teach Information Technology (IT)	65.7	6.0	28.4
3. Lack of infrastructures (e.g., internet accessibility, computer laboratory)	63.6	4.5	31.8
4. Lack of institutional support (e.g., financial resources, training)	61.2	10.4	28.4
5. Lack of accounting academics interested in teaching IT	58.2	6.0	35.8
6. Lack of teaching materials (e.g., updated textbooks, educational software, course guides)	56.7	14.9	28.4
7. Lack of technological literacy among accounting academics	53.0	12.1	34.9
8. Academics reluctant to change with the technology evolution	43.9	7.6	48.4
9. Student's lack of IT knowledge	40.9	16.7	42.5

10. Lack of student interest	32.8	19.4	47.7
11. Student's lack of confidence in using technology	27.7	16.9	55.4

The existence of constraints gaps (Gap 7 and Gap 8) as discussed in earlier sections can be explained by these several factors put forward by the educators. These factors are considered under three separate categories: academic staff barriers, environmental based barriers, and student-based barriers.

7.4.3.1 Academic staff barriers

Academic staff barriers include issues related to curriculum overload, lack of qualified staff, lack of accounting academics interested in teaching IT, and academics' reluctance to change with the technology evolution. Each of the barriers is discussed below.

(a) Curriculum Overload

This study found that curriculum overload is the most significant barrier to the development of digital competencies in accounting education at universities. This is consistent with previous studies, which have identified that large class sizes, heavy workloads, and excessive academic responsibilities hinder the development of graduates' digital competencies (Bui & Porter, 2010; Watty et al., 2016), including studies in Malaysia (Rusdi et al., 2023). As one educator stated, "syllabus and work or assignments overload impede the development of digital competencies among students" (EDU 50). Another expressed concern over the multitude of responsibilities, noting that "lecturers also overload with many other tasks …" (EDU 22). Two other participants pointed out "time constraints" as a factor (EDU 5 and EDU 59).

Educators also need time to learn new technologies (Watty et al., 2016). However, overloaded curriculums hinder their ability to dedicate time to learning and limit their focus on teaching technological tools in depth. Additionally, excessive workload further reduces educators' teaching performance quality (Janib et al., 2021; Lyell et al., 2018). These challenges limit the extent to which educators can integrate technology into the curriculum. As a result, graduates acquired a level of competence that was below what the educator desired, receiving limited exposure to technology rather than the comprehensive knowledge and proficiency needed in the current high-tech era.

(b) Lack of qualified accounting academics to teach IT

Educators in this study also agreed that the lack of qualified accounting academics to teach information technology hinders the development of digital competencies among accounting graduates. Extant literature also reports a shortage of qualified and skilled accounting faculty members to teach IT to accounting students (Andiola et al., 2020; Gunarathne et al., 2021; Johnson et al., 2014; Kotb et al., 2019). In Malaysia, this shortage is a key obstacle in integrating emerging technologies into accounting curricula (MIA, 2021; Tasmin & Tan, 2020). Despite technological advancements, there remains a shortage of expertise, especially in areas such as big data and data visualisation, which often requires a good understanding of statistics, which many educators lack (Mikalef et al., 2018). Addressing these barriers is crucial because effective integration of technology directly influences the development of digital competencies among graduates (Qasim & Kharbat, 2020). Without qualified educators, graduates may not receive adequate training, limiting their ability to adapt to workplace technologies, and reducing their competitiveness in the job market.

(c) Lack of accounting academics interested in teaching IT

Another considerable barrier is the lack of accounting academics interested in teaching IT. This finding aligns with previous studies (Kotb et al., 2019; Senik & Broad, 2011), which reported similar trends where educators lacked interest in integrating technology into their teaching. A possible explanation for this disinterest is the already overloaded curriculum, which may leave educators with little time or motivation to learn and incorporate new technologies (Watty et al., 2016). Without incentives and extra time set aside for staff to develop technological skills, educators have little motivation to help students develop digital competencies to the desired level. Incorporating educational technologies into accounting education is essential, as graduates face a technology-driven environment. To enhance educators' interest in educational technologies, institutions must also address workload concerns. Providing manageable workloads, along with targeted training and support, can foster educators' interest in integrating technology into their teaching at the level expected of graduates.

(d) Lack of technological literacy among accounting academics

Educators also identified a lack of technological literacy among educators as a considerable barrier to developing digital competencies among accounting graduates. This study's findings align with broader concerns in the field. Other studies have also indicated that educators' unfamiliarity with the latest technologies mitigates the graduates' digital competencies development process (Al Ghatrifi et al., 2023; Birt et al., 2023; Dzuranin et al., 2018; Senik & Broad, 2011), including in Malaysia (Ahmad et al., 2019). The MIA's survey supports these findings, showing that over 65% of Malaysian accounting educators were not IT competent or only had a foundation level of competencies in all emerging technologies. In addition, more than 85% expressed deficiencies in artificial intelligence and blockchain (MIA, 2021).

This unfamiliarity or limited knowledge and understanding of technological tools may result in a deficiency in integrating these technologies into their teaching materials and methods, consequently leading to a lack of utilisation of technology in the classroom. As noted by Fernandez and Guat (2023), the effectiveness or accomplishments of lecturers are influenced by their competency, which in turn affects the effectiveness of institutions and the quality of their graduates. This issue is closely related to the lack of qualified accounting academics previously discussed. The findings of this study suggest that while educators aim to help graduates develop more digital competencies, they are unable to help them achieve the desired level partly due to this constraint.

(e) Educators' attitude towards changes

Educators' attitudes towards change have been identified as a significant constraint to developing digital competencies in accounting education (Al-Htaybat et al., 2018; Birt et al., 2023; Dangi et al., 2023; Watty et al., 2016). This barrier is often linked to an individual's mindset, beliefs, and attitudes towards learning, change, and personal growth (Kamaruddin et al., 2023). However, the findings of the current study show mixed views among educators on this issue. While some view resistance to change as a barrier, nearly half disagree, suggesting that educators' attitudes towards change may not significantly contribute to the constraints gap. It appears that they are willing to change, provided they are given time, and the teaching workload allows this development. One educator provided the following insights suggesting that only older educators might be less willing to change: "attitudes-denial of the needs for technological change especially the old school educators hinder the development of graduates' competencies" (EDU 47). While most educators may be open to adopting new technologies, older educators may struggle more with technological proficiency and adaptation.

7.4.3.2 Environmental based barriers

Environmental based barriers include lack of institutional support, lack of infrastructures, and lack of teaching materials. Each of the barriers is discussed below.

(a) Lack of infrastructures

The findings of this study identified the lack of infrastructure such as internet accessibility and computer laboratories, as a significant barrier. The majority of educators agreed that infrastructure issues are among the topmost influential factors that potentially constrain the development of digital competencies in accounting education at the university. Several participants in this study echoed these concerns. One educator stated, "the willingness of the university to invest in IT infrastructure. Sometimes it is not their priority" (EDU 26). Due to the lack of infrastructure, students are often required to purchase their own digital tools.

The findings of this study align with prior studies reporting infrastructure challenges in digital learning environments (e.g., Don et al., 2023; Fernandez & Guat, 2023; Purnamasari et al., 2019). In Malaysia, internet connectivity remains a critical issue directly affecting student engagement and their learning experiences in digitalised classrooms (Bernama, 2023; Shamsudin et al., 2023). Additionally, insufficient bandwidth within Malaysian HEIs further restricts the integration of emerging technologies into learning environments (Shahzad et al., 2016). Although Malaysia continues to work on improving internet access, particularly in rural areas, these limitations restrict the widespread use of technologies in universities. These challenges impede the integration of digital technologies, preventing students and educators from fully adopting the tools necessary for developing digital competencies. Therefore, significant improvements are needed to ensure that accounting graduates are better equipped with digital competencies.

(b) Lack of institutional support

Another major factor negatively affecting the inclusion of technology in the curriculum as agreed by educators is the lack of institutional support, such as insufficient financial resources and training. Similar findings were reported by previous studies (Ahadiat, 2005; Andiola et al., 2020; Birt et al., 2023; Kotb et al., 2019; Senik & Broad, 2011; Watty et al., 2016), which found inadequate financial resources (e.g., funds and budget) as a key obstacle to developing accounting graduates' digital competencies. Lack of funding for establishing facilities has been identified as a major obstacle to incorporating emerging technologies in accounting education across Malaysia and other Asian countries (ASEAN Accounting

Education Workgroup [AAEW], 2023; MIA, 2021). Some educators shared their concerns regarding the limitations they face due to resource constraints. One participant noted:

> Accounting Digitalisation has already taken its toll in Accounting World in recent years, and many of the academicians has already acknowledged this. But the inability of our university to cope with the demand of technology changes and limited resources in terms of funding for the right software and hardware hinder our objectives to teach and transfer IT skills to accounting students (EDU 56).

Another educator emphasised the need for appropriate financial allocations, stating: “the university should not deduct budget allocation on infrastructure hardware and software if really want to support the digital education” (EDU 17).

Additional insights from educators highlighted the need for institutional support. One participant stated, “lack of university or management support to provide financial resources, lecturers have to look for sponsors personally…” (EDU 20). One educator also shared how students were impacted by budget constraints, noting that, “students did not be given the opportunity or freedom to explore new digital technology to suit their learning phase or requirement because of budget constraint” (EDU 62). Another pointed out “there is a need for curriculum review and support from the management” (EDU 64).

The findings of the study further align with previous studies indicating that university educators require training and adequate resources to perform their roles effectively (Rusdi et al., 2023). Simple forms of support, such as providing reasoning, motivation, and promoting educational technology, can enhance accounting educators' confidence in institutional efforts to improve teaching and learning productivity. Additionally, institutional support can positively enhance educators' confidence in using technology, particularly when they recognise its benefits and advantages in teaching and learning. When technology is actively endorsed by the institution, it boosts educators' confidence and willingness to integrate it into their practices (Dangi & Saat, 2021).

In Malaysian HEIs, it is standard practice and widely anticipated that any new initiative or change management project must receive approval from the top management group (Tasmin et al., 2022). This is mainly because the top management possesses the authority to allocate resources, including financial resources. The reluctance of management to provide sufficient support, such as funding for IT training, limits the integration of digital technologies into accounting education (Kotb et al., 2019). The findings of this study suggest that while educators aim to equip graduates with digital competencies, their efforts are constrained by institutional limitations, preventing them from achieving the desired level of digital competencies of graduates. Thus, developing digital competencies among graduates requires not just the efforts of educators but also active support from institutional management.

(c) Lack of teaching material

This study also found that educators considered the lack of teaching materials, such as updated textbooks, educational software, and course guides, a major barrier to the development of graduates' digital competencies. Previous studies have also emphasised the need for regularly updated course content to incorporate digital technologies effectively (Birt et al., 2023; Kotb et al., 2019; Xu et al., 2024). The challenge is compounded by the rapidly evolving nature of emerging technologies, making it difficult to keep courses and teaching materials current. As noted by Tavares et al. (2023) and MIA (2021), universities often struggle to keep up with these trends, limiting the effective integration of new technologies into the curriculum. One educator commented, "the courses can get quite obsolete with the rapidly evolving technology environment. Last semester's material, for example, may get updated with more information *[sic]*" (EDU 42). Another educator added, "technology may change in just a blink" (EDU 59).

This lack of essential resources not only hinders educators' ability to adapt to technological changes but also prevents them from equipping students with the digital competencies expected and necessary for success in today's accounting landscape. Without access to updated materials and tools, educators may struggle to fully prepare students to meet the demands of a digitalised profession and align with industry needs. Reflecting on these findings, HEIs must address these issues and provide educators with the necessary resources and support to effectively integrate technologies into their teaching practices, thereby, enhancing graduates' digital competencies.

7.4.3.3 Student-based barriers

The findings of this study show that while there were mixed views, a higher proportion of educators perceived the lack of students' IT knowledge as less of an obstacle. These views also appear consistent with the educators' perception that graduates possess a relatively high level of proficiency in digital competencies as discussed earlier. In addition, many educators disagreed with the notion of students' lack of interest in technology. This suggests that students are generally motivated and engaged in digital learning initiatives, viewing technology use as a positive aspect of their learning experiences (Abou-El-Sood, 2024; Vysostskaya & Prokofieva, 2024). Similarly, most educators did not perceive students as lacking confidence in using technology. Instead, they viewed students as reasonably confident and familiar with digital tools, which supports their engagement in tech-based learning environments. Given that most students today have access to smartphones, laptops, and social media, they are often considered digital natives, capable of navigating various technologies with ease (ACCA, 2020b; Al-Htaybat et al., 2018; Hashim et al., 2019). Overall, educators see academic staff and institutional barriers as the primary factors hindering the development of digital competencies to the level desired or expected by educators.

7.5 Expectation-Performance Gap

The expectation-performance gap was identified by comparing employers' views of the digital competencies they desired or expected graduates to acquire upon completion of studies versus the actual competencies demonstrated by the graduates they had hired. This aimed to answer the following research question:

Gap 9: Are there any differences in the perceptions of employers regarding the desired level of digital competencies accounting graduates should have acquired and the level of digital competencies accounting graduates they hired have acquired upon graduation?

Table 7.10 presents the paired sample t-tests result, showing significant differences between expected and acquired levels across all eight digital competencies. This indicates the existence of an expectation-performance gap as perceived by employers.

Table 7.10 *Paired Sample T-Tests for Expected and Acquired Level of Competence Perceived by Employers.*

	Level of Expected		Level of Acquired			95% CI			
Digital Competencies	*M*	*SD*	*M*	*SD*	*MD*	Lower	Upper	*t*	*p*
Information System	4.07	0.665	3.30	0.887	0.77	0.543	0.992	6.83***	.000
Data Visualisation	3.87	0.731	3.15	0.976	0.72	0.470	0.965	5.79***	.000
Data Analytics	3.69	0.795	2.93	1.032	0.76	0.494	1.028	5.70***	.000
Data Governance	4.10	0.738	3.42	1.111	0.68	0.408	0.947	5.03***	.000
Communication	4.12	0.641	3.55	0.896	0.57	0.384	0.765	6.02***	.000
Problem-Solving	3.81	0.747	3.19	0.972	0.62	0.389	0.851	5.36***	.000
Critical Thinking	3.81	0.851	3.11	1.037	0.70	0.456	0.933	5.83***	.000
Creativity	3.76	0.843	3.16	1.023	0.60	0.338	0.849	4.65***	.000

Note. *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed). *MD* = Mean Difference, CI = Confidence Interval.

The study found that there were expectation-performance gaps across the eight digital competencies. The expectation-performance gap identified in this study aligns with previous studies on generic and professional skills (Abayadeera & Watty, 2014; Albrecht & Sack, 2000; Bui & Porter, 2010; Hassall et al., 2005; Howcroft, 2017; Jackling & De Lange, 2009; Kavanagh & Drennan, 2008). Similar results have been found in Malaysia by Norman et al. (2018) and Phan et al. (2020) on generic skills. The findings of this study and previous studies suggest that accounting graduates' acquired competencies do not meet employers' standards and expectations. This issue is not new in accounting education, as the education provided has continually faced challenges to fully meet employers' expectations. Consequently, accounting education has been criticised for not appropriately addressing the competencies demanded by employers (Awayiga et al., 2010; Hussein, 2017; Low et al., 2013).

The largest significant gap was found in technical digital competencies, particularly in information system. This is consistent with Maali and Al-Attar (2020), who noted that employers valued proficiency in information system but perceived graduates' lack proficiency in this area. One reason for this gap may be the rapid pace of technological advancements, which require ongoing adaptation. However, due to institutional constraints, accounting programmes may not always incorporate the latest technologies, leaving graduates less prepared to meet the practical needs of employers. As a result, graduates are often trained with basic and commonly used software in structured academic settings, which limits their preparedness for real-world applications (Ghazali et al., 2022; Heang et al., 2019). As one employer noted, "Students need to be trained to use more accounting and audit software as part of their syllabuses" (EMP 57, Director).

Following closely is data analytics, which employers consider data analytics as important but ranks lower than some other digital competencies. Despite this, graduates' performance in this area remains subpar, creating a noticeable gap between employers' expectations and graduates' actual competency levels. In addition to Microsoft Excel, employers expect graduates to be competent in using advanced tools such as Microsoft Access or SQL and apply data analytics effectively to real-world datasets. However, findings indicate that graduates primarily rely on Microsoft Excel and basic accounting software, highlighting a mismatch between the tools used in academia and those required in the workplace. This gap is further compounded by institutional limitations. In Malaysia, learning data analytics with advanced tools is still in its early stages, and available systems are not yet fully integrated (West et al., 2018), especially within accounting education (MIA, 2021; Salleh et al., 2023; Zin et al., 2022). Similarly, data visualisation also exhibited a significant gap. Employers expect graduates to be highly competent in this area, specifically tailored to their organisational needs. Again, this could be partly due to HEIs' limitations such as inadequate funding for updated software and teaching materials, making it difficult to provide the necessary training.

Among the generic digital competencies, critical thinking showed the largest gap. Employers often face complex, real-world problems that require their employees to critically analyse situations and make informed decisions, particularly in technology-driven environments that can be enhanced by using digital tools such as data analytics and visualisation (Jackson et al., 2020). However, this study shows the demand for high-level cognitive competencies is often not fully met by graduates. This gap may stem from Malaysian academic settings, where some courses incorporate traditional case scenarios and problem-based learning to develop students' critical thinking (Manaf et al., 2011). However, the continued reliance on traditional teaching methods, which emphasise rote learning and procedural knowledge, may limit the extent to which this competency is fully developed (Rodzalan & Saat, 2018). Additionally, the lack of digital tools and resources to teach virtual case studies and communication simulation in academic environments further restricts graduates' ability to apply critical thinking in technology-driven contexts.

Other digital competencies such as data governance, communication, problem-solving, and creativity also display a significant gap. Overall, the expectation-performance gap may stem from various factors, including the institutional and educator factors that constrain educators from developing the competencies to the level employers desire for accounting graduates to acquire. Bui and Porter's (2010) framework identifies such gaps as causal components of the expectation-performance gap. In this study, while educators often acknowledge industry demands and have a higher expectation than employers, their ability to meet these expectations is hindered by curriculum overload, limited resources, insufficient IT skills among educators, and outdated curriculum materials, which in turn affects graduates' digital competencies. On the other hand, employers' evaluations are often shaped by the specific needs of their organisations and bring added value to the workplace (Phan et al., 2020). They expect graduates to not only possess foundational competencies but also to adapt and apply them in dynamic, real-world environments. However, these expectations can sometimes surpass what is feasible within the constraints of academic programmes, which are often limited in their ability to integrate the latest industry demands.

In summary, the findings confirm a persistent expectation-performance gap in graduates' competencies, particularly in digital competencies. This gap can be attributed to institutional limitations, curriculum design, and educators' preparedness. These findings highlight the need for structural and pedagogical reforms to better align academic preparation with industry needs. Table 7.11 provides a summary of the findings on the gaps.

Table 7.11 *Summary – Findings of the Gaps*

Gaps	Research Questions	Results
Expectation Gap		
1	Are there any differences in the perceptions of educators and employers regarding the level of digital competencies desired of accounting graduates?	Gap exists across all digital competencies.
2	Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies desired of accounting graduates?	Gap exists across all digital competencies.
3	Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies desired of accounting graduates?	No gap across all digital competencies, except data analytics.
Performance Gap		
4	Are there any differences in the perceptions of educators and employers regarding the level of digital competencies that accounting graduates have acquired upon graduation?	Gap exists across all digital competencies, except data governance, problem-solving and critical thinking.
5	Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies that accounting graduates have acquired upon graduation?	No gap across all digital competencies, except problem-solving and critical thinking.
6	Are there any differences in perceptions of employers and graduates regarding the level of digital competencies that accounting graduates have acquired upon graduation?	Gap exists across all digital competencies.
Constraints Gap		
7	Are there any differences in the perceptions of educators regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?	Gap exists across all digital competencies.
8	Are there any differences in the perceptions of graduates regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?	Gap exists across all digital competencies.
Expectation-Performance Gap		
9	Are there any differences in the perceptions of employers regarding the desired level of digital competencies accounting graduates should have acquired and the level of digital competencies accounting graduates they hired have acquired upon graduation?	Gap exists across all digital competencies.

7.6 Summary of the Chapter

This chapter presented findings and discussion on expectation gaps, performance gaps, constraints gaps, and the expectation-performance gap. The chapter began with expectation gaps focusing on three comparisons: educators versus employers, graduates versus educators, and employers versus graduates. The study identified expectation gaps between educators and employers across all eight digital competencies, with the largest gap found in data analytics. Similarly, gaps were observed between graduates and educators. Educators generally had higher expectations than both employers and graduates, driven by the aim to comprehensively prepare graduates for a technology-driven future and meet accreditation standards. In contrast, employers prioritised competencies that meet their immediate organisational needs, leading to less emphasis on certain competencies such as data analytics competency compared the other digital competencies. While employers and graduates mostly shared similar expectations regarding digital competencies, data analytics stood out as the only area where graduates placed higher importance, indicating their intent to be well-prepared for the evolving digital workplace.

Performance gaps were also explored between similar groups. This study found performance gaps between educators and employers in areas such as information system, data visualisation, data analytics, communication, and creativity. Educators consistently rated graduates' competency levels higher than employers. Interestingly, the study found no substantial performance gap between graduates and educators, suggesting that graduates' self-assessed competencies generally align with educators' perceptions, except for problem-solving and critical thinking. Differences emerged between employers and graduates across all digital competencies. Employers consistently rated graduates lower than graduates' self-assessed competence. Employers' ratings may be affected by their direct experience working with graduates, their experience in the field, and organisational needs.

Gaps in the digital competencies expected by the educators and the actual levels of competencies acquired by the graduates were also identified, highlighting a constraints gap. Constraints gaps were found in all digital competencies, particularly notable in higher-order thinking skills such as problem-solving and critical thinking, as well as technical skills such as data analytics. These gaps were attributed to several factors, including academic staff and institutional barriers such as curriculum overload, a lack of qualified and technologically literate educators, and insufficient institutional support in terms of resources and infrastructure. Most educators did not perceive students' lack of IT knowledge, interest, or confidence as primary barriers, contradicting some previous studies. Instead, they viewed academic and institutional factors as the major obstacles to fully developing the digital competencies needed for today's accounting graduates. Graduates also observed constraints gaps across all digital competencies. Noting that their expectations aligned closely with those of employers, likely due to their exposure to real-world applications through internships and job experiences, which provided insights into needs. However, they acknowledged gaps in the competencies they had acquired, indicating that their education did not fully equip them with the competencies they expected.

Finally, this study highlighted a significant expectation-performance gap across all digital competencies, particularly in technical digital competencies such as information system, data analytics, and data visualisation, as well as generic skills such as critical thinking. Using stakeholder theory, 'desired' scores are read as stakeholder expectations and 'acquired' scores as programme outputs. Comparing the two shows where programmes met expectations and where gaps remained. The analysis also indicates where educators, employers and graduates share similar expectations and where their views differ. This study supported Bui and Porter's (2010) framework, which identified performance gaps and constraints gaps as causal components of the expectation-performance gap. However, unlike Bui and Porter's suggestion that the expectation gap primarily stemmed from inadequate communication and understanding between educators and employers, this study suggests otherwise. Educators in this study appeared to acknowledge the rapid pace of technological advancement and tended to have higher expectations than employers. They also demonstrated efforts to align with industry expectations. Nevertheless, academic programmes often failed to provide adequate training due to various constraints. Closing these gaps requires conscious efforts to address the constraints that hinder the development of digital competencies, which in turn will help align educational curricula more closely with industry needs.

The next chapter provides a conclusion of the study.

Chapter Eight: Conclusion

8.1 Overview

This study draws upon human capital theory, which highlights the importance of investing in competencies to meet evolving industry demands. As technology advances, the need for digital competencies has grown significantly in the accounting profession. Earlier evidence suggests that competency gaps exist in accounting education. More specifically, earlier studies have identified gaps in generic, professional, and soft skills. However, less attention has been given to digital competencies, despite their growing relevance in today's digital age.

The digital competency gaps among accounting graduates in this study were examined through the lens of stakeholder theory, focusing on educators, employers, and graduates as key stakeholders. This theory highlights the differing interests and expectations of each group, which can lead to conflicting views. Educators design and deliver the curriculum to equip graduates with the necessary competencies while ensuring alignment with academic standards. Employers, on the other hand, expect graduates to be job-ready and seek graduates who can immediately add value to their organisations. Meanwhile, graduates expect their education to adequately prepare them for the job market. These differing perspectives can lead to misalignment between what is taught, what is expected, and what is ultimately acquired. Given this potential disconnect, this study examines the expectations of educators, employers, and graduates regarding digital competencies, as well as their perceptions of the competencies acquired by graduates at university. Furthermore, it seeks to examine any significant differences in the perceptions among these groups and to identify the challenges educators face in helping graduates develop their digital competencies to the level that they desire.

Adopting a positivist paradigm, this study employs a quantitative approach to gather data. Questionnaires were distributed to educators, employers, and graduates in Malaysia, to capture their perceptions of the desired and acquired level of digital competencies among accounting graduates. This approach provides a comprehensive view of stakeholders' diverse needs and expectations, particularly regarding essential digital competencies for the accounting profession. Importantly, the study considers a broad spectrum of digital competencies, both technical and generic competencies, with the latter specifically related to technology usage. These competencies include information system, data visualisation, data analytics, data governance, communication, problem-solving, critical thinking, and creativity, all of which are essential in preparing graduates to meet the demands of the profession in the digital age.

This chapter provides a comprehensive summary of the findings of the study and is organised in the following manner. Section 8.2 presents the key findings, focusing on the level of expectations, the level of performance, and the identified gaps in digital competencies among accounting graduates as perceived by educators, employers, and graduates themselves. Section 8.3 discusses the study's contributions, highlighting how this study contributes to accounting education literature, existing framework and methodology. Section 8.4 addresses the implications of the study, and Section 8.5 offers recommendations for improving accounting education and practice. Section 8.6 highlights the study's limitations, considering factors such as sample size, methodological constraints, and contextual boundaries that may have impacted the generalisability of the findings. Finally, the chapter concludes with Section 8.7, providing suggestions for future research.

8.2 Key Findings

Several key conclusions have been drawn from the research objectives of this study. These conclusions are presented in the following subsections.

8.2.1 Stakeholder Perceptions of Expected Digital Competencies

This section highlights the desired level of digital competencies as perceived by educators, employers, and graduates. The findings indicate that all groups have high expectations for the digital competencies accounting graduates should acquire, with particular emphasis on communication, data visualisation, data governance, and information system. Communication competency was consistently rated as the most important by all three stakeholders. Prior research on generic skills has emphasised the significance of communication in the workplace. The findings of this study further demonstrate that, even in the digital age, communication remains critical as accounting professionals must effectively convey complex financial information through various digital platforms. Although the ranking order of data visualisation, data governance, and information system varied slightly across the groups, these competencies were also consistently rated as most essential. Data visualisation has become increasingly critical, because of the heightened reliance of accounting professionals on visual representation of data in their decision-making processes. In addition, data governance, particularly in the context of data security and privacy, is also crucial in the digital age. While information system was viewed as more routine, it remained essential for accounting graduates. Skills such as searching for data, understanding different data types and managing general ledger modules such as charts of accounts, journal entries, and trial balances within accounting software are fundamental to performing daily accounting tasks.

Beyond these competencies, critical thinking, problem-solving, creativity, and data analytics were also highly valued across all three stakeholder groups, reflecting the increasing demand for graduates with diverse digital competencies. Higher-order thinking competencies, such as critical thinking and problem-solving are needed to operate current and future advanced technologies. This operation requires the ability to assess, analyse, interpret, and critically apply information to support effective decision-making, which are the key aspects of these competencies. Likewise, creativity was viewed as valuable particularly in fostering innovative approaches to problem-solving and adapting to technological advancements. The emphasis on data analytics highlights the shift towards data-driven in accounting practices, requiring graduates to interpret and analyse financial data effectively, although it is not rated as highly as other competencies by employers and graduates.

In addition, employers expect graduates to be competent in accounting software and advanced systems such as SQL, SAP, Oracle, and Audit Express, along with being proficient in Microsoft Excel. Despite its significance, findings indicate that less than half of the educators reported that they incorporated Excel into their courses. Given that Excel is commonly used in AIS courses in Malaysia, strengthening its integration into the curriculum is essential. Enhancing Excel proficiency and incorporating updated accounting software into AIS courses would better align educational practices with industry demands, ensuring graduates are well-prepared for the workforce.

Interestingly, all stakeholder groups generally held consistent expectations for most digital competencies, regardless of differences in their demographic subgroups. However, some variations were observed. Among educators, expectations were consistent across technology usage and academic positions, except that public universities had higher expectations for data governance than those from private universities. Additionally, senior educators with 20 or more years of experience had higher expectations for data analytics, data governance, and problem-solving compared to their less experienced counterparts. These findings suggest that while a shared understanding of digital competencies exists, certain factors such as experience and institutional context can shape expectations.

Employers also exhibited similar expectations across positions, organisation sizes, and specialisations. However, expectations varied based on organisation type and experience. Employers with more experience expect high competencies in data visualisation, data analytics, communication, critical thinking, and creativity. Additionally, organisation type played a role, as public practice (non-audit) employers held higher expectations than those in the private sector. This indicates that, while there is a shared baseline expectation for digital competencies, the level of competency desired by employers can differ depending on the operational context and their specific needs.

Graduates' expectations regarding digital competencies remained consistent regardless of employment status, organisation size, work experience after graduation, organisation type, and position. However, differences in data analytics and communication emerged based on education level. Diploma and bachelor’s degree holders reported higher expectations compared to master’s graduates. This may reflect more limited academic exposure among the former groups, leading them to perceive data analytics as more important based on industry trends. In contrast, master’s graduates having engaged in more advanced or applied academic experience, may have a deeper understanding of its complexity, resulting in more moderate expectations.

8.2.2 Stakeholder Perceptions of Acquired Digital Competencies

This section presents stakeholders’ perceptions of the digital competencies acquired by accounting graduates. Educators generally perceived accounting graduates as having a high level of digital competencies upon completing their studies, particularly in communication, data visualisation, information system, and data governance. They also perceived graduates as highly competent in creativity and data analytics, while critical thinking and problem-solving were rated as average. Employers recognised communication as graduates’ strongest competency, followed by data governance and information system. However, only communication was rated at a high level, while all other competencies including data governance, information system, problem-solving, creativity, data visualisation, critical thinking, and data analytics were considered average. Graduates, in contrast, rated all their digital competencies at high levels, with communication as their most highly acquired competency, followed by information system and data governance.

The consistent recognition of communication as the top acquired competency by all three stakeholder groups suggests that graduates are highly proficient in communicating ideas and information effectively in professional settings. This strength is likely due to the increased usage of digital tools and platforms across the HEIs, fostering the development of communication competency. Being digital natives, graduates have grown up using a wide range of technology including social media and other collaborative platforms, allowing them to adapt easily to the demands of digital communication in professional contexts. This extensive exposure to digital communication tools likely explains why communication is considered a core strength of accounting graduates. Information system and data governance were also ranked among the strongest digital competencies of accounting graduates by all three stakeholders.

Additional analyses of this study suggest that educators' perceptions of acquired digital competencies were generally consistent across demographic subgroups, except for critical thinking, where public university educators rated graduates lower than those from private universities. Employers also showed no significant differences based on position, work experience, or organisation size, suggesting a consensus on graduates' acquired competencies. However, public practice audit employers rated graduates significantly lower than those in non-audit roles, particularly in information system, data visualisation, data analytics, data governance, communication, critical thinking, and creativity. The structured nature of audit work and differences in workplace tools may explain this gap, while broader competency demands in non-audit roles align better with academic training. Public practice audit employers also rated graduates lower than public sector employers in information system and data governance. Additionally, employers' specialisations influenced perceptions, with auditing employers rating graduates lower in information system and creativity compared to accounting employers, likely due to the specialised tools required in auditing. Similarly, auditing, accounting, and taxation employers perceived graduates to have a lower level of competence in digital competencies than those in consulting and advisory, where digital competencies have broader applications. These findings suggest that core accounting fields require more specialised competencies, whereas non-accounting fields assess digital competencies in a more general context, leading to higher ratings of graduates' acquired competencies.

There was a general agreement among graduates regarding their acquired digital competencies upon graduation, with no significant differences across education levels, job positions, organisation types, years of work experience, or organisation size. This consistency suggests that Malaysia's standardised education curriculum provides uniform exposure to digital competencies and industry expectations. However, a notable exception was observed in the communication competency, where graduates in SMEs rated themselves higher while unemployed graduates rated themselves higher in creativity.

8.2.3 Expectation, Performance, and Constraints Gaps, and the Expectation-Performance Gap

This section highlights the gaps in digital competencies identified in this study. Building on the gap framework proposed by Bui and Porter (2010), this study investigated the following gaps:

a) the expectation gaps between the three stakeholder groups (RQs 1, 2, 3),

b) the performance gaps between the three stakeholder groups (RQs 4, 5, 6),

c) the constraints gaps as perceived by educators and graduates (RQs 7, 8),

d) the expectation-performance gap from the perspective of employers (RQ 9).

The findings related to each of the research questions posed in this study are summarised below.

8.2.3.1 Expectation Gaps

RQ 1: Are there any differences in the perceptions of educators and employers regarding the level of digital competencies desired of accounting graduates?

This study identified significant differences in expectations between educators and employers across all eight digital competencies, indicating a clear expectation gap. The largest gap appeared in data analytics, creativity, and data visualisation, followed by problem-solving, critical thinking, communication, information system, and data governance. Overall, educators expected graduates to acquire these digital competencies at a higher level than employers deemed necessary.

RQ 2: Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies desired of accounting graduates?

Differences in expectations were also found between graduates and educators. The most pronounced gap is in the communication competency, followed by data analytics, data visualisation, data governance, creativity, problem-solving, information system, and critical thinking. Overall, educators consistently expected a higher level of competence across all digital competencies than graduates perceived.

RQ 3: Are there any differences in the perceptions of employers and graduates regarding the level of digital competencies desired of accounting graduates?

The results indicate that there were no significant differences in expectations between employers and graduates for most of the digital competencies. This includes areas in information system, data visualisation, data governance, communication, problem-solving, critical thinking, and creativity. However, a notable expectation gap existed in the data analytics competency, where graduates expected a higher level of competence in data analytics than employers expected. Overall, employers and graduates share strong alignment in their expectations of most digital competencies.

This study concludes that stakeholder expectations are largely misaligned, except between employers and graduates. Educators held the highest expectations, surpassing those of both employers and graduates. This heightened expectation is likely due to educators' focus on preparing their students comprehensively for a technology-driven future and meeting accreditation standards. Educators often aim to instil a high level of proficiency so that their students are well prepared for the job market. In contrast, employers prioritised digital competencies that meet their immediate organisational needs, placing less emphasis on certain competencies than others. They also believed that some digital competencies could be further developed through work experience and training. Interestingly, employers and graduates shared mostly aligned views on digital competencies. This alignment can be attributed to graduates' exposure to employers' expectations through internships or work experience, offering practical insights into workplace demands.

8.2.3.2 Performance Gaps

RQ 4: *Are there any differences in the perceptions of educators and employers regarding the level of digital competencies that accounting graduates have acquired upon graduation?*

This study identified significant differences between educators' and employers' perceptions of the digital competencies acquired by graduates, highlighting a performance gap. Educators consistently rated graduates' competencies higher than employers did, particularly in data visualisation, data analytics, communication, information system, and creativity. However, no gaps were found in data governance, problem-solving, and critical thinking, suggesting an alignment in these areas. Overall, although educators perceived graduates' acquired digital competencies as higher than employers acknowledged, alignment existed in some areas.

RQ 5: *Are there any differences in the perceptions of graduates and educators regarding the level of digital competencies that accounting graduates have acquired upon graduation?*

The findings showed there is no significant difference in perceptions regarding graduates' acquired digital competencies between graduates and educators across six of the eight competency areas including information system, data visualisation, data analytics, data governance, communication, and creativity. However, significant differences emerged in critical thinking and problem-solving, where graduates rated their competencies higher than educators. Overall, graduates and educators demonstrated broad alignment in their perceptions of most digital competencies, with differences emerging only in critical thinking and problem-solving.

RQ 6: Are there any differences in perceptions of employers and graduates regarding the level of digital competencies that accounting graduates have acquired upon graduation?

Significant differences were found between employers' and graduates' perceptions of acquired digital competencies, indicating performance gaps. The largest gaps were in data analytics, followed by critical thinking, data visualisation, creativity, problem-solving, information system, data governance, and communication, with graduates consistently rating their competencies higher than employers. Overall, employers rated graduates' acquired digital competencies lower than graduates rated themselves.

This study concludes that stakeholders' perceptions of graduates' acquired digital competencies are largely misaligned, except between graduates and educators. Educators consistently rated graduates' digital competencies higher than employers, reflecting differences in curriculum coverage, assessment methods, and workplace needs. One reason for educators' higher ratings is their continuous involvement in curriculum development, informed by interactions with the accounting profession and employers, particularly through MIA initiatives and internship programmes. This engagement provides them with a broader perspective on the competencies essential for graduates' success. Their ongoing efforts to align curricula with industry needs reinforce their belief that graduates are well-prepared.

Furthermore, educators evaluate competencies in structured academic settings, whereas employers prioritise real-world application and job performance, further contributing to this misalignment. Employers tend to assess graduates based on specific organisational needs, often identifying gaps between academic preparation and practical application. For example, universities tend to focus on foundational and commonly used tools such as Microsoft Excel, MYOB, and UBS, whereas employers, particularly those in audit and data-driven roles, require proficiency in more specialised software such as Power BI and SQL. Diverse systems used by different organisations compared to specific software taught in universities further contribute to this gap. This variation may lead employers to perceive graduates as less prepared for workplace systems than educators might assume. Many employers wish to see that graduates they hire possess the necessary digital competencies to work effectively in their organisation, yet universities do not always provide training on updated tools and technologies used in the workplace limited by constraints.

Interestingly, graduates' self-assessed competencies mostly aligned with educators' perceptions, However, this alignment did not extend to employers, who consistently rated graduates lower across all digital competencies, particularly in data analytics. The greatest discrepancies emerged in higher-order thinking competencies such as problem-solving and critical thinking, where graduates appeared more confident, while educators and employers offered more measured evaluations informed by practical experience and industry demands.

8.2.3.3 Constraints Gap

RQ 7: *Are there any differences in the perceptions of educators regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?*

The results reveal significant gaps between the digital competencies educators expect graduates to attain and the competencies graduates actually acquire across all digital competencies, indicating constraints gaps. The largest gaps were in problem-solving and critical thinking. Educators also reported notable gaps in technical competencies, including information system, data visualisation, data governance, and data analytics. Additional gaps emerged in other generic competencies, such as communication and creativity. Overall, the findings suggest that graduates' acquired competencies do not meet educators' expectations, with educators believing graduates should attain a significantly higher level of digital competencies than they actually achieve.

RQ 8: *Are there any differences in the perceptions of graduates regarding the desired level of digital competencies accounting graduates should have acquired upon graduation and the level of digital competencies they have acquired upon graduation?*

Likewise, graduates reported significant differences between the digital competencies they expected to acquire and those they actually acquired in all eight areas. Their acquired levels are significantly lower than their expectations, highlighting constraints gaps. The most pronounced gaps appeared in data visualisation, data analytics, problem-solving, critical thinking, followed by information system, creativity, data governance, with communication exhibiting the smallest gap. Overall, their acquired competencies did not meet their expectations.

There is a broad misalignment between digital competencies that educators believe are essential for workplace readiness and the actual competencies acquired by graduates. This gap suggests that while the Malaysian education curriculum incorporates digital competencies, it may not fully equip graduates with the digital competencies needed in the workplace. Similarly, graduates reported a gap between their own expectations and the competencies they ultimately acquired. Their expectations closely aligned with those of employers, likely due to exposure to real-world applications through internships or job experiences, which helped them better understand industry needs. However, graduates acknowledged that their education did not help them acquire the competencies they expected, emphasising the need for further development in digital competencies.

Despite high expectations from both educators and graduates, graduates' acquired competencies remained below these expectations. Educators identified academic and institutional factors as the main contributors to this gap, viewing them as key obstacles to equipping graduates with the digital competencies needed in today's digital era. Among the academic staff-based barriers, curriculum overload was cited as the most significant barrier, followed by a shortage of qualified accounting academics, a lack of technological literacy among accounting academics, and limited interest in teaching IT. On the institutional side, the primary barriers were a lack of institutional support, followed by inadequate infrastructure and a lack of teaching materials. However, most educators did not perceive students' lack of IT knowledge, interest, or confidence as primary barriers. These findings suggest that the current Malaysian curriculum lacks the necessary support to enhance the development of critical digital competencies, emphasising the need for better institutional support and better-trained faculty.

8.2.3.4 Expectation-Performance Gap

RQ 9: Are there any differences in the perceptions of employers regarding the desired level of digital competencies accounting graduates should have acquired and the level of digital competencies accounting graduates they hired have acquired upon graduation?

The study identified significant differences between employers' expectations of graduates' digital competencies and the actual competencies acquired by those they hired, indicating an expectation-performance gap. The largest gap appeared in information system, data analytics, and data visualisation, followed by critical thinking, data governance, problem-solving, creativity, and communication. Overall, employers consistently reported that graduates fell short of their desired competency levels, achieving only average competency across most areas.

This study concludes that employers have higher expectations of the graduates' digital competencies, viewing graduates as not having achieved the level they expected in most areas. Notably, this gap is not due to educators having lower expectations than employers regarding the level of competency graduates should acquire. In fact, educators in this study acknowledged the rapid pace of technological advancement and expressed even higher expectations for graduates than employers. However, while employers seek graduates who can adapt to and apply advanced technologies in dynamic, real-world environments, academic programmes often struggle to provide sufficient training. Constraints such as curriculum overload, limited institutional resources and infrastructures, and a lack of specialised training hinder the development of graduates' digital competencies. This study supports Bui and Porter's (2010) framework, which identifies constraints gaps as causal components of the expectation-performance gaps. The findings emphasise the urgent need to strengthen the accounting curriculum by addressing institutional and academic constraints, ensuring that graduates are not only equipped with relevant digital competencies but are also better aligned with the evolving expectations of employers in a digitally driven profession.

Overall, the findings of the different gaps in this study align with stakeholder theory, which provides valuable insights into the roles and perspectives of different groups. According to this theory, educators, employers, and graduates have differing perspectives on expectations and performances due to their distinct interests and roles. Employers emphasise practical workplace competencies that can give value to their organisations, educators tend to focus on broader educational objectives to produce job-ready graduates, and graduates preparing themselves for the workforce. Understanding these differing interests is essential to bridging the gaps in graduates' digital competencies. In addition, the findings resonate with human capital theory, which emphasises the importance of education in developing the competencies needed for economic productivity. In this context, HEIs play a crucial role in cultivating human capital by equipping graduates with the digital competencies demanded by the evolving labour market. Aligning educational outcomes with stakeholder expectations is therefore vital to ensuring graduates are truly prepared for the digital demands of the accounting profession.

8.3 Contributions

The findings of this study contribute to the accounting education literature by offering insights specific to the Malaysian context, which has been underrepresented in prior research. To the best of the author's knowledge, no previous research has specifically examined the gaps related to digital competencies in accounting education. Therefore, this study helps to fill the gap in the literature by comparing the expectations and perceptions of different stakeholder groups regarding digital competencies, using the Malaysian context as an example.

This study extends Bui and Porter's (2010) expectation-performance gap framework by incorporating graduates' perspectives in addition to educators and employers. By capturing these stakeholder groups' perspectives, the study provides a more holistic understanding of the digital competencies required for the modern accounting profession in Malaysia. This study explores multiple dimensions of gaps such as the expectation gap, performance gap, constraints gap, and the expectation-performance gap by comparing the perceptions within and between these stakeholder groups. Such an approach reveals a better understanding of the digital competencies needed for modern accounting professionals in Malaysia, especially in areas such as data analytics, data visualisation, and problem-solving, which have not been widely studied in the Malaysian context.

While most prior studies focused mainly on generic, employability, or professional skills, this study is the first to comprehensively examine digital competencies in accounting using the digital competencies framework. The use of a broad digital competencies framework for accounting graduates highlights that in addition to technical digital competencies, generic competencies are equally important to enhance the effective use of digital tools. To the best of the author's knowledge, no specific digital competencies framework has been proposed for accounting education that integrates both technical and generic competencies. Generic competencies such as critical thinking, problem-solving, communication, and creativity are increasingly important in today's dynamic digital landscape and are arguably as crucial as technical competencies. The gaps identified in these areas further highlight the need to address them within the curriculum. The proposed digital competencies framework aims to guide Malaysian higher education institutions in developing these competencies within accounting programmes and offers valuable insights for future improvements in accounting education and research.

Additionally, the study provides a precise understanding of the specific software required for contemporary accounting roles in Malaysia and the level of proficiency expected by local employers. It provides a clearer insight into the discrepancies in digital competencies within Malaysian education and identifies areas where graduates require further development to meet industry demands.

Further contributions of this study lie in its focus on identifying the constraining factors within accounting education, as perceived by educators. By examining these barriers, the study reveals the challenges that hinder the development of digital competencies, including curriculum overload, a lack of qualified academics to teach IT, inadequate infrastructure, and a lack of institutional support. These insights are valuable for universities, enabling them to identify areas where changes can be implemented to optimise the learning environment. Addressing these constraints can help institutions enhance their educational approaches, ultimately maximise the human capital of their graduates and better prepare them for the digital demands of the modern workforce.

Lastly, the frameworks and methodology employed in this study can be applied by other researchers across different educational systems and regional contexts. By incorporating the perspectives of key stakeholders such as educators, employers, and graduates, this approach provides valuable insights into the development of digital competencies. It facilitates the identification of gaps and helps align educational practices with workforce needs, making it a useful tool for improving digital competencies development across diverse educational systems.

8.4 Implications

The findings of this study have significant implications for the future of accounting education in Malaysia, especially in the development of digital competencies essential for graduates' success in the workforce. All stakeholder groups emphasised the importance of digital competencies, highlighting the crucial role universities must play in equipping students to meet the evolving demands of the accounting profession, not to mention the cultivation of human capital. Universities are positioned to help graduates acquire the necessary competencies to thrive in a technology-driven workplace. This approach not only enhances graduates’ employability but also supports broader economic growth by fostering a more digitally proficient workforce, ultimately better meeting the needs of all stakeholders in the accounting profession.

This study identifies several critical gaps: expectation, performance, constraints, and expectation-performance gaps, all of which show that current accounting programmes in Malaysia are not fully equipping students with the digital competencies required by the profession. Educators generally have higher expectations for graduates’ digital competencies than employers, highlighting their commitment to meeting evolving standards. However, a misalignment exists between employers' expectations and graduates' actual competencies, revealing that accounting education in Malaysia often struggles to align with industry needs. Addressing these gaps is essential; otherwise, universities risk producing graduates who may not be adequately prepared for the digital competencies required in the workforce, limiting their ability to transition effectively into employment.

Graduates' alignment with employers' expectations of digital competencies further highlights the importance of real-work experiences such as internships in bridging the gap between academic learning and industry demands. While internships are a compulsory component of Malaysian accounting education, their effectiveness depends on the extent to which students gain exposure to advanced digital tools used in professional settings. Employers often utilise specialised digital tools and software that may not be fully integrated into the academic curriculum, highlighting the need for more structured internships. These placements must not be mere formalities but rigorous, hands-on digital learning experiences that equip graduates with practical digital competencies relevant to the workplace. Stronger collaboration between universities and industry is crucial to ensuring that internships provide meaningful exposure, thereby better preparing graduates for the technological demands of the accounting profession.

This study also identifies several barriers that are currently hindering the development of digital competencies in Malaysian accounting education. The shortage of qualified educators, curriculum overload, and the lack of institutional support and resources limit the ability to cultivate necessary digital competencies among graduates. These challenges, if not addressed, will likely widen the digital competency gap. This could potentially make it more difficult for universities to adequately prepare students for the growing demands of the modern profession.

From an organisational and employers' perspective, applying human capital theory can help reshape talent management and resource allocation. Employers recognise that their workforce represents a significant investment, leading them to focus on attracting, developing, and retaining top talent. This involves not only hiring graduates with the right competencies and qualifications but also providing ongoing training and development opportunities to enhance human capital. Consequently, employers may hold slightly lower initial expectations than educators, viewing university education as a starting point and anticipating additional skill development within the workplace. This study implies that, although employers rely on universities to equip graduates with core competencies, fostering a strong working relationship between both parties is crucial, as long-term success in a rapidly changing digital landscape also depends on employers' role in further developing graduates' digital competencies through continuous training.

Finally, the study reinforces the relevance of stakeholder theory in accounting education. The gaps identified between educators, employers, and graduates indicate that universities cannot work in isolation. Engaging with all relevant stakeholders is essential to ensure that the curriculum remains aligned with the evolving needs of the profession. Stakeholder theory supports this by implying that balancing these interests is essential to ensure the overall effectiveness of accounting education.

In summary, this study has significant implications for the development of accounting curriculum in Malaysia. Continued efforts and improvements will help graduates achieve the desired levels of digital competencies to meet the demands of the evolving nature of the profession. The next section will offer specific recommendations to address these challenges.

8.5 Recommendations

This current study offers several recommendations for both accounting education institutions and employers in Malaysia. One of the key findings of this study is the significant gap between the digital competencies expected by employers and those acquired by graduates. Educators express a desire to cover competencies at a higher level than is currently possible, highlighting a need for additional support. Limited resources and curriculum overload restrict the ability of accounting programmes to fully prepare students for digital demands. Rather than overhauling the existing curriculum, universities could enhance digital competency development by providing greater support, such as increased funding for digital resources, improvements in digital infrastructure, and professional development opportunities for educators.

Effectively integrating emerging technologies into accounting programmes to the level desired by educators requires both financial and administrative support. It is essential that government and educational authorities allocate more resources toward technological infrastructure and tools that can be embedded into accounting programmes. Investment in digital laboratories, updated software, and cloud-based platforms enhances students' access to essential tools for developing critical digital competencies that the modern accounting industry demands. Equally important is the upskilling of educators. Institutions should provide support by prioritising the training of their teaching staff in areas such as data analytics, data visualisation, cloud computing, and digital governance. This can be facilitated through collaborations with statutory bodies, such as the MIA to offer regular workshops designed to equip educators with the necessary digital competencies on a regular basis. By empowering educators with these competencies, they can deliver more relevant and up-to-date content, ensuring that student learning aligns with the rapidly changing digital landscape of the accounting profession. Without these crucial investments, accounting programmes risk falling behind in preparing students for the digital future.

At the programme level, periodic curriculum reviews with industry stakeholders would help ensure that programs remain aligned with the evolving digital landscape and better equip graduates to meet current and future industry needs. Accounting programmes can adopt a more comprehensive, technology-driven curriculum that incorporates advanced digital tools and emerging technologies. Exposing students to a range of tools and technologies relevant to accounting would be beneficial. Based on earlier discussions, employers expect graduates to possess at least advanced beginner proficiency in key tools such as Power BI, Tableau, SQL, and computer-assisted auditing tools such as IDEA. To meet these industry demands, accounting programmes could expand their curriculum to provide deeper, more focused training in these tools, ensuring that graduates are not only competent but competitive in the modern accounting landscape. This includes emphasising the use of software such as Power BI, SQL, and auditing tools such as Audit Express and IDEA, while also strengthening the more established use of Microsoft Excel. Furthermore, integrating programming languages such as Python and R into the curriculum is recommended to enhance graduates' competencies in data analytics and advanced reporting, which are highly sought after in the job market. Extant literature highlights that the development of data analytics skills in Malaysian accounting education remains at an early stage (MIA, 2021; Zin et al., 2022). Despite clear directives from regulatory bodies like the MIA and the MQA, which expect higher education providers to align with industry standards and the national qualification framework, these critical digital competencies have yet to be properly embedded in the Malaysian curriculum.

In addition, accounting education programmes could also broaden their focus beyond technical competencies and place greater emphasis on cultivating key generic competencies related to technology usage as highlighted in this current study. To effectively develop these essential competencies, educators need to continuously integrate advanced learning methods such as virtual case studies, online discussion forums, and computer simulations, as recommended in numerous studies (Al-Hashimy et al., 2023; Huang et al., 2023; Kroon et al., 2021). These tools are expected to foster the critical thinking, problem-solving, and collaboration competencies needed in the digital age.

At the educator level, practical steps include mapping the eight digital competencies to course learning outcomes and weekly topics and sharing this map with students. Within each accounting course, a minimal common toolset could be embedded as the baseline. For universities with licence limits or budget constraints, educators could use widely available or free options, for example advanced Excel and the Power BI Desktop visualisation platform. Using this toolset, educators could set regular assessed practical tasks, such as short labs, case exercises and mini projects, so that students practise the skills throughout the semester. This approach is affordable and scalable. A course could begin with one core tool and a small set of activities, then add further tools and more complex tasks as resources allow. Educators could also invite industry speakers and use live briefs to keep activities aligned with the professional practice.

The findings of this study suggest that while internships play a key role in aligning graduates’ expectations with those of employers regarding digital competencies, there remains an opportunity to further enhance their effectiveness in developing practical digital competencies. Many universities worldwide do not require internships, limiting students' exposure to real-world professional environments. In Malaysia, however, internships are already a compulsory component of accounting education, providing students with an early introduction to the professional world. To further enhance the benefits of these internships, this study recommends that Malaysian universities implement more structured and immersive placements. These placements should focus on exposing students to emerging digital tools and technologies within the accounting industry, ensuring they gain practical, relevant experience aligned with industry standards. Strengthening the quality and scope of these internships can better equip students to meet the demands of the modern workforce.

Last but not least, as digital technologies continue to evolve, the digital competencies required in accounting may change significantly over time. Therefore, both graduates and educators must embrace a mindset of lifelong learning to keep pace with technological advancements in accounting. Employers also play a crucial role in this process, as human capital theory suggests that investing in continuous training enhances workforce capabilities. While universities provide the foundational competencies, employers are encouraged to offer ongoing training and professional development opportunities to ensure that graduates remain proficient in modern digital technologies. Strengthening this collaborative approach between universities, employers, and graduates will better prepare the accounting workforce for future technological demands.

8.6 Research Limitations

A key limitation of this study is the relatively small number of fully completed responses, particularly from educators and employers compared to graduates’ responses. However, as discussed in Chapter Five, the sample sizes meet established guidelines for subgroup comparisons in social science research (Kwak & Kim, 2017; Memon et al., 2020; Roscoe, 1975; Sekaran & Bougie, 2016), thus ensuring the validity of statistical analyses. The process of data collection was challenging, time constrained, and time-consuming. It is possible that some who received the questionnaires may not have fully understood certain questions, particularly the more technical ones. In addition, those without a background in accounting information systems or with limited IT literacy may have found the questions challenging to respond to. Employers' busy schedules may have also contributed to the low response. Furthermore, the questionnaires might have also reached those who have no interest in surveys. As a result, the limited number of usable responses may have affected the comprehensiveness of the findings, limiting the ability to generalise the results to a wider population. While a shorter questionnaire might have improved the response rate, this study prioritised a thorough analysis of eight dimensions of digital competencies to capture the perspectives of educators, employers, and graduates in a meaningful way.

Another limitation of this study is the reliance on self-assessed perceptions of digital competencies, which introduces the potential for self-reporting bias. Graduates for instance might have been overconfident in their acquisition of competencies, leading them to overestimate or misjudge their proficiency in certain areas. Some participants might have been reluctant to acknowledge lower levels of digital competencies. Despite efforts to ensure anonymity and confidentiality of information provided to encourage honest responses, self-reporting bias is difficult to eliminate completely. Furthermore, this study specifically asked graduates to reflect on the digital competencies they acquired upon graduation rather than those gained through work experience. The aim was to assess the extent to which universities prepared them for digital demands in the workforce. However, recalling skill development retrospectively may have posed difficulties for some participants, introducing a recall bias that could influence their responses. This is an unavoidable limitation in self-assessment studies, as graduates may not accurately remember the level of digital competencies they have acquired at the time of graduation. Similarly, educators may have displayed a tendency to express high expectations for graduates' competencies, possibly influenced by their role in preparing students to meet professional standards. This inclination may result in elevated perceptions of the ideal competency level expected from graduates, creating a potential discrepancy between expectations and actual competencies.

Further, this cross-sectional study provides a snapshot of the current state of digital competencies among accounting graduates. It does not offer longitudinal data to track changes over time. As a result, it is limited in its ability to capture how digital competencies develop throughout the educational process and upon graduation.

Finally, although this study focuses on educators, employers, and accounting graduates in Malaysia, the findings may not be fully generalisable to other countries or educational systems. Each country's accounting education structure, cultural context, level of economic development and industry needs vary. Therefore, the results of this current study should be interpreted with caution when applying them to a broader context outside Malaysia.

8.7 Future Research

This current study offers several opportunities for future research. The digital framework adopted in this study has proven to be a suitable tool for analysing the expectation, performance, constraints, and expectation-performance gap across eight groups of digital competencies. It serves as a suitable model for future research providing a robust foundation for further exploration in this area. In addition, a key insight that emerges from this study is the emphasis by an employer on the importance of a positive attitude toward learning new tools. Employers prefer graduates with a positive attitude as they are better equipped to keep pace with these changes and can quickly adapt to new systems and processes. This attitude also intersects with critical thinking, as it reflects graduates' openness, adaptability, self-confident, and willingness to engage with unfamiliar digital environments. Given these insights, future research could consider positioning positive attitude as a subcomponent under the critical thinking competency within the digital competencies framework and exploring its interconnection with other competencies. Further investigation is also warranted into how employers perceive the role of positive attitudes in the development and workplace readiness of accounting graduates within an increasingly digital environment. Extending the current framework to include these non-technical skills may reveal whether they influence existing gaps in stakeholders' expectations and performance in the digital age, thereby offering a more comprehensive view of the competencies necessary for today's accounting graduates.

Another potential direction for future research is to apply the digital competencies frameworks used in this study to a broader context. This could involve extending the research to other countries or regions with different accounting education systems and industry needs. By doing so, researchers could assess the applicability and relevance of the frameworks in diverse settings and identify any adjustments required to accommodate varying cultural, economic, or industry-specific factors. Additionally, future studies could compare findings across different economic development levels to further understand how expectations for digital competencies differ globally.

Future studies can also focus on exploring the differences in perceptions regarding digital competencies between educators, employers, and graduates in greater detail. Conducting in-depth interviews would provide qualitative insights into their specific expectations and perceptions of digital competencies. While this study employed a quantitative approach using surveys and open-ended questions, future research could incorporate qualitative methods to gain a richer and more nuanced overview.

Lastly, a longitudinal approach may help provide a deeper insight into how digital competencies develop throughout the educational process and post-graduation career careers. For example, tracking students from their first year of accounting studies through to several years after graduation could reveal how their digital competencies progress as they transition from academic settings to real-world professional environments. This will particularly be useful in understanding the long-term impact of curriculum changes and digital upskilling efforts. Furthermore, it will also help to identify whether the competencies acquired during university years are retained, improved, or become outdated as graduates enter the workforce. These insights are expected to offer a clearer picture of the effectiveness of the current education programmes in preparing students for the evolving demands of the accounting profession.

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Appendices

Appendix 5.1 *Summary of Experts' Interview Feedback*

1. <u>Accounting Professional Bodies & Employer</u>

a. Questionnaire Length and Focus

- The experts suggested shortening the questionnaire to improve response rates, as long forms may be ignored or completed partially.
- Questions should reflect practical business needs, focusing five to six competencies instead of the full list of nine. If it is too short, it will be too general.
- Align questions with employers' strategic thinking, reflecting what employers truly seek in graduates
- Recommendations included refining the language used in the questionnaire, such as replacing negative connotations (e.g., "manipulate" in data analytics) with more neutral terms.
- Ensure questions align with the research objectives and are free of ambiguity or technical jargon.

b. Rating Scale:

- A (1 to 5) scale was recommended for assessing competencies, as "0" was deemed inappropriate for evaluation.

c. Digital Competencies and Software:

Common software

- SMEs prefer Sage UBS, MYOB and SQL Accounting, while large/multinational corporations favour SAP and Oracle.
- Cloud-based tools like Audit Express Pro are gaining prominence.
- Zero and Quickbooks. Most companies use Quickbooks compared to Zero software as it is much cheaper, and the features are more competitive.

Auditing Tools

- IDEA, Teammate Analytics, and Audit Express Pro are used in specialised contexts, but manual methods still dominate.
  "If you are targeting audit/accounting firm: 9/10 of firm still doing accounting manually. And most audit firm in Malaysia using audit express pro (Cloud). It is expected that practitioners/employees able to use it"

Data Visualisation and Analytics

- Tools such as Microsoft Power BI should be included in the questionnaire, as they are more accessible than Tableau.

d. Additional Input:

- Use strategic method such as digital forms to make easier for participant to respond.
- Different type of company such as multinational, Audit/tax firm, commercial using different software. Suggestion: Add one column "not applicable to me"
- *"Graduates should consistently update their knowledge and be proficient with the latest software tools. Familiarity with outdated platforms such as MYOB and UBS are no longer sufficient in today's evolving technological landscape".*

2. Educators

a. Terminology and Definitions

- Provide clear explanations, use simple language for technical terms like "data analytics," "ERP," and "data visualisation" to ensure all educators, especially non-AIS specialists, understand the context.

b. Question Clarity and Structure:

- Avoid combining unrelated concepts in single questions (e.g., collaboration and participation, formal and informal communication).
- Split long or complex items into smaller, focused questions for better comprehension.

c. Competency-Specific Suggestions:

- Avoid irrelevant items and focus on essential skills.
- Data governance: Add questions on database recovery, backup procedures, and risk management.

d. General Information Section:

- Use ranges for demographic questions (e.g., age, years of experience) to ensure respondent comfort.
- Tailor options to Malaysian context (e.g., remove "non-binary" for gender).

Appendix 5.2 *Questionnaires*

(a) Educators

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

MASSEY BUSINESS SCHOOL
TE KURA WHAI PAKIHI

Digital Competencies of Accounting Graduates in Malaysia

INFORMATION SHEET FOR EDUCATORS

Researcher(s) Introduction

This research is being conducted by Norhasniza Hanum Binti Ishak, PhD student at Massey University, School of Accountancy. The academic supervisors are Associate Professor Lin Mei Tan and Associate Professor Radiah Othman.

Research Description

Digital technologies have changed how individuals do things and work. These changes demand the development of new digital competencies in the workplace. This PhD study intends to examine the level of digital competencies of Malaysian accounting graduates as perceived by educators, graduates, and employers.

For the purpose of this study, digital competencies are defined as the ability to explore new technological settings in a flexible way, as well as to analyse, select, and critically evaluate data and information. This study grouped the competencies into eight categories: (1) Information System, (2) Data Visualisation, (3) Data Analytics, (4) Data Governance, (5) Communication, (6) Problem Solving, (7) Critical Thinking, and (8) Creativity.

Invitation to Participate

You are invited to participate in this research by sharing your perceptions on the following sections:

- the level of digital competencies you reasonably expect accounting graduates to have acquired upon completion of their accounting degree,
- the desired level of digital competencies accounting graduates should have acquired upon completion of their accounting degree, and

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Private Bag 11222, Palmerston North 4442, New Zealand
06 356 9099 | www.massey.ac.nz

AACSB ACCREDITED Accounting

- the constraining factors in the development of accounting graduates' digital competencies at the university.

Your help with my PhD study would be greatly appreciated. As an educator, your participation would provide invaluable insights into the digital competencies of accounting graduates. Please read the instructions for each question and consider the response options carefully. The questionnaire consists of three sections; Section A: Level of Digital Competencies, Section B: Constraining Factors, and Section C: General Information. It should take about 20 minutes to complete this questionnaire.

Participant's Rights

You can withdraw from the research at any time before it begins. You can also withdraw while the research is in progress. However, it will not be possible to withdraw the information you have provided up to that point. If you decide not to participate, there are no consequences. Be assured that the confidentiality of the information solicited is guaranteed. This research is purely to satisfy the academic requirement only.

If you would like to receive a copy of the findings of this research, please provide your details at the end of the questionnaire. If you have any questions, either now or in the future, please feel free to contact:

PhD Student

Norhasniza Hanum Binti Ishak: [redacted]

Supervisors (School of Accountancy)

Associate Professor Lin Mei Tan: L.M.Tan@massey.ac.nz

Associate Professor Radiah Othman: R.Othman@massey.ac.nz

You may also contact the Massey University Human Ethics Committee (MUHEC) involving any concerns that you may have:

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz.

Do you consent and want to start the survey?

O Yes

O No

SECTION A: LEVEL OF DIGITAL COMPETENCIES

The following statements relate to eight categories of digital competencies. Drawing from your experience as an educator and using a scale of 1 (Very Low Level of Competence) to 5 (Very High Level of Competence), please rate:

(i) The level of digital competencies you reasonably expect accounting graduates to have acquired upon completion of their accounting degree.

(ii) The desired level of digital competencies accounting graduates should have acquired upon completion of their accounting degree.

Note:

The first part (i) refers to your reasonable expectation as an educator regarding the level of digital competencies accounting graduates at your university have attained after they complete their accounting degree programme.

The second part (ii) refers to your expectation as an educator regarding the level of digital competencies accounting graduates should have acquired after they complete their accounting degree programme.

		(i) Level of competence graduates have acquired 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
1.	**Information System** – use an accounting information system to support operational and financial processes in a digital environment.		
Able to:			
a.	Search for data, information, and content in digital environments.	O O O O O O O	O O O O O O O
b.	Understand different types of data (e.g., numeric, text).	O O O O O O O	O O O O O O O

c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	O O O O O O O	O O O O O O O
d.	Understand accounting databases (e.g., customers, inventory, and suppliers' information).	O O O O O O O	O O O O O O O
e.	Understand processes related to modules in a financial system (e.g., accounts payable module) in integrated system such as Enterprise Resource Planning (ERP).	O O O O O O O	O O O O O O O
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	O O O O O O O	O O O O O O O

2. Data Visualisation - Present data visually to explain key patterns, trends, and correlations to support decision making.		**(i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	O O O O O O O	O O O O O O O
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	O O O O O O O	O O O O O O O
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	O O O O O O O	O O O O O O O
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	O O O O O O O	O O O O O O O
e.	Select the best presentation approach for the targeted audience.	O O O O O O O	O O O O O O O

3. Data Analytics - Extract, transform, and analyse data to find trends and draw conclusions about the information contained.		**(i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	O O O O O O O	O O O O O O O
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	O O O O O O O	O O O O O O O
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	O O O O O O O	O O O O O O O
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL)	O O O O O O O	O O O O O O O
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	O O O O O O O	O O O O O O O

4. Data Governance - The process of managing the availability, utility, integrity, and security of data in accounting systems based on standards and policies.	**(i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:		

a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	O O O O O O O	O O O O O O O
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	O O O O O O O	O O O O O O O
c.	Understand the need to protect the security and privacy of stakeholder data.	O O O O O O O	O O O O O O O
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	O O O O O O O	O O O O O O O
e.	Know how to communicate the potential data errors and weaknesses.	O O O O O O O	O O O O O O O

5.	**Communication** – Convey thoughts, ideas, and information in various forms of communication, including written and spoken, using technology.	**i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use a range of different digital communication methods (e.g., email, webinars).	O O O O O O O	O O O O O O O
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	O O O O O O O	O O O O O O O
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	O O O O O O O	O O O O O O O
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	O O O O O O O	O O O O O O O

e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	O O O O O O O	O O O O O O O

6.	**Problem Solving -** Identify the problem, gather information, develop a solution and implement the solution in digital environment.	**i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	O O O O O O O	O O O O O O O
b.	Formulate an appropriate inquiry to diagnose the problem.	O O O O O O O	O O O O O O O
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a filesharing using accounting & collaboration software)	O O O O O O O	O O O O O O O
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	O O O O O O O	O O O O O O O
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	O O O O O O O	O O O O O O O

7.	**Critical Thinking -** Research, investigate, critically analyse, reflect, and apply professional judgment to evaluate data and information from a variety of sources in the digital environment.	**i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			

a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	O O O O O O O	O O O O O O O
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	O O O O O O O	O O O O O O O
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	O O O O O O O	O O O O O O O
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	O O O O O O O	O O O O O O O
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	O O O O O O O	O O O O O O O

8.	**Creativity** – Generate new ideas to emerge using digital technologies.	**i) Level of competence graduates have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	O O O O O O O	O O O O O O O
b.	Apply existing knowledge innovatively to a new situation.	O O O O O O O	O O O O O O O
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	O O O O O O O	O O O O O O O
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	O O O O O O O	O O O O O O O

e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability)	O O O O O O O	O O O O O O O

SECTION B: CONSTRAINING FACTORS

For each statement listed below, please indicate, using a scale of 1 (Strongly Agree) to 5 (Strongly Disagree), the extent of your agreement that the following factors might have constrained the development of digital competencies in accounting education at your university.

CONSTRAINING FACTORS		**1 (Strongly Agree) to 5 (Strongly Disagree)** 1 2 3 4 5
1.	Lack of qualified accounting academics to teach Information Technology (IT)	O O O O O O O
2.	Lack of accounting academics interested in teaching IT	O O O O O O O
3.	Lack of technological literacy among accounting academics	O O O O O O O
4.	Academics reluctant to change with the technology evolution	O O O O O O O
5.	Curriculum overload	O O O O O O O
6.	Lack of teaching materials (e.g., updated textbooks, educational software, course guides)	O O O O O O O
7.	Lack of infrastructures (e.g., internet accessibility, computer laboratory)	O O O O O O O
8.	Lack of institutional support (e.g., financial resources, training)	O O O O O O O
9.	Lack of student interest	O O O O O O O
10.	Student's lack of IT knowledge	O O O O O O O
11.	Student's lack of confidence in using technology	O O O O O O O

b. Any other constraints or challenges you think might hinder the development of accounting graduates' digital competencies at university? (Please specify):

……………………………………………………………………………………………

SECTION C: GENERAL INFORMATION

Please choose the appropriate response or answer the questions in the space provided.

1. What is your gender?

   O Male O Female O Prefer not to mention

2. What is your age?

   O Under 30 years
   O 30 to below 40 years
   O 40 to below 50 years
   O 50 to below 60 years
   O 60 years and above

3. What is your ethnicity?

   O Malay
   O Chinese
   O Indian
   O Other (please specify):__________

4. What is your highest level of education?

   O Bachelor's Degree
   O Master's Degree
   O Doctor of Philosophy
   O Other (please specify):__________

5. Do you have any accounting professional certification? (e.g., ACCA, CIMA, MICPA)

   O Yes, please indicate which one___________ O No

6. Which type of university you graduated from?

   O Public University
   O Private University

- O Other (please specify):_________

7. What is your current academic rank?
   - O Lecturer
   - O Senior lecturer
   - O Associate Professor
   - O Professor
   - O Other (please specify):__________

8. What is your employment status?
   - O Full time O Part-time

9. How many years of teaching experience do you have as an accounting educator?
   _________ year(s).

10. What is (are) your main accounting subject(s) you teach at university? You may choose more than one subject.
    - O Financial Accounting
    - O Management of Accounting
    - O Taxation
    - O Auditing
    - O Accounting Information System
    - O Other (please specify):__________

11. Do you use technology (e.g., any accounting related software) in the accounting subject(s) you teach?
    - O Yes. (Proceed to Question 12) For which course?__________
    - O No. (Please proceed to Question 13)

12. Please choose the application that you use in your subject. You may choose more than one application. Please specify another application(s) if it is not on the list.

O	Microsoft Excel	O	UBS	O	MYOB
O	Microsoft Access	O	Autocount	O	Other (please specify): __________

13. Any other comments you like to make?

…………………………………………………………………………………………………

14. Lastly, to gain further insights into graduates' digital competencies from you as an educator, I would greatly appreciate it if you could participate in an interview session after the completion of this questionnaire. The interview (about an hour) will be conducted using Zoom at an appropriate date and time suitable to you.

    Are you willing to participate in an interview session?

    - O Yes, please provide email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted]

      ____

    - O No

15. If you would like to receive a copy of the findings of this study, please provide your email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted]

Thank You Very Much for Your Time and Participation

(b) Employers

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

MASSEY BUSINESS SCHOOL
TE KURA WHAI PAKIHI

Digital Competencies of Accounting Graduates in Malaysia

INFORMATION SHEET FOR EMPLOYERS

Researcher(s) Introduction

This research is being conducted by Norhasniza Hanum Binti Ishak, PhD student at Massey University, School of Accountancy. The academic supervisors are Associate Professor Lin Mei Tan and Associate Professor Radiah Othman.

Research Description

Digital technologies have changed how individuals do things and work. These changes demand the development of new digital competencies in the workplace. This PhD study intends to examine the level of digital competencies of Malaysian accounting graduates as perceived by educators, employers, and graduates.

For the purpose of this study, digital competencies are defined as the ability to explore new technological settings in a flexible way, as well as to analyse, select, and critically evaluate data and information. This study grouped the competencies into eight categories: (1) Information System, (2) Data Visualisation, (3) Data Analytics, (4) Data Governance, (5) Communication, (6) Problem Solving, (7) Critical Thinking, and (8) Creativity.

Invitation to Participate in Pilot Study

You are invited to participate in this research by sharing your perceptions on the following sections:

- The level of digital competencies you expect accounting graduates should have acquired upon completion of their accounting degree,
- The level of digital competencies the accounting graduates you hired possess or have acquired upon completion of their accounting degree, and
- the level of proficiency expected of an accounting graduate in using the tools/software upon completion of their accounting degree

Your help with my PhD study would be greatly appreciated. As an employer, your participation would provide invaluable insights into the digital competencies of accounting graduates. Please read the instructions for each question and consider the response options carefully. The questionnaire consists of three sections; Section A: Level of Digital Competencies, Section B: Accounting Software Proficiency, and Section C: General Information. It should take about 20 minutes to complete this questionnaire.

Participant's Right

You can withdraw from the research at any time before it begins. You can also withdraw while the research is in progress. However, it will not be possible to withdraw the information you have provided up to that point. If you decide not to participate, there are no consequences. Be assured that the confidentiality of the information solicited is guaranteed. This research is purely to satisfy the academic requirement only.

If you would like to receive a copy of the findings of this research, please provide your details at the end of the questionnaire. If you have any questions, either now or in the future, please feel free to contact:

PhD Student

Norhasniza Hanum Binti Ishak: [redacted]

Supervisors (School of Accountancy)

Associate Professor Lin Mei Tan: L.M.Tan@massey.ac.nz

Associate Professor Radiah Othman: R.Othman@massey.ac.nz

You may also contact the Massey University Human Ethics Committee (MUHEC) involving any concerns that you may have:

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz.

Do you consent and want to start the survey?

O Yes

O No

SECTION A: LEVEL OF DIGITAL COMPETENCIES

The following statements relate to eight categories of digital competencies. Drawing from your experience as an employer and using a scale of 1 (Very Low Level of Competence) to 5 (Very High Level of Competence), please rate:

(i) The level of digital competencies you expect accounting graduates should have acquired upon completion of their accounting degree, and

(ii) The level of digital competencies the accounting graduates you hired possess or have acquired upon completion of their accounting degree.

Note:

The first part (i) refers to your expectation regarding the level of digital competencies accounting graduates should have when they graduate from their universities (i.e., the desired competencies).

The second part (ii) refers to the level of digital competencies you perceive the accounting graduates you hired have achieved upon completion of their accounting degree (i.e., the graduates' actual competencies).

1.	**Information System** – use an accounting information system to support operational and financial processes in a digital environment.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Search for data, information, and content in digital environments.	O O O O O O O	O O O O O O O
b.	Understand different types of data (e.g., numeric, text).	O O O O O O O	O O O O O O O

c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	O O O O O O O	O O O O O O O
d.	Understand accounting databases (e.g., customers, inventory, and suppliers' information).	O O O O O O O	O O O O O O O
e.	Understand processes related to modules in a financial system (e.g., accounts payable module) in integrated system such as Enterprise Resource Planning (ERP).	O O O O O O O	O O O O O O O
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	O O O O O O O	O O O O O O O

2.	**Data Visualisation** - Present data visually to explain key patterns, trends, and correlations to support decision making.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	O O O O O O O	O O O O O O O
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	O O O O O O O	O O O O O O O
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	O O O O O O O	O O O O O O O
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	O O O O O O O	O O O O O O O
e.	Select the best presentation approach for the targeted audience.	O O O O O O O	O O O O O O O

3. **Data Analytics** - Extract, transform, and analyse data to find trends and draw conclusions about the information contained.		**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	O O O O O O O	O O O O O O O
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	O O O O O O O	O O O O O O O
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	O O O O O O O	O O O O O O O
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL)	O O O O O O O	O O O O O O O
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	O O O O O O O	O O O O O O O

4. **Data Governance** - The process of managing the availability, utility, integrity, and security of data in accounting systems based on standards and policies.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:		

a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	O O O O O O O	O O O O O O O
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	O O O O O O O	O O O O O O O
c.	Understand the need to protect the security and privacy of stakeholder data.	O O O O O O O	O O O O O O O
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	O O O O O O O	O O O O O O O
e.	Know how to communicate the potential data errors and weaknesses.	O O O O O O O	O O O O O O O

5.	**Communication** – Convey thoughts, ideas, and information in various forms of communication, including written and spoken, using technology.	**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use a range of different digital communication methods (e.g., email, webinars).	O O O O O O O	O O O O O O O
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	O O O O O O O	O O O O O O O
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	O O O O O O O	O O O O O O O
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	O O O O O O O	O O O O O O O

e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	O O O O O O O	O O O O O O O

6.	**Problem Solving -** Identify the problem, gather information, develop a solution and implement the solution in digital environment.	**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	O O O O O O O	O O O O O O O
b.	Formulate an appropriate inquiry to diagnose the problem.	O O O O O O O	O O O O O O O
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a filesharing using accounting & collaboration software)	O O O O O O O	O O O O O O O
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	O O O O O O O	O O O O O O O
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	O O O O O O O	O O O O O O O

7.	**Critical Thinking -** Research, investigate, critically analyse, reflect, and apply professional judgment to evaluate data and information from a variety of sources in the digital environment.	**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			

a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	O O O O O O O	O O O O O O O
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	O O O O O O O	O O O O O O O
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	O O O O O O O	O O O O O O O
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	O O O O O O O	O O O O O O O
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	O O O O O O O	O O O O O O O

8.	**Creativity** – Generate new ideas to emerge using digital technologies.	**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	O O O O O O O	O O O O O O O
b.	Apply existing knowledge innovatively to a new situation.	O O O O O O O	O O O O O O O
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	O O O O O O O	O O O O O O O
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	O O O O O O O	O O O O O O O

e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability)	O O O O O O O	O O O O O O O

SECTION B: ACCOUNTING SOFTWARE PROFICIENCY (ADDITIONAL INFORMATION)

The following is a list of accounting application software/tools that employers use. Please indicate the level of proficiency (0 = None required to 6 = Expert) expected of an accounting graduate in using the following tools/software upon completion of their accounting degree.

		Level of Proficiency						
		None Required 0	Novice 1	Adv. Beginner 2	Competent 3	Proficient 4	Expert 5	Don't Know 6
Accounting Software								
1.	Quickbooks	O	O	O	O	O	O	O
2.	Autocount	O	O	O	O	O	O	O
3.	SQL Accounting	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O
Computer-Assisted Auditing Tools								
1.	Audit Express	O	O	O	O	O	O	O
2.	Interactive Data Extraction and Analysis (IDEA)	O	O	O	O	O	O	O
3.	CCH Axcess Workflow	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O
Advanced Excel Features								
1.	PowerQuery	O	O	O	O	O	O	O
2.	VBA & Macros	O	O	O	O	O	O	O
3.	Advanced formulas	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O
Database Software								
1.	Microsoft access	O	O	O	O	O	O	O
2.	Structured Query Language (SQL)	O	O	O	O	O	O	O
3.	NoSQL	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O

Visualisation Tool								
1.	Microsoft Power BI	O	O	O	O	O	O	O
2.	Microsoft Excel	O	O	O	O	O	O	O
3.	Tableau	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O
Data Infrastructure								
1.	Hadoop	O	O	O	O	O	O	O
2.	Oracle	O	O	O	O	O	O	O
3.	SAP	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O
Programming Tool								
1.	Programming (e.g., R, Java, Python)	O	O	O	O	O	O	O
Statistical Tool								
1.	Statistical Analysis Software (SAS)	O	O	O	O	O	O	O
2.	SPSS	O	O	O	O	O	O	O
3.	Microsoft Excel	O	O	O	O	O	O	O
4.	Other (please specify):	O	O	O	O	O	O	O

SECTION C: GENERAL INFORMATION

Please choose the appropriate response or answer the questions in the space provided.

1. What is your gender?

   O Male   O Female   O Prefer not to mention

2. What is your age?

   O Below 30 years
   O 30 to below 40 years
   O 40 to below 50 years
   O 50 to below 60 years
   O 60 years and above

3. What is your ethnicity?

   O Malay
   O Chinese
   O Indian
   O Other (please specify):__________

4. What is the type of organisation you work in?

   O Public Practice - Audit
   O Public Practice - Non-Audit
   O Private Sector
   O Public Sector
   O Other (please specify):__________

5. How many employees in the organisation you work in?

   O Less than 20
   O 20 and less than 50
   O 50 and less than 100
   O More than 100

6. Title of your position in the organisation:

- O Chief Executive Officer
- O Manager
- O Supervisor
- O Other (please specify):_________

7. Your Specialisation

- O Bookkeeping / Accounting
- O Audit
- O Tax
- O Other (please specify):_________

8. How many years have you been working in the organisation?_________year(s).

9. What is the main accounting software that you use in your organisation?

- O QuickBooks
- O Autocount
- O SQL Accounting
- O Xero
- O Other (please specify):_________

10. Any other comments you like to make?

……………………………………………………………………………………………

11. Lastly, to gain further insights into graduates' digital competencies from you as an employer, I would greatly appreciate it if you could participate in an interview session after the completion of this questionnaire. The interview (about an hour) will be conducted using zoom at an appropriate date and time suitable to you.

Are you willing to participate in an interview session?

- **O** Yes, please provide email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted]

____

- **O** No

12. If you would like to receive a copy of the findings of this study, please provide your email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted]

Thank You Very Much for Your Time and Participation

(c) Graduates

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

MASSEY BUSINESS SCHOOL
TE KURA WHAI PAKIHI

Digital Competencies of Accounting Graduates in Malaysia

INFORMATION SHEET FOR GRADUATES

Researcher(s) Introduction

This research is being conducted by Norhasniza Hanum Binti Ishak, PhD student at Massey University, School of Accountancy. The academic supervisors are Associate Professor Lin Mei Tan and Associate Professor Radiah Othman.

Research Description

Digital technologies have changed how individuals do things and work. These changes demand the development of new digital competencies in the workplace. This PhD study intends to examine the level of digital competencies of Malaysian accounting graduates as perceived by educators, graduates, and employers.

For the purpose of this study, digital competencies are defined as the ability to explore new technological settings in a flexible way, as well as to analyse, select, and critically evaluate data and information. This study grouped the competencies into eight categories: (1) Information System, (2) Data Visualisation, (3) Data Analytics, (4) Data Governance, (5) Communication, (6) Problem Solving, (7) Critical Thinking, and (8) Creativity.

Invitation to Participate

You are invited to participate in this research by sharing your perceptions on the following sections:

- The level of digital competencies you think you should acquire (i.e., expected level) upon completion of your accounting degree, and
- The level of digital competencies you have acquired (i.e., acquired level) upon completion of your accounting degree.

School of Accountancy
Private Bag 11222, Palmerston North 4442, New Zealand
06 356 9099 | www.massey.ac.nz

AACSB ACCREDITED Accounting

Your help with my PhD study would be greatly appreciated. As a graduate, your participation would provide invaluable insights into the digital competencies of accounting graduates. Please read the instructions for each question and consider the response options carefully. The questionnaire consists of two sections; Section A: Level of Digital Competencies and Section B: General Information. It should take about 20 minutes to complete this questionnaire.

Participant's Right

You can withdraw from the research at any time before it begins. You can also withdraw while the research is in progress. However, it will not be possible to withdraw the information you have provided up to that point. If you decide not to participate, there are no consequences. Be assured that the confidentiality of the information solicited is guaranteed. This research is purely to satisfy the academic requirement only.

If you would like to receive a copy of the findings of this research, please provide your details at the end of the questionnaire. If you have any questions, either now or in the future, please feel free to contact:

PhD Student

Norhasniza Hanum Binti Ishak: [redacted]

Supervisors (School of Accountancy)

Associate Professor Lin Mei Tan: L.M.Tan@massey.ac.nz Associate Professor Radiah Othman: R.Othman@massey.ac.nz

You may also contact the Massey University Human Ethics Committee (MUHEC) involving any concerns that you may have:

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz.

Do you consent and want to start the survey?

O Yes

O No

SECTION A: LEVEL OF DIGITAL COMPETENCIES

The following statements relate to eight categories of digital competencies. Drawing from your experience as an early career accountant (i.e., during the first five years of work after graduation), and using a scale of 1 (Very Low Level of Competence) to 5 (Very High Level of Competence), please rate:

(i) The level of digital competencies you think you should acquire (i.e., expected level) upon completion of your university accounting degree, and

(ii) The level of digital competencies the university has helped you acquire on completion of your accounting degree (i.e., acquired level).

Note:

The first part (i) refers to your expectation regarding the level of digital competencies you should acquire at the university (i.e., your desire as a graduate).

The second part (ii) refers to the level of digital competencies you think you have achieved upon completion of your accounting degree (i.e., your actual competence).

	1. Information System – use an accounting information system to support operational and financial processes in a digital environment.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Search for data, information, and content in digital environments.	O O O O O O O	O O O O O O O
b.	Understand different types of data (e.g., numeric, text).	O O O O O O O	O O O O O O O
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	O O O O O O O	O O O O O O O

d.	Understand accounting databases (e.g., customers, inventory, and suppliers' information).	O O O O O O O	O O O O O O O
e.	Understand processes related to modules in a financial system (e.g., accounts payable module) in integrated system such as Enterprise Resource Planning (ERP).	O O O O O O O	O O O O O O O
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	O O O O O O O	O O O O O O O

2.	**Data Visualisation** - Present data visually to explain key patterns, trends, and correlations to support decision making.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	O O O O O O O	O O O O O O O
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	O O O O O O O	O O O O O O O
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	O O O O O O O	O O O O O O O
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	O O O O O O O	O O O O O O O
e.	Select the best presentation approach for the targeted audience.	O O O O O O O	O O O O O O O

3.	**Data Analytics** - Extract, transform, and analyse data to find trends and draw conclusions about the information contained.	**(i) Level of competence graduates should have acquired**	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5

		1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	(Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	O O O O O O O	O O O O O O O
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	O O O O O O O	O O O O O O O
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	O O O O O O O	O O O O O O O
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL)	O O O O O O O	O O O O O O O
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	O O O O O O O	O O O O O O O

4.	**Data Governance** - The process of managing the availability, utility, integrity, and security of data in accounting systems based on standards and policies.	**(i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	O O O O O O O	O O O O O O O

b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	O O O O O O O	O O O O O O O
c.	Understand the need to protect the security and privacy of stakeholder data.	O O O O O O O	O O O O O O O
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	O O O O O O O	O O O O O O O
e.	Know how to communicate the potential data errors and weaknesses.	O O O O O O O	O O O O O O O

5.	**Communication** – Convey thoughts, ideas, and information in various forms of communication, including written and spoken, using technology.	**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use a range of different digital communication methods (e.g., email, webinars).	O O O O O O O	O O O O O O O
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	O O O O O O O	O O O O O O O
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	O O O O O O O	O O O O O O O
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	O O O O O O O	O O O O O O O
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	O O O O O O O	O O O O O O O

6. **Problem Solving -** Identify the problem, gather information, develop a solution and implement the solution in digital environment.		**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	O O O O O O O	O O O O O O O
b.	Formulate an appropriate inquiry to diagnose the problem.	O O O O O O O	O O O O O O O
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a filesharing using accounting & collaboration software)	O O O O O O O	O O O O O O O
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	O O O O O O O	O O O O O O O
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	O O O O O O O	O O O O O O O

7. **Critical Thinking -** Research, investigate, critically analyse, reflect, and apply professional judgment to evaluate data and information from a variety of sources in the digital environment.		**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	O O O O O O O	O O O O O O O

b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	O O O O O O O	O O O O O O O
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	O O O O O O O	O O O O O O O
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	O O O O O O O	O O O O O O O
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	O O O O O O O	O O O O O O O

8. Creativity – Generate new ideas to emerge using digital technologies.		**i) Level of competence graduates should have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know	**(ii) Level of competence graduate have acquired** 1 (Very Low Level of Competence) to 5 (Very High Level of Competence) 1 2 3 4 5 Not Applicable Don't Know
Able to:			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	O O O O O O O	O O O O O O O
b.	Apply existing knowledge innovatively to a new situation.	O O O O O O O	O O O O O O O
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	O O O O O O O	O O O O O O O
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	O O O O O O O	O O O O O O O
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability)	O O O O O O O	O O O O O O O

SECTION B: GENERAL INFORMATION

Please choose the appropriate response or answer the questions in the space provided.

1. What is your gender?

   O Male O Female O Prefer not to mention

2. What is your age?

   O Below 25 years

   O 25 to below 35 years

   O 35 to below 45 years

   O 45 to below 55 years

   O 55 years and above

3. What is your ethnicity?

   O Malay

   O Chinese

   O Indian

   O Other (please specify): ___________

4. What is your highest level of education?

   O Diploma

   O Bachelor's Degree

   O Master's Degree

   O Doctor of Philosophy

   O Other (please specify): ___________

5. Do you have any accounting professional certification? (e.g., ACCA, CIMA, MICPA)

   O Yes, please indicate which one ___________ O No

6. Which type of university you graduated from?

   O Public University

   O Private University

- O Other (please specify):__________

7. What is the type of organisation you work in?

- O Public Practice – Audit
- O Public Practice - Non-Audit
- O Private Sector
- O Public Sector
- O Other (please specify):__________

8. What is your employment status?

- O Full time
- O Part-time

9. How many employees in the organisation you work in?

- O Less than 20
- O 20 and less than 50
- O 50 and less than 100
- O More than 100

10. Title of your position in the organisation:__________

11. What is the main area of your work?

- O Management accounting
- O Financial accounting
- O Risk, Audit and Assurance
- O Corporate and Commercial finance
- O Taxation
- O Other (please specify):__________

12. How many years have you been working since you graduated?__________ year(s).

13. What is the main accounting software that you use in your organisation?

- **O** QuickBooks
- **O** Autocount
- **O** SQL Accounting
- **O** Xero
- **O** Other (please specify):_________

14. Any other comments you like to make?

…………………………………………………………………………………………………

15. Lastly, to gain further insights into graduates' digital competencies from you as an employer, I would greatly appreciate it if you could participate in an interview session after the completion of this questionnaire. The interview (about an hour) will be conducted using zoom at an appropriate date and time suitable to you.

Are you willing to participate in an interview session?

- **O** Yes, please provide email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted]

  ____
- **O** No

16. If you would like to receive a copy of the findings of this study, please provide your email address in the box below. If you prefer to remain anonymous, you can leave it blank here and send your email address separately to Norhasniza Hanum Binti Ishak: [redacted].

Thank You Very Much for Your Time and Participation

Appendix 5.3 *Ethics Approval*

(a) Experts' Interview

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

30/10/2024

Dear

Re: Protocol No.

The above application was considered and granted approval to proceed by the Animal Ethics Committee at its meeting held on

Approval for ongoing research, testing or teaching procedures must be resubmitted for consideration at least every three (3) years.

Any proposed alteration to an approved application must be considered for approval or noting by the Committee or by the Chairperson acting with authority vested through sections 3.11.1-3.11.2 of the Code of Ethical Conduct. A description of such modifications must be submitted to the Secretary for review at the next meeting.

Yours sincerely

Rebecca Hickson (Associate Professor)
Chairperson
Massey University Animal Ethics Committee

Research Ethics Office, Research and Enterprise

Massey University, Private Bag 11222, Palmerston North 4442, New Zealand
T 06 951 6841; 06 951 6840
E humanethics@massey.ac.nz; animalethics@massey.ac.nz
www.massey.ac.nz

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Dear:

Thank you for submitting a low risk notification for your research/teaching/evaluation.

This email is to acknowledge receipt of the low risk notification and to inform you that the details of your project have been recorded in our database for inclusion in the annual reports to the Health Research Council Ethics Committee (HRCEC) and the Massey University Research Committee (URC).

You may proceed with your research, though it is advisable to provide a couple of weeks before commencing, as all low risk notifications are checked for completeness and clarity by a Research Ethics Advisor. You may be contacted if your application is incomplete and/or further clarification is required.

The low risk notification for this project is valid for a maximum of three years.

Please notify me if situations subsequently occur which cause you to reconsider your initial ethical analysis.

If a sponsoring organisation, funding authority (e.g., the Health Research Council) or a journal require evidence of ethical approval from a Human Ethics Committee (with an approval number), you need to complete a full Massey University Human Ethics application to be reviewed and approved by one of our Human Ethics Committees. Applications must be submitted and approved prior to the commencement of the research.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact the Research Ethics Office, email humanethics@massey.ac.nz. "

Please include the following statement on all public documents (e.g., information sheet, consent form) related to your project:

> ***This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.***
>
> ***If you have any concerns about the ethical conduct of this research that you want to raise with someone other than the researcher(s), please contact Massey University Human Ethics by email: humanethics@massey.ac.nz.***

I wish you all the best in your research, teaching or evaluation activities and appreciate your thoughtful consideration of ethics principles and practices.

Ngā mihi nui,

Dr Brian Finch Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand T 06 951 6841; 06 951 6840
E humanethics@massey.ac.nz; animalethics@massey.ac.nz; gtc@massey.ac.nz

(b) Pilot study & Data collection

Human Ethics - Full Application Letter 1.3 7/17/22, 10:49 PM

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Dear:

Thank you for the above application that was considered by the Massey University Human Ethics Committee:

at their meeting held on

On behalf of the Committee I am pleased to advise you that the ethics of your application are approved.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Brian Finch Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Dear:

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our database for inclusion in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please contact a Research Ethics Administrator.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director - Ethics, telephone 06 3569099 ext 86015, email humanethics@massey.ac.nz. "

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

B J Finch

Dr Brian Finch Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Appendix 5.4 *Missing Values*

Missing values in the dataset may occur for several reasons. For instance, a respondent may leave both the expected and acquired parts of a competency blank if they do not find it relevant, or they may respond only to the expectation section while skipping the acquired section. Additionally, some responses might be marked as 'don't know' or 'not applicable,' resulting in missing data for certain competencies. It is important to note that this may occur with the same individual in such cases.

1. Overall group.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Expected Level						
Information System	269	98.90%	3	1.10%	272	100.00%
Data Visualisation	262	96.30%	10	3.70%	272	100.00%
Data Analytics	262	96.30%	10	3.70%	272	100.00%
Data Governance	257	94.50%	15	5.50%	272	100.00%
Communication	258	94.90%	14	5.10%	272	100.00%
Problem-Solving	251	92.30%	21	7.70%	272	100.00%
Critical Thinking	251	92.30%	21	7.70%	272	100.00%
Creativity	251	92.30%	21	7.70%	272	100.00%
Acquired Level						
Information System	268	98.50%	4	1.50%	272	100.00%
Data Visualisation	261	96.00%	11	4.00%	272	100.00%
Data Analytics	261	96.00%	11	4.00%	272	100.00%
Data Governance	256	94.10%	16	5.90%	272	100.00%
Communication	257	94.50%	15	5.50%	272	100.00%
Problem-Solving	250	91.90%	22	8.10%	272	100.00%
Critical Thinking	250	91.90%	22	8.10%	272	100.00%
Creativity	250	91.90%	22	8.10%	272	100.00%

Note. Less than 10% (Mirzaei et al., 2022).

2. Educators

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	*N*	Percent	*N*	Percent
Expected Level						
Information System	71	100.00%	0	0.00%	71	100.00%
Data Visualisation	71	100.00%	0	0.00%	71	100.00%
Data Analytics	71	100.00%	0	0.00%	71	100.00%
Data Governance	70	98.60%	1	1.40%	71	100.00%
Communication	70	98.60%	1	1.40%	71	100.00%
Problem-Solving	69	97.20%	2	2.80%	71	100.00%
Critical Thinking	69	97.20%	2	2.80%	71	100.00%
Creativity	69	97.20%	2	2.80%	71	100.00%
Acquired Level						
Information System	70	98.60%	1	1.40%	71	100.00%
Data Visualisation	70	98.60%	1	1.40%	71	100.00%
Data Analytics	70	98.60%	1	1.40%	71	100.00%
Data Governance	69	97.20%	2	2.80%	71	100.00%
Communication	69	97.20%	2	2.80%	71	100.00%
Problem-Solving	68	95.80%	3	4.20%	71	100.00%
Critical Thinking	68	95.80%	3	4.20%	71	100.00%
Creativity	68	95.80%	3	4.20%	71	100.00%

2.1 Sample Size and Missing Values with Percentages for Educators' Expected Digital Competencies of Graduates

1.	**Information System**	***N***	**MV/NA/DN**	**Percentage**
a.	Search for data, information, and content in digital environments.	71	1MV	1.4%
b.	Understand different types of data (e.g., numeric, text).	71	1MV	1.4%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	71	1MV	1.4%
d.	Understand accounting databases (e.g., customers', suppliers' information).	71	1MV	1.4%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	69	3MV	4.2%

f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	71	1MV	1.4%
2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	71	1MV	1.4%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	68	1NA, 2DK, 4MV	5.6%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	71	1MV	1.4%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	71	1MV	1.4%
e.	Select the best presentation approach for the targeted audience.	71	1MV	1.4%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	71	1MV	1.4%
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	71	1MV	1.4%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	71	1MV	1.4%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	70	2MV	2.8%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	68	2NA, 1DK, 1MV	5.6%
4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	70	2MV	2.8%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	70	2MV	2.8%
c.	Understand the need to protect the security and privacy of stakeholder data.	70	2MV	2.8%
d.	Understand the importance of data security (e.g., protect data from visualisation access).	70	2MV	2.8%
e.	Know how to communicate the potential data errors and weaknesses.	70	2MV	2.8%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	70	2MV	2.8%

b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	70	2MV	2.8%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	70	2MV	2.8%
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	70	2MV	2.8%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	70	2MV	2.8%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	69	3MV	4.2%
b.	Formulate an appropriate inquiry to diagnose the problem.	69	3MV	4.2%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	69	3MV	4.2%
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	69	3MV	4.2%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	69	3MV	4.2%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	69	3MV	4.2%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	65	2NA, 2DK, 3MV	9.7%
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	69	3MV	4.2%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	69	3MV	4.2%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	69	3MV	4.2%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	69	3MV	4.2%
b.	Apply existing knowledge innovatively to a new situation.	69	3MV	4.2%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	69	3MV	4.2%

d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	69	3MV	4.2%
e.	Use technology creatively to explore potential outcomes for visualisation (e.g., reduce cost, increase profitability).	69	3MV	4.2%

Note. MV – Missing Value, NA – Not Applicable, DN – Don't Know

2.2 *Sample Size and Missing Values with Percentages for Educators' Perceived Acquired Digital Competencies of Graduates*

1.	**Information System**	**N**	**MV/NA/DN**	**Percentage**
a.	Search for data, information, and content in digital environments.	70	2MV	2.8%
b.	Understand different types of data (e.g., numeric, text).	70	2MV	2.8%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	70	2MV	2.8%
d.	Understand accounting databases (e.g., customers, suppliers' information).	70	2MV	2.8%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	68	4MV	5.6%
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	70	2MV	2.8%
2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	70	2MV	2.8%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	67	1NA, 1DN, 2MV	6.9%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	70	2MV	2.8%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	70	2MV	2.8%
e.	Select the best presentation approach for the targeted audience.	70	2MV	2.8%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	70	2MV	2.8%

b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	70	2MV	2.8%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	70	2MV	2.8%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	69	3MV	4.2%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	67	3NA, 2MV	6.9%
4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	69	3MV	4.2%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	69	3MV	4.2%
c.	Understand the need to protect the security and privacy of stakeholder data.	69	3MV	4.2%
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	69	3MV	4.2%
e.	Know how to communicate the potential data errors and weaknesses.	69	3MV	4.2%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	69	3MV	4.2%
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	69	3MV	4.2%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	69	3MV	4.2%
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	69	3MV	4.2%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	69	3MV	4.2%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	68	4MV	5.6%
b.	Formulate an appropriate inquiry to diagnose the problem.	68	4MV	5.6%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	68	4MV	5.6%

d.	Analyse the impact (e.g., pros & cons) of potential solutions.	68	4MV	5.6%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	68	4MV	5.6%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	68	4MV	5.6%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	64	2NA, 2DN,4 MV	11.1%
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	68	4MV	5.6%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	68	4MV	5.6%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	68	4MV	5.6%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	68	4MV	5.6%
b.	Apply existing knowledge innovatively to a new situation.	68	4MV	5.6%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	68	4MV	5.6%
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	68	4MV	5.6%
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	68	4MV	5.6%

Note. MV – Missing Value, NA – Not Applicable, DN – Don't Know.

3. Employers

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Expected Level						
Information System	66	97.10%	2	2.90%	68	100.00%
Data Visualisation	63	92.60%	5	7.40%	68	100.00%
Data Analytics	64	94.10%	4	5.90%	68	100.00%
Data Governance	62	91.20%	6	8.80%	68	100.00%
Communication	62	91.20%	6	8.80%	68	100.00%
Problem-Solving	61	89.70%	7	10.30%	68	100.00%
Critical Thinking	60	88.20%	8	11.80%	68	100.00%
Creativity	60	88.20%	8	11.80%	68	100.00%
Acquired Level						
Information System	66	97.10%	2	2.90%	68	100.00%
Data Visualisation	63	92.60%	5	7.40%	68	100.00%
Data Analytics	64	94.10%	4	5.90%	68	100.00%
Data Governance	62	91.20%	6	8.80%	68	100.00%
Communication	62	91.20%	6	8.80%	68	100.00%
Problem-Solving	61	89.70%	7	10.30%	68	100.00%
Critical Thinking	60	88.20%	8	11.80%	68	100.00%
Creativity	60	88.20%	8	11.80%	68	100.00%

3.1 Sample Size and Missing Values with Percentages for Employers' Expected Digital Competencies of Graduates

1.	Information System	*N*	MV/NA/DN	Percentage
a.	Search for data, information, and content in digital environments.	66	2MV	2.9%
b.	Understand different types of data (e.g., numeric, text).	66	2MV	2.9%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	66	2MV	2.9%
d.	Understand accounting databases (e.g., customers', suppliers' information).	66	2MV	2.9%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	66	2MV	2.9%
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	66	2MV	2.9%

2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	63	4MV 1NA	7.4%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	62	4MV 2NA	8.8%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	63	4MV 1NA	7.4%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	62	4MV 2NA	8.8%
e.	Select the best presentation approach for the targeted audience.	63	4MV 1NA	7.4%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	64	4MV	5.9%
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	64	4MV	5.9%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	64	4MV	5.9%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	62	4MV 2NA	8.8%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	61	4MV 3NA	10.3%
4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	62	6MV	8.8%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	62	6MV	8.8%
c.	Understand the need to protect the security and privacy of stakeholder data.	62	6MV	8.8%
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	62	6MV	8.8%
e.	Know how to communicate the potential data errors and weaknesses.	62	6MV	8.8%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	62	6MV	8.8%
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	61	6MV 1DN	10.3%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	61	6MV 1DN	10.3%

d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	62	6MV	8.8%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	62	6MV	8.8%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	61	7MV	10.3%
b.	Formulate an appropriate inquiry to diagnose the problem.	61	7MV	10.3%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	61	7MV	10.3%
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	61	7MV	10.3%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	61	7MV	10.3%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	60	8MV	11.8%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	59	8MV 1NA	13.2%
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	59	8MV 1NA	13.2%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	60	8MV	11.8%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	60	8MV	11.8%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	60	8MV	11.8%
b.	Apply existing knowledge innovatively to a new situation.	60	8MV	11.8%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	60	8MV	11.8%
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	60	8MV	11.8%
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	60	8MV	11.8%

Note. MV – Missing Value, NA – Not Applicable, DN – Don't Know.

3.2 Sample Size and Missing Values with Percentages for Employers' Perceived Acquired Digital Competencies of Graduates

1.	Information System	*N*	MV/NA/DN	Percentage
a.	Search for data, information, and content in digital environments.	66	2MV	2.9%
b.	Understand different types of data (e.g., numeric, text).	66	2MV	2.9%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	66	2MV	2.9%
d.	Understand accounting databases (e.g., customers', suppliers' information).	66	2MV	2.9%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	66	2MV	2.9%
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	66	2MV	2.9%
2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	63	4MV 1NA	7.4%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	62	4MV 2NA	8.8%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	63	4MV 1NA	7.4%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	62	4MV 2NA	8.8%
e.	Select the best presentation approach for the targeted audience.	63	4MV 1NA	7.4%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	64	4MV	5.9%
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	64	4MV	5.9%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	64	4MV	5.9%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	62	4MV 2NA	8.8%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	61	4MV 3NA	10.3%

4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	62	6MV	8.8%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	62	6MV	8.8%
c.	Understand the need to protect the security and privacy of stakeholder data.	62	6MV	8.8%
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	62	6MV	8.8%
e.	Know how to communicate the potential data errors and weaknesses.	62	6MV	8.8%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	62	6MV	8.8%
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	61	6MV 1NA	10.3%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	61	6MV 1NA	10.3%
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	62	6MV	8.8%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	62	6MV	8.8%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	61	7MV	10.3%
b.	Formulate an appropriate inquiry to diagnose the problem.	61	7MV	10.3%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	61	7MV	10.3%
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	61	7MV	10.3%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	61	7MV	10.3%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	60	8MV	11.8%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	59	8MV 1NA	13.2%

c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	59	8MV 1NA	13.2%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	60	8MV	11.8%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	60	8MV	11.8%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	60	8MV	11.8%
b.	Apply existing knowledge innovatively to a new situation.	60	8MV	11.8%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	60	8MV	11.8%
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	60	8MV	11.8%
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	60	8MV	11.8%

Note. MV – Missing Value, NA – Not Applicable, DN – Don't Know.

4. Graduates

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	*N*	Percent	*N*	Percent
Expected Level						
Information System	132	100.00%	0	0.00%	132	100.00%
Data Visualisation	128	97.00%	4	3.00%	132	100.00%
Data Analytics	127	96.20%	5	3.80%	132	100.00%
Data Governance	125	94.70%	7	5.30%	132	100.00%
Communication	126	95.50%	6	4.50%	132	100.00%
Problem-Solving	121	91.70%	11	8.30%	132	100.00%
Critical Thinking	122	92.40%	10	7.60%	132	100.00%
Creativity	122	92.40%	10	7.60%	132	100.00%
Acquired Level						
Information System	132	100.00%	0	0.00%	132	100.00%
Data Visualisation	128	97.00%	4	3.00%	132	100.00%
Data Analytics	127	96.20%	5	3.80%	132	100.00%
Data Governance	125	94.70%	7	5.30%	132	100.00%
Communication	126	95.50%	6	4.50%	132	100.00%
Problem-Solving	121	91.70%	11	8.30%	132	100.00%
Critical Thinking	122	92.40%	10	7.60%	132	100.00%
Creativity	122	92.40%	10	7.60%	132	100.00%

4.1 Sample Size and Missing Values with Percentages for Graduates' Expected Digital Competencies.

1.	**Information System**	**N**	**MV/NA/DN**	**Percentage**
a.	Search for data, information, and content in digital environments.	132	-	0.0%
b.	Understand different types of data (e.g., numeric, text).	132	-	0.0%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	132	-	0.0%
d.	Understand accounting databases (e.g., customers', suppliers' information).	132	-	0.0%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	128	1NA, 3DV	3.1%
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	128	1NA, 3DV	3.1%

2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	128	4MV	3.0%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	118	4MV, 7NA, 3DN	10.6%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	124	4MV, 2NA, 2DN	6.1%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	128	4MV	3.0%
e.	Select the best presentation approach for the targeted audience.	128	4MV	3.0%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	127	5MV	3.8%
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	127	5MV	3.8%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	127	5MV	3.8%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	123	5MV	3.8%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	119	5MV, 4NA, 4DN	9.8%
4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	125	6MV, 1NA	5.3%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	125	6MV, 1NA	5.3%
c.	Understand the need to protect the security and privacy of stakeholder data.	121	6MV, 3DN, 2NA	8.3%
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	125	6MV, 1NA	5.3%
e.	Know how to communicate the potential data errors and weaknesses.	125	6MV, 1NA	5.3%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	126	6MV	4.5%
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	126	6MV	4.5%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	119	6MV, 1DK, 6NA	9.8%

d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	126	6MV	4.5%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	126	6MV	4.5%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	121	10MV, 1NA	8.4%
b.	Formulate an appropriate inquiry to diagnose the problem.	120	10MV, 1NA, 1DN	9.1%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	121	10MV, 1NA	8.4%
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	121	10MV, 1NA	8.4%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	121	10MV, 1NA	8.4%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	122	10MV	7.6%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	112	10MV, 6NA, 4DN	15.2%
c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	122	10MV	7.6%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	122	10MV	7.6%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	122	10MV	7.6%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	116	10MV, 4NA, 2DN	12.1%
b.	Apply existing knowledge innovatively to a new situation.	122	10MV	7.6%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	119	10MV, 3NA	9.9%
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	122	10MV	7.6%
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	122	10MV	7.6%

Note. MV – Missing Value, NA – Not Applicable, DN – Don’t Know

4.2 Sample Size and Missing Values with Percentages for Graduates' Perceived Acquired Digital Competencies

	1. Information System	***N***	**MV/DN/NA**	**Percentage**
a.	Search for data, information, and content in digital environments.	132	-	0.0%
b.	Understand different types of data (e.g., numeric, text).	132	-	0.0%
c.	Work with general ledger (GL) module (e.g., chart of accounts, journal entries, trial balance) using accounting system.	132	-	0.0%
d.	Understand accounting databases (e.g., customers', suppliers' information).	132	-	0.0%
e.	Understand processes related to accounting modules (e.g., accounts payable module) in an integrated system such as Enterprise Resource Planning (ERP).	128	1NA, 3DN	3.1%
f.	Understand the applications of some emerging technologies (e.g., cloud computing, artificial intelligence).	128	2NA, 2DN	3.0%
2.	**Data Visualisation**			
a.	Create simple charts and graphs using visualisation tools (e.g., Microsoft Excel).	128	4MV	3.0%
b.	Create charts and graphs using advanced visualisation packages (e.g., Microsoft Power BI, python).	118	4MV, 7NA, 3DN	10.6%
c.	Understand how to communicate results with visualisation to convey complex information (e.g., charts and graphs).	124	4MV, 2NA, 2DN	6.1%
d.	Apply some basic design (e.g., colour, simple font) to develop an interactive summary of information.	128	4MV	3.0%
e.	Select the best presentation approach for the targeted audience.	128	4MV	3.0%
3.	**Data Analytics**			
a.	Create spreadsheets and manipulate data (e.g., grouping, sorting, importing data) using basic formulas and functions (e.g., SUM, COUNT).	127	5MV	3.8%
b.	Perform basic descriptive statistics (e.g., ratios and basic averages) to reveal trends using digital tools (e.g., Excel).	127	5MV	3.8%
c.	Understand the basics of business intelligence (e.g., costing & revenue analysis).	127	5MV	3.8%
d.	Extract, transform, and query data using appropriate tools (e.g., Microsoft Access, SQL).	123	5MV, 2NA, 2DN	6.8%
e.	Use various statistical methods (e.g., regression analysis) to predict business outcomes and interpret results.	119	5MV, 4NA,4DN	9.8%

4.	**Data Governance**			
a.	Exercise good data stewardship (e.g., creating, storing, deleting data) by complying with all data policies and documenting procedures.	125	6MV, 1NA	5.3%
b.	Understand the impact on business reputation if decisions are made based on incorrect, poor-quality, or incomplete data.	125	6MV, 1NA	5.3%
c.	Understand the need to protect the security and privacy of stakeholder data.	121	6MV, 4DN, 1NA	8.3%
d.	Understand the importance of data security (e.g., protect data from unauthorised access).	125	6MV, 1NA	5.3%
e.	Know how to communicate the potential data errors and weaknesses.	125	6MV, 1NA	5.3%
5.	**Communication**			
a.	Use a range of different digital communication methods (e.g., email, webinars).	126	6MV	4.5%
b.	Use a variety of digital technologies effectively to suit different recipients (e.g., management, customers).	126	6MV	4.5%
c.	Collaborate with people using a range of digital tools in ways that respect differing needs, expectations, cultures, and experiences.	119	6MV, 2DN, 5NA	9.8%
d.	Use appropriate modes (e.g., email, digital financial report) for formal communication in the digital environment.	126	6MV	4.5%
e.	Use appropriate modes (e.g., web chat, social media platforms) for informal communication in the digital environment.	126	6MV	4.5%
6.	**Problem-Solving**			
a.	Retrieve relevant information and evidence via digital technologies (e.g., accounting system, internet) to solve a problem.	121	10MV, 1NA	8.3%
b.	Formulate an appropriate inquiry to diagnose the problem.	120	10MV, 1DN, 1NA	9.1%
c.	Identify a range of solutions using creative thinking and digital tools (e.g., create a file-sharing using accounting & collaboration software).	121	10MV, 1NA	8.3%
d.	Analyse the impact (e.g., pros & cons) of potential solutions.	121	10MV, 1NA	8.3%
e.	Use rational and logical reasoning to arrive at an acceptable conclusion.	121	10MV, 1NA	8.3%
7.	**Critical Thinking**			
a.	Analyse information using ratio analysis techniques and digital tools (e.g., Excel) to support decisions.	122	10MV	7.6%
b.	Perform computations (e.g., precise calculation, estimation, forecast) using a range of digital tools (e.g., Microsoft Power BI).	112	10MV, 6NA, 4DN	15.2%

c.	Determine the extent of testing needed to validate the completeness, accuracy, and reliability of information before making judgment.	122	10MV	7.6%
d.	Combine ideas and information from a variety of sources to understand issues and solve problems.	122	10MV	7.6%
e.	Recommend a solution or an opinion based on an integrative view of the information and analysis.	122	10MV	7.6%
8.	**Creativity**			
a.	Use appropriate digital tools (e.g., cloud system, social media platforms) to execute tasks creatively.	116	10MV, 2DN, 4NA	12.1%
b.	Apply existing knowledge innovatively to a new situation.	122	10MV	7.6%
c.	Propose creative ideas (e.g., cost-effective methods for new products) via digital tools.	119	10MV, 3NA	9.8%
d.	Recommend improvements to existing services (e.g., record-keeping, accounting processes and services) using digital tools (e.g., accounting software).	122	10MV	7.6%
e.	Use technology creatively to explore potential outcomes for organisation (e.g., reduce cost, increase profitability).	122	10MV	7.6%

Note. MV – Missing Value, NA – Not Applicable, DN – Don't Know

Appendix 5.5 *Normality on Residual*

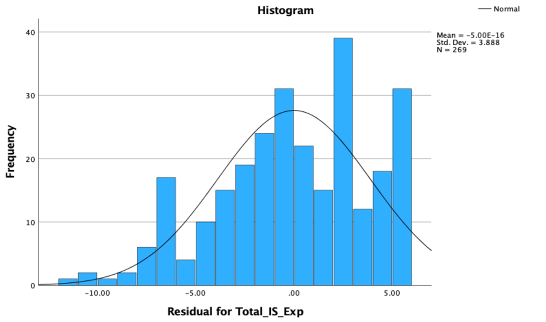
(a) Skewness and Kurtosis

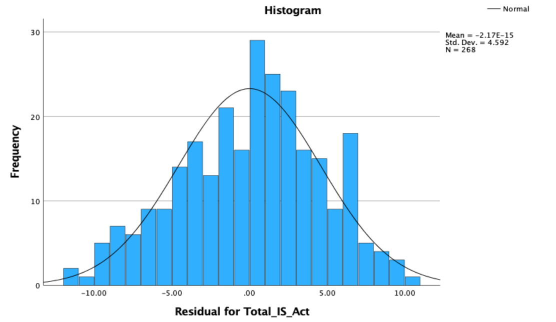
		Skewness		Kurtosis	
	N	Statistic	SE	Statistic	SE
Expected Level					
Information System	269	-0.504	0.149	-0.380	0.296
Data Visualisation	262	-0.880	0.150	1.222	0.300
Data Analytics	262	-0.372	0.150	-0.531	0.300
Data Governance	257	-0.699	0.152	0.009	0.303
Communication	258	-0.978	0.152	1.248	0.302
Problem-Solving	251	-0.583	0.154	0.060	0.306
Critical Thinking	251	-0.664	0.154	-0.129	0.306
Creativity	251	-0.829	0.154	0.671	0.306
Acquired Level					
Information System	268	-0.239	0.149	-0.465	0.297
Data Visualisation	261	-0.499	0.151	0.359	0.300
Data Analytics	261	-0.210	0.151	-0.455	0.300
Data Governance	256	-0.485	0.152	-0.111	0.303
Communication	257	-0.616	0.152	0.159	0.303
Problem-Solving	250	-0.101	0.154	-0.193	0.307
Critical Thinking	250	-0.338	0.154	0.250	0.307
Creativity	250	-0.332	0.154	-0.052	0.307

(b) Histogram

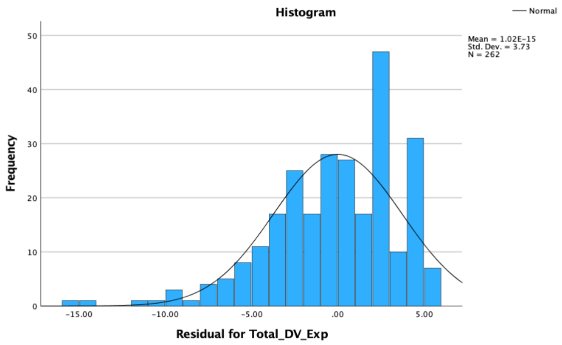
Expected	Acquired

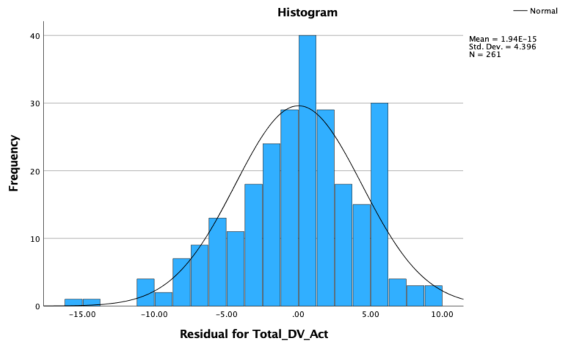
1. Information System



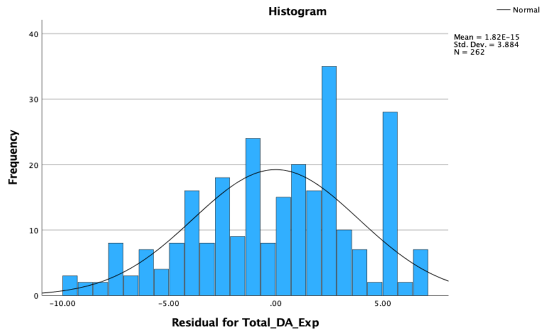


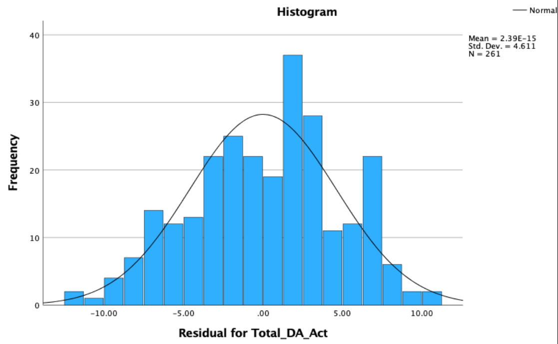
2. Data Visualisation



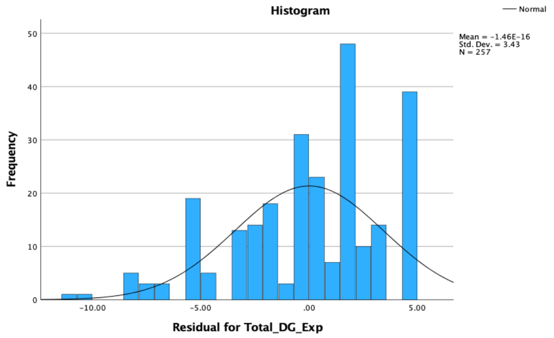


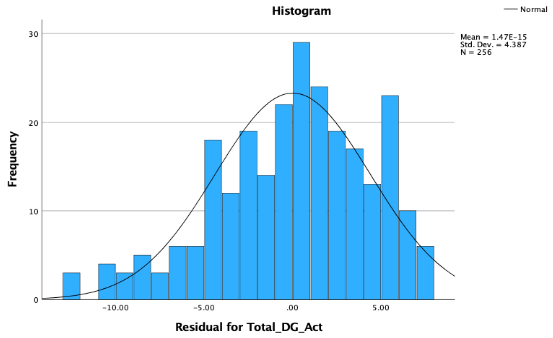
3. Data Analytics



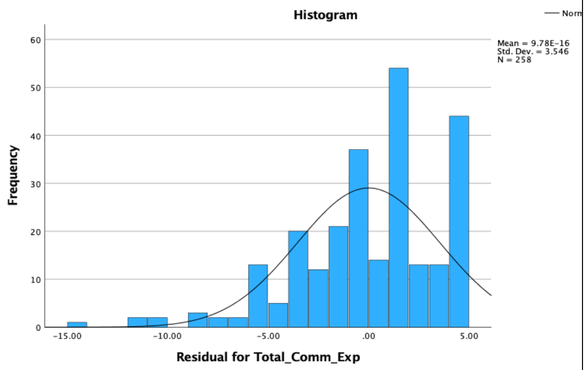


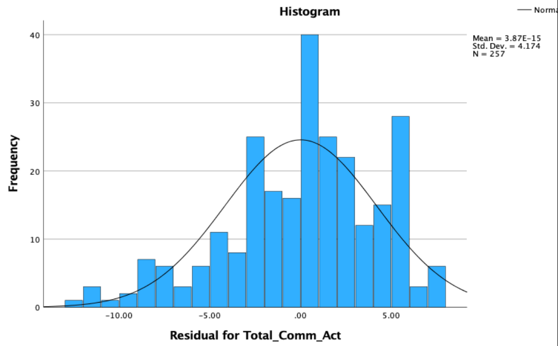
4. Data Governance



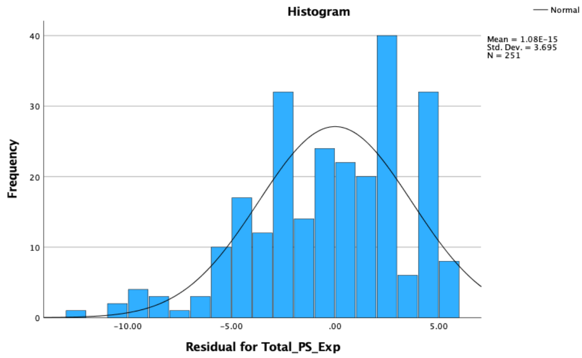


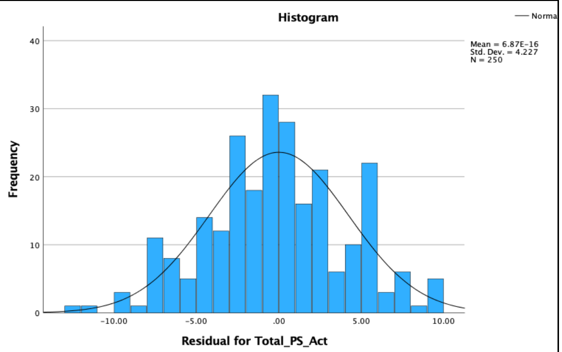
5. Communication



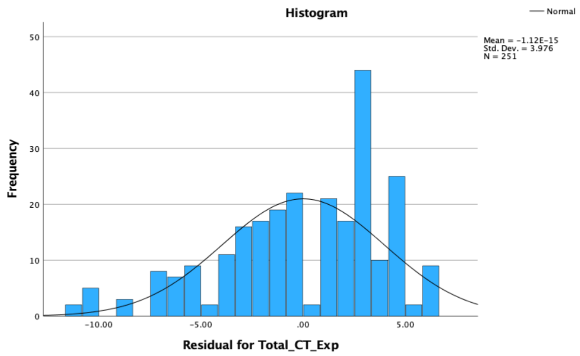


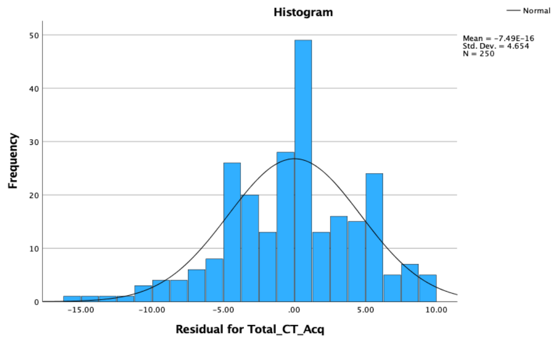
6. Problem-Solving



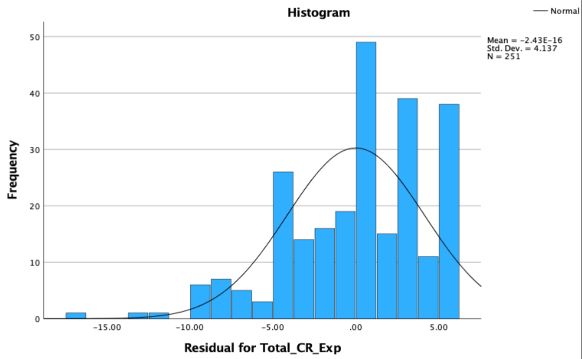


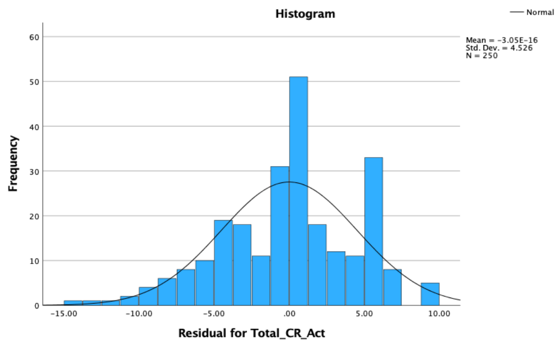
7. Critical Thinking





8. Creativity





(c) Q-Q Plot

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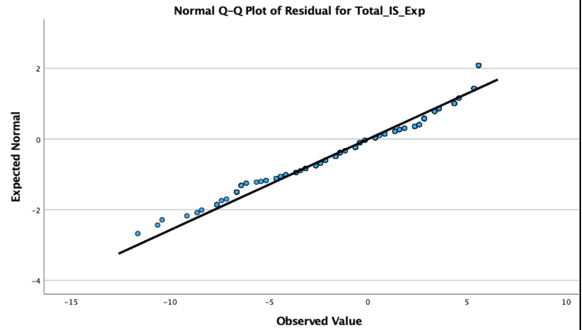
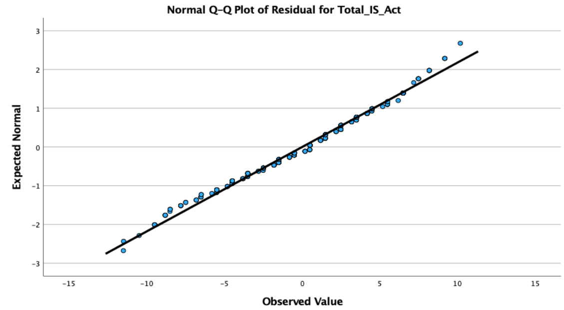
<tr><td>
</td><td>
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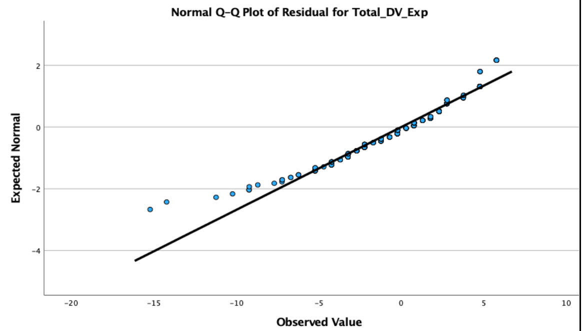
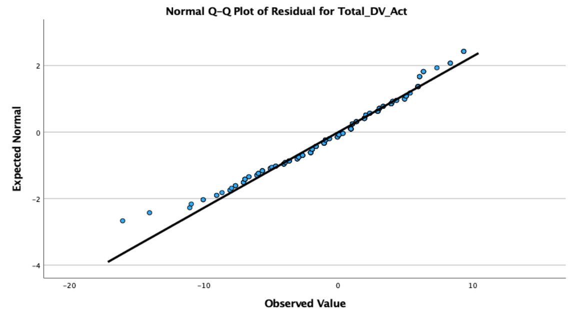
<tr><td colspan="2">2. Data Visualisation</td></tr>
<tr><td>
</td><td>
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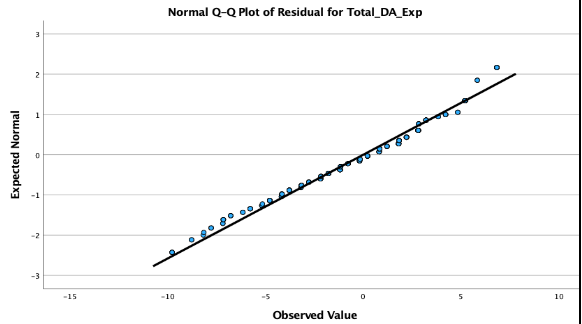
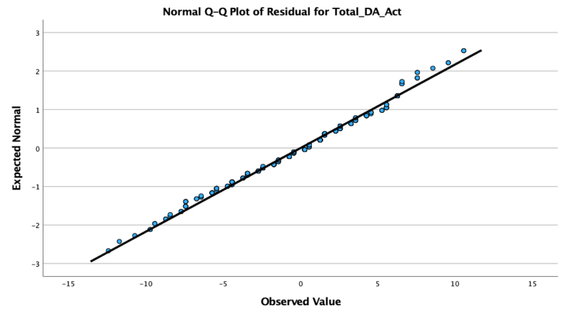
<tr><td>
</td><td>
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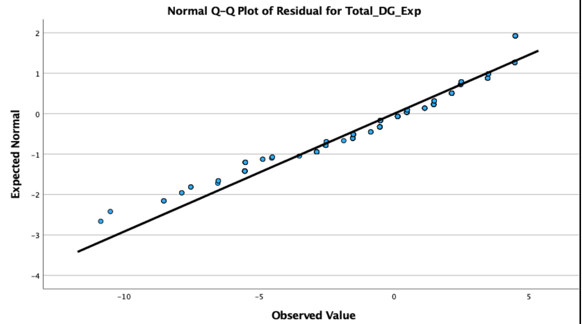
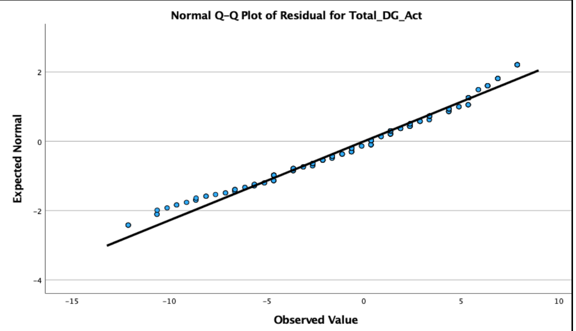
<tr><td>
</td><td>
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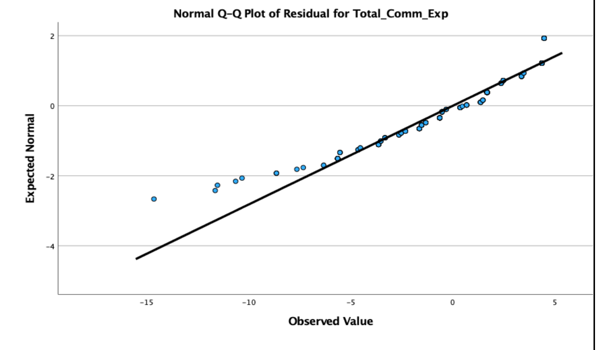
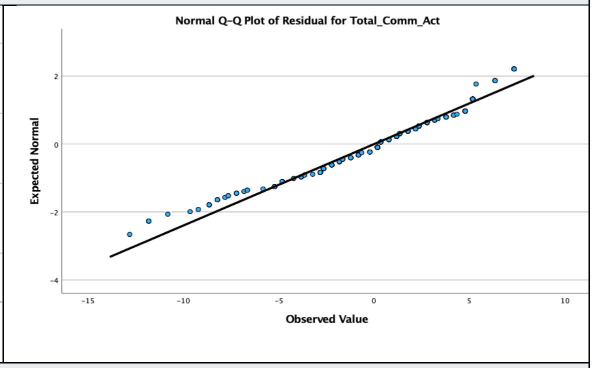
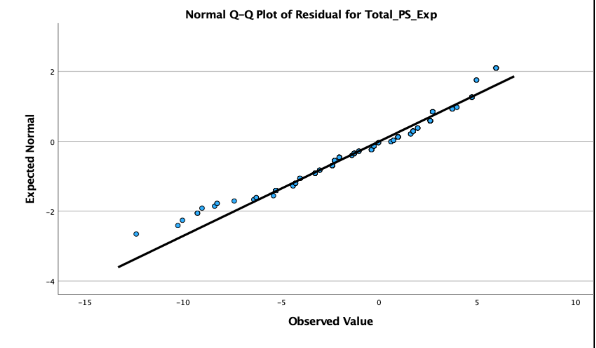
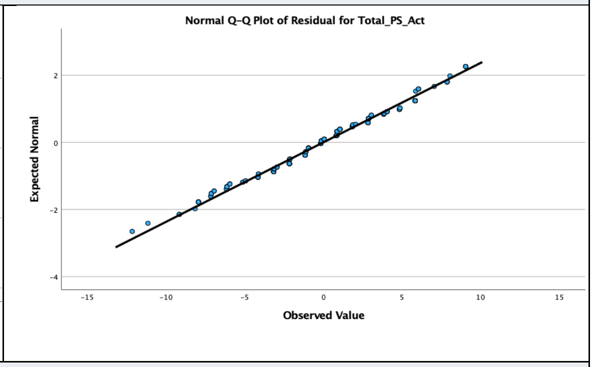
5. Communication



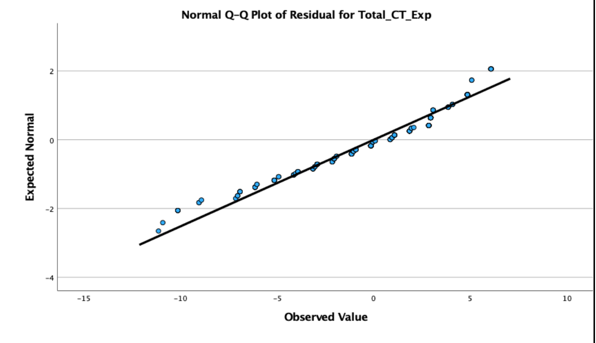


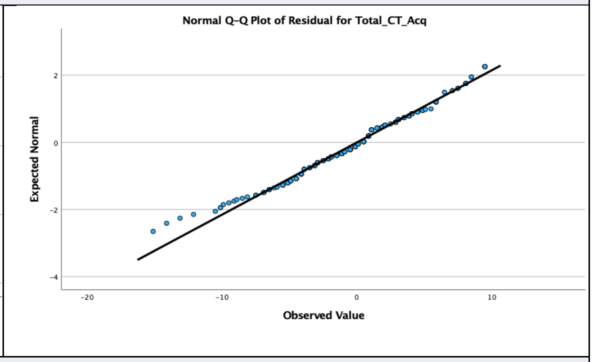
6. Problem-Solving



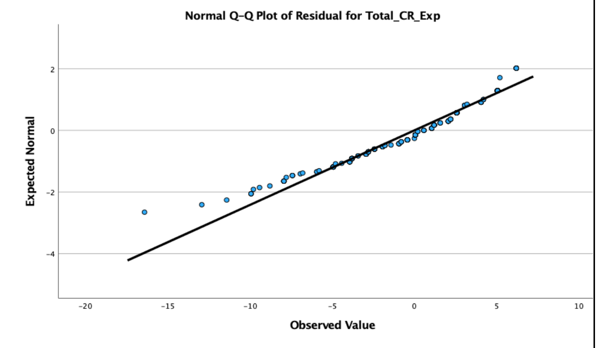


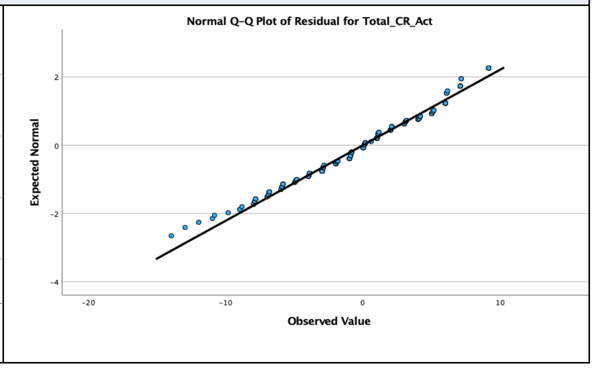
7. Critical Thinking





8. Creativity





Appendix 6.1 *Digital Competencies Variation by Educators' Demographics*

1. Type of universities	Public		Private			Levene's		T-test for Equality of Means					
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	*MD*	*F*	*p*	*t*	*df*	*p*	*SE*	Lower	Upper
Information System	4.64	0.47	4.48	0.47	0.16	0.093	.761	1.34	64	.185	0.12	-0.07	0.40
Data Visualisation[a]	4.68	0.38	4.53	0.58	0.14	5.992	.017	1.12	36.51	.269	0.13	-0.11	0.41
Data Analytics	4.59	0.44	4.46	0.50	0.13	0.022	.883	1.10	64	.273	0.11	-0.10	0.36
Data Governance	4.72	0.45	4.44	0.59	0.27	0.822	.368	2.11	64*	**.038**	0.12	0.01	0.53
Communication[a]	4.79	0.36	4.59	0.60	0.19	5.408	.023	1.48	34.47	.147	0.13	-0.07	0.47
Problem-Solving	4.54	0.56	4.50	0.60	0.03	0.225	.637	0.25	64	.800	0.14	-0.25	0.33
Critical Thinking	4.54	0.55	4.44	0.61	0.10	0.377	.541	0.68	64	.498	0.14	-0.19	0.39
Creativity	4.67	0.52	4.38	0.71	0.28	2.508	.118	1.89	64	.063	0.15	-0.01	0.59
Acquired													
Information System	3.70	0.65	3.94	0.69	-0.23	0.347	.558	-1.35	63	.182	0.17	-0.57	0.11
Data Visualisation	3.87	0.68	3.85	0.92	0.01	2.554	.115	0.09	63	.923	0.19	-0.37	0.41
Data Analytics	3.54	0.80	3.55	0.99	-0.01	1.897	.173	-0.05	63	.954	0.22	-0.46	0.43
Data Governance	3.71	0.78	3.82	0.83	-0.11	0.053	.819	-0.55	63	.579	0.20	-0.52	0.29
Communication	4.08	0.70	4.07	0.88	0.01	2.849	.096	0.06	63	.948	0.19	-0.38	0.40
Problem-Solving	3.32	0.74	3.64	0.81	-0.31	1.002	.321	-1.60	63	.114	0.19	-0.70	0.07
Critical Thinking	3.29	0.78	3.74	0.87	-0.45	0.800	.375	-2.17	63*	**.034**	0.20	-0.86	-0.03
Creativity	3.54	0.74	3.71	0.98	-0.16	2.415	.125	-0.77	63	.440	0.21	-0.59	0.26

Note. * $p<.05$, ** $p<.01$, *** $p<.001$ (two-tailed). [a]Equal variances not assumed.

2. Years of Experience	1 to less than 10 years		10 to less than 20 years		20 years and above		Homogeneity of Variance		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	*SS*	*df*	*MS*	*F*	*p*
Information system[a]	4.38	0.64	4.53	0.39	4.74	0.39	5.699	.005	1.23	2	0.61	2.86	.091
Data Visualisation	4.58	0.66	4.56	0.39	4.72	0.41	1.297	.281	0.36	2	0.18	0.81	.449
Data Analytics[a]	4.45	0.68	4.43	0.36	4.72	0.35	8.235	.001	1.26	2	0.63	3.07*	**.021**
Data Governance[a]	4.29	0.82	4.59	0.38	4.84	0.27	14.325	.000	2.83	2	1.41	5.94**	**.008**
Communication[a]	4.65	0.73	4.67	0.38	4.79	0.36	3.511	.036	0.24	2	0.12	0.53	.514
Problem-Solving[a]	4.29	0.77	4.40	0.54	4.79	0.33	10.069	.000	2.94	2	1.47	5.00**	**.005**
Critical Thinking[a]	4.25	0.86	4.46	0.46	4.71	0.39	13.113	.000	2.07	2	1.03	3.33	.051
Creativity[a]	4.24	0.99	4.58	0.49	4.73	0.30	25.080	.000	2.32	2	1.16	3.29	.117
Acquired													
Information system	3.86	0.68	3.75	0.79	3.80	0.53	1.618	.207	0.12	2	0.06	0.13	.872
Data Visualisation	4.03	0.83	3.87	0.80	3.75	0.71	0.335	.717	0.72	2	0.36	0.59	.553
Data Analytics	3.57	0.84	3.44	1.00	3.65	0.75	0.989	.378	0.56	2	0.28	0.35	.700
Data Governance	3.66	0.80	3.77	0.89	3.78	0.70	1.353	.266	0.14	2	0.07	0.11	.893
Communication	4.12	0.96	4.10	0.67	4.02	0.77	1.543	.222	0.11	2	0.05	0.09	.909
Problem-Solving	3.45	0.73	3.46	0.80	3.42	0.81	0.155	.856	0.01	2	0.01	0.01	.986
Critical Thinking	3.48	1.00	3.48	0.76	3.43	0.84	0.580	.563	0.03	2	0.01	0.02	.976
Creativity	3.69	0.93	3.56	0.84	3.60	0.80	0.424	.656	0.16	2	0.08	0.11	.893

Note. * p<.05, **p<.01, ***p<.001(two-tailed). [a]homogeneity of variance violated, use Welch's test.

2.1 Years of Experience: Games Howell Post Hoc Comparisons

Dependent Variable						95% CI	
	(a) Years of Experience	(b) Years of Experience	*MD* (a - b)	*SE*	*p*	Lower Bound	Upper Bound
Data Analytics (Expected)	1 to less than 10 years	10 to less than 20 years	0.02	0.19	.995	-0.46	0.50
	10 to less than 20 years	20 years and above	-.29*	0.10	**.015**	-0.53	-0.04
	20 years and above	1 to less than 10 years	0.27	0.19	.346	-0.21	0.75
Data Governance (Expected)	1 to less than 10 years	10 to less than 20 years	-0.29	0.22	.398	-0.87	0.27

	10 to less than 20 years	20 years and above	-.24*	0.09	**.030**	-0.47	-0.02
	20 years and above	1 to less than 10 years	0.54	0.22	.059	-0.02	1.11
Problem-Solving (Expected)	1 to less than 10 years	10 to less than 20 years	-0.11	0.22	.869	-0.68	0.45
	10 to less than 20 years	20 years and above	-.38*	0.13	**.011**	-0.69	-0.07
	20 years and above	1 to less than 10 years	0.49	0.21	.072	-0.04	1.03

Note. * p<.05, ** p<.01, *** p<.001(two-tailed).

3. Technology Usage	User		Non-user			Levene's		T-test for Equality of Means					
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	*MD*	*F*	*p*	*t*	*df*	*p*	*SE*	Lower	Upper
Information System	4.52	0.51	4.67	0.41	-0.15	1.931	.169	-1.22	64	.226	0.12	-0.38	0.09
Data Visualisation[a]	4.54	0.53	4.75	0.31	-0.21	9.788	.003	-2.00	63.97*	**.049**	0.10	-0.41	-0.00
Data Analytics	4.52	0.50	4.59	0.40	-0.07	0.682	.412	-0.60	64	.547	0.11	-0.31	0.16
Data Governance	4.61	0.54	4.63	0.49	-0.02	0.061	.806	-0.16	64	.869	0.13	-0.29	0.24
Communication	4.67	0.53	4.78	0.36	-0.11	3.047	.086	-0.91	64	.362	0.12	-0.35	0.13
Problem-Solving	4.49	0.62	4.58	0.50	-0.09	1.146	.288	-0.62	64	.536	0.14	-0.38	0.20
Critical Thinking	4.44	0.63	4.61	0.45	-0.17	1.896	.173	-1.16	64	.249	0.14	-0.46	0.12
Creativity[a]	4.47	0.70	4.70	0.40	-0.23	4.817	.032	-1.65	63.84	.103	0.13	-0.49	0.04
Acquired													
Information System	3.76	0.73	3.86	0.57	-0.10	1.640	.205	-0.58	63	.559	0.17	-0.45	0.24
Data Visualisation	3.78	0.85	3.99	0.60	-0.21	3.705	.059	-1.06	63	.289	0.19	-0.61	0.18
Data Analytics	3.47	0.93	3.67	0.76	-0.19	3.150	.081	-0.85	63	.398	0.22	-0.64	0.25
Data Governance	3.61	0.84	3.99	0.66	-0.38	1.680	.200	-1.87	63	.066	0.20	-0.77	0.02
Communication	4.02	0.83	4.16	0.66	-0.14	1.248	.268	-0.69	63	.492	0.19	-0.53	0.26
Problem-Solving	3.37	0.78	3.56	0.77	-0.19	0.010	.919	-0.95	63	.345	0.20	-0.59	0.21
Critical Thinking	3.39	0.87	3.59	0.78	-0.20	0.255	.616	-0.92	63	.360	0.21	-0.63	0.23
Creativity	3.54	0.88	3.72	0.77	-0.18	0.806	.373	-0.84	63	.400	0.21	-0.61	0.24

Note. * p<.05, ** p<.01, *** p<.001(two-tailed). [a]Equal variances not assumed.

4. Position	Lecturer		Senior Lecturer		Associate Professor		Homogeneity of Variance		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	*SS*	*df*	*MS*	*F*	*p*
Information system	4.61	0.45	4.58	0.49	4.51	0.51	0.937	.397	0.06	2	0.03	0.13	.871
Data Visualisation	4.56	0.58	4.65	0.42	4.63	0.43	0.284	.754	0.10	2	0.05	0.22	.802
Data Analytics	4.49	0.53	4.58	0.46	4.54	0.38	0.693	.504	0.11	2	0.05	0.25	.777
Data Governance	4.44	0.71	4.69	0.38	4.69	0.45	2.537	.087	0.91	2	0.45	1.69	.191
Communication	4.62	0.64	4.76	0.37	4.74	0.41	1.385	.258	0.26	2	0.13	0.57	.567
Problem-Solving	4.49	0.62	4.53	0.59	4.56	0.47	0.590	.557	0.04	2	0.02	0.06	.935
Critical Thinking	4.41	0.64	4.54	0.57	4.58	0.45	0.839	.437	0.29	2	0.14	0.42	.653
Creativity	4.41	0.78	4.61	0.56	4.67	0.39	1.962	.149	0.70	2	0.35	0.92	.400
Acquired													
Information system	3.99	0.64	3.72	0.69	3.65	0.65	0.105	.900	1.18	2	0.59	1.31	.276
Data Visualisation	3.93	0.68	3.80	0.70	3.94	1.16	2.722	.074	0.28	2	0.14	0.23	.795
Data Analytics	3.60	0.81	3.45	0.93	3.80	0.80	0.212	.809	1.02	2	0.51	0.66	.519
Data Governance	3.87	0.82	3.76	0.66	3.48	1.14	2.931	.061	1.02	2	0.51	0.79	.454
Communication	3.98	0.80	4.11	0.69	4.16	1.00	0.864	.426	0.30	2	0.15	0.25	.779
Problem-Solving	3.51	0.78	3.34	0.69	3.68	1.04	0.717	.492	1.00	2	0.50	0.81	.447
Critical Thinking	3.53	0.79	3.40	0.81	3.52	1.08	1.270	.288	0.25	2	0.12	0.17	.953
Creativity[a]	3.59	0.97	3.64	0.68	3.54	1.11	3.391	.040	0.08	2	0.04	0.06	.941

Note. * p<.05, ** p<.01, *** p<.001(two-tailed).[a]homogeneity of variance violated, use Welch's test.

Appendix 6.2 *Cross tabulation of Employer Gender by Position in the Organisation*

	Gender		
	Male	Female	Prefer not to mention
Position in the Organisation	% (N)	% (N)	% (N)
Top Management	86.4% (19)	13.6% (3)	0.0% (0)
Middle Management	73.9% (17)	26.1% (6)	0.0% (0)
Lower / Operating Management	36.4% (4)	54.5% (6)	9.1% (1)

Note. One employer did not indicate the software used in the organisation.

Appendix 6.3 *Digital Competencies Variation by Employers' Demographics*

1. Position	Top Management		Middle Management		Lower Management		Homogeneity of Variances		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	*SS*	*df*	*MS*	*F*	*p*
Information System	4.19	0.53	3.81	0.78	4.25	0.59	1.310	.279	2.20	2	1.10	2.57	.086
Data Visualisation	4.07	0.68	3.57	0.81	4.10	0.61	0.211	.811	3.41	2	1.70	3.19*	**.049**
Data Analytics	3.97	0.75	3.48	0.83	3.65	0.69	0.193	.825	2.76	2	1.38	2.28	.112
Data Governance	4.14	0.78	3.93	0.78	4.30	0.57	0.967	.387	1.11	2	0.55	0.99	.378
Communication	4.20	0.76	4.01	0.57	4.07	0.58	3.021	.057	0.37	2	0.18	0.43	.652
Problem-Solving	3.84	0.79	3.79	0.76	3.70	0.77	0.033	.967	0.13	2	0.06	0.11	.893
Critical Thinking	3.88	0.90	3.66	0.90	3.83	0.70	0.498	.611	0.55	2	0.28	0.37	.693
Creativity	3.88	0.85	3.67	0.92	3.61	0.70	0.500	.609	0.70	2	0.35	0.47	.623
Acquired													
Information System	3.12	0.97	3.43	0.89	3.56	0.81	1.228	.301	1.70	2	0.85	1.01	.370
Data Visualisation	2.89	0.96	3.30	1.05	3.52	0.92	0.883	.420	3.34	2	1.67	1.68	.196
Data Analytics	2.73	1.16	3.07	1.10	3.23	0.73	1.870	.164	2.25	2	1.12	0.98	.382
Data Governance	3.11	1.26	3.57	1.13	3.89	0.77	1.596	.213	4.89	2	2.44	1.90	.160
Communication	3.36	1.03	3.63	0.87	3.65	0.82	1.168	.319	1.02	2	0.51	0.59	.558
Problem-Solving	2.86	0.96	3.38	0.97	3.38	1.03	0.245	.784	3.54	2	1.77	1.84	.169
Critical Thinking	2.87	1.16	3.25	1.03	3.27	0.91	0.580	.563	2.02	2	1.01	0.88	.419
Creativity	2.81	1.09	3.43	1.06	3.36	0.81	0.478	.622	4.69	2	2.34	2.20	.121

Note. * p<.05, ** p<.01, *** p<.001(two-tailed).

1.1 Position: Tukey HSD Post Hoc Comparisons

Dependent Variable	(a) Position	(b) Position	*MD* (a - b)	*SE*	*p*	95% CI Lower Bound	95% CI Upper Bound
Data Visualisation (Expected)	Top Management	Middle Management	0.50	0.22	.075	-0.04	1.03
	Middle Management	Lower Management	-0.54	0.27	.125	-1.18	0.11
	Lower Management	Top Management	0.04	0.27	.989	-0.61	0.69

Note. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed).

2. Organisations' size

	Less than 50		50 and above		Levene's Test		T-test for Equality of Means					95% CI	
Expected	*M*	*SD*	*M*	*SD*	*F*	*p*	*t*	*df*	*p*	*MD*	*SE*	Lower	Upper
Information System[a]	4.14	0.50	3.99	0.77	4.199	.045	0.89	52.54	.372	0.15	0.17	-0.19	0.50
Data Visualisation	3.86	0.63	3.88	0.84	1.835	.181	-0.06	52	.946	-0.01	0.21	-0.44	0.41
Data Analytics	3.85	0.67	3.61	0.86	2.337	.132	1.13	53	.263	0.24	0.21	-0.19	0.68
Data Governance	4.11	0.73	4.08	0.77	0.027	.870	0.15	53	.878	0.03	0.20	-0.38	0.44
Communication	4.08	0.65	4.11	0.66	0.008	.930	-0.14	53	.888	-0.03	0.18	-0.38	0.33
Problem-Solving	3.87	0.78	3.74	0.76	0.001	.972	0.59	53	.553	0.13	0.21	-0.29	0.54
Critical Thinking	3.80	0.82	3.77	0.89	0.221	.640	0.10	53	.916	0.02	0.23	-0.45	0.50
Creativity	3.81	0.73	3.69	0.93	2.845	.098	0.52	53	.599	0.12	0.23	-0.34	0.59
Acquired													
Information System	3.35	0.86	3.32	0.96	0.249	.620	0.12	53	.899	0.03	0.25	-0.47	0.53
Data Visualisation[a]	3.01	0.78	3.31	1.13	6.379	.015	-1.17	51.99	.245	-0.31	0.26	-0.83	0.21
Data Analytics	2.91	1.06	3.00	1.09	0.066	.798	-0.30	53	.765	-0.09	0.29	-0.68	0.50
Data Governance	3.36	1.21	3.51	1.12	0.061	.807	-0.48	53	.631	-0.15	0.31	-0.79	0.48
Communication	3.44	0.93	3.59	0.92	0.017	.895	-0.59	53	.558	-0.15	0.25	-0.66	0.36
Problem-Solving	3.30	1.02	3.08	0.98	0.221	.640	0.81	53	.418	0.22	0.27	-0.32	0.77
Critical Thinking	3.07	1.13	3.12	1.03	0.145	.705	-0.16	53	.867	-0.05	0.29	-0.63	0.54
Creativity	3.22	1.04	3.13	1.07	0.082	.775	0.30	53	.762	0.09	0.29	-0.49	0.67

Note. MITI (2015) definition. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed). [a]Equal variances not assumed.

3. **Years of experience**	Less Than 10 years		10 years and above		Levene's Test		T-test for Equality of Means						
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	*F*	*p*	*t*	*df*	*p*	*MD*	*SE*	Lower	Upper
Information System	3.91	0.73	4.22	0.56	1.313	.257	-1.76	53	.084	-0.31	0.17	-0.67	0.04
Data Visualisation	3.67	0.76	4.10	0.70	0.066	.799	-2.12	52*	**.039**	-0.42	0.20	-0.82	-0.02
Data Analytics	3.47	0.80	4.00	0.69	0.718	.400	-2.62	53*	**.011**	-0.53	0.20	-0.94	-0.12
Data Governance	3.92	0.80	4.30	0.62	1.325	.255	-1.94	53	.058	-0.38	0.19	-0.78	0.01
Communication	3.88	0.60	4.36	0.62	0.819	.370	-2.84	53**	**.006**	-0.47	0.16	-0.80	-0.14
Problem-Solving	3.63	0.70	3.99	0.80	0.193	.662	-1.76	53	.084	-0.35	0.20	-0.76	0.04
Critical Thinking	3.55	0.81	4.06	0.84	0.005	.942	-2.27	53*	**.027**	-0.51	0.22	-0.96	-0.06
Creativity	3.48	0.81	4.06	0.79	0.018	.893	-2.67	53*	**.010**	-0.58	0.21	-1.02	-0.14
Acquired													
Information System[a]	3.37	0.79	3.29	1.06	5.221	.026	0.30	43.75	.760	0.07	0.25	-0.43	0.59
Data Visualisation	3.29	0.95	3.08	1.08	1.610	.210	0.76	52	.447	0.21	0.27	-0.34	0.76
Data Analytics	2.98	0.90	2.94	1.26	3.498	.067	0.14	53	.883	0.04	0.29	-0.54	0.63
Data Governance	3.50	1.02	3.39	1.30	2.865	.096	0.36	53	.717	0.11	0.31	-0.51	0.74
Communication	3.45	0.81	3.62	1.05	2.221	.142	-0.67	53	.501	-0.17	0.25	-0.67	0.33
Problem-Solving[a]	3.26	0.81	3.06	1.18	7.038	.011	0.72	41.26	.473	0.20	0.28	-0.36	0.76
Critical Thinking[a]	3.03	0.85	3.19	1.29	8.532	.005	-0.53	40.21	.596	-0.16	0.30	-0.77	0.44
Creativity[a]	3.21	0.85	3.12	1.27	6.736	.012	0.28	40.71	.776	0.08	0.29	-0.51	0.68

Note. * p<.05, ** p<.01, *** p<.001(two-tailed). [a]Equal variances not assumed.

4. **Specialisation**	Accounting		Auditing		Taxation		Other		Homogeneity of Variances		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	*SS*	*df*	*MS*	*F*	*p*
Information System	4.18	0.57	3.85	0.66	4.22	0.61	4.01	0.93	1.792	.160	1.32	3	0.44	0.96	.416
Data Visualisation	3.82	0.71	3.74	0.75	4.00	0.71	4.15	0.93	0.135	.939	1.13	3	0.37	0.64	.591

Data Analytics	3.84	0.70	3.54	0.83	3.91	0.90	3.60	0.90	0.731	.538	1.22	3	0.40	0.63	.599
Data Governance	4.18	0.65	4.03	0.75	4.06	0.79	4.02	1.01	1.065	.372	0.28	3	0.09	0.16	.921
Communication	4.10	0.65	4.03	0.63	4.16	0.93	4.20	0.57	1.690	.181	0.19	3	0.06	0.14	.932
Problem-Solving	4.00	0.65	3.72	0.74	3.73	0.99	3.48	0.88	1.091	.361	1.88	3	0.62	1.07	.367
Critical Thinking	3.84	0.81	3.68	0.82	3.80	0.94	3.82	1.10	0.508	.678	0.26	3	0.08	0.11	.953
Creativity	3.81	0.78	3.63	0.85	3.76	0.96	3.77	1.03	0.502	.682	0.35	3	0.11	0.15	.925
Acquired															
Information System	3.61	0.89	2.83	0.89	3.02	0.79	3.87	0.53	1.154	.337	9.38	3	3.12	4.44**	**.008**
Data Visualisation	3.26	0.91	2.67	0.89	2.80	0.87	4.33	0.53	0.943	.427	17.66	3	5.88	8.08***	**.000**
Data Analytics	3.15	1.08	2.43	1.04	2.83	0.94	3.66	0.70	0.622	.604	10.40	3	3.47	3.43*	**.024**
Data Governance	3.74	1.04	2.86	1.30	3.00	0.59	4.22	0.67	2.530	.067	14.62	3	4.87	4.34**	**.008**
Communication	3.66	0.88	3.17	1.00	3.56	1.05	3.88	0.64	0.932	.432	3.79	3	1.26	1.51	.222
Problem-Solving	3.37	1.04	2.86	0.99	2.93	1.22	3.46	0.58	0.944	.427	3.68	3	1.22	1.25	.299
Critical Thinking	3.30	1.08	2.63	1.04	2.96	1.00	3.64	0.83	0.253	.859	7.71	3	2.57	2.44	.074
Creativity	3.46	0.94	2.61	1.12	2.86	0.97	3.80	0.65	1.281	.291	11.64	3	3.88	4.08*	**.011**

Note. * $p<.05$, ** $p<.01$, *** $p<.001$ (two-tailed).

4.1 Specialisation: Tukey HSD Post Hoc Comparisons

Dependent Variable						95% CI	
	(a) Specialisation	(b) Specialisation	*MD* (a - b)	*SE*	*p*	Lower Bound	Upper Bound
Information System (Acquired)	Accounting	Auditing	.78*	0.26	**.026**	0.07	1.48
	Accounting	Taxation	0.58	0.38	.436	-0.44	1.61
	Accounting	Other	-0.26	0.33	.866	-1.13	0.62
	Auditing	Taxation	-0.19	0.39	.961	-1.24	0.85
	Auditing	Other	-1.04*	0.34	**.020**	-1.94	-0.12
	Taxation	Other	-0.84	0.44	.239	-2.01	0.33
Data Visualisation (Acquired)	Accounting	Auditing	0.60	0.27	.144	-0.13	1.32
	Accounting	Taxation	0.47	0.39	.641	-0.58	1.51
	Accounting	Other	-1.07*	0.33	**.015**	-1.97	-0.16
	Auditing	Taxation	-0.13	0.40	.988	-1.19	0.93

	Auditing	Other	-1.66***	0.34	**.000**	-2.58	-0.73
	Taxation	Other	-1.53**	0.44	**.007**	-2.72	-0.33
Data Analytics (Acquired)	Accounting	Auditing	0.72	0.31	.122	-0.12	1.57
	Accounting	Taxation	0.32	0.46	.901	-0.91	1.54
	Accounting	Other	-0.51	0.39	.575	-1.56	0.54
	Auditing	Taxation	-0.40	0.47	.830	-1.66	0.85
	Auditing	Other	-1.23*	0.41	**.021**	-2.32	-0.14
	Taxation	Other	-0.83	0.52	.406	-2.23	0.57
Data Governance (Acquired)	Accounting	Auditing	0.88	0.33	.056	-0.01	1.77
	Accounting	Taxation	0.74	0.48	.428	-0.54	2.04
	Accounting	Other	-0.48	0.41	.668	-1.58	0.63
	Auditing	Taxation	-0.13	0.49	.993	-1.45	1.19
	Auditing	Other	-1.35*	0.43	**.015**	-2.50	-0.20
	Taxation	Other	-1.22	0.55	.140	-2.70	0.26
Creativity (Acquired)	Accounting	Auditing	.85*	0.30	**.040**	0.02	1.67
	Accounting	Taxation	0.60	0.44	.548	-0.59	1.78
	Accounting	Other	-0.34	0.38	.819	-1.36	0.68
	Auditing	Taxation	-0.25	0.45	.944	-1.47	0.96
	Auditing	Other	-1.19*	0.39	**.022**	-2.24	-0.13
	Taxation	Other	-0.93	0.51	.277	-2.29	0.43

Note. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed).

5. Types of Organisations	Public Practice - Audit		Public Practice - Non Audit		Private Sector		Public Sector		Homogeneity of Variances		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	SS	df	*MS*	*F*	*p*
Information System	3.84	0.67	4.34	0.53	3.63	0.65	4.52	0.48	0.197	.898	5.82	3	1.94	5.28**	**.003**
Data Visualisation	3.69	0.74	4.20	0.66	3.40	0.73	4.30	0.51	0.444	.722	6.39	3	2.13	4.40**	**.008**
Data Analytics	3.52	0.82	4.13	0.68	3.18	0.65	3.90	0.65	0.524	.668	7.73	3	2.58	4.96**	**.004**
Data Governance	3.95	0.73	4.21	0.72	3.75	0.73	4.80	0.40	1.297	.286	5.01	3	1.67	3.37*	**.025**

Communication	3.95	0.59	4.25	0.74	3.86	0.55	4.50	0.45	1.920	.138	2.43	3	0.81	2.01	.125
Problem-Solving	3.68	0.73	4.05	0.76	3.33	0.71	4.20	0.49	0.848	.474	5.05	3	1.68	3.23*	**.030**
Critical Thinking	3.63	0.81	4.11	0.79	3.25	0.80	4.20	0.80	0.021	.996	6.96	3	2.32	3.59*	**.020**
Creativity	3.56	0.81	4.05	0.80	3.23	0.73	4.26	0.76	0.344	.794	7.18	3	2.39	3.84*	**.015**
Acquired															
Information System	2.77	0.89	3.68	0.86	3.18	0.69	4.08	0.56	1.036	.385	11.41	3	3.80	5.72**	**.002**
Data Visualisation	2.60	0.88	3.63	0.96	3.18	0.99	3.50	0.88	0.202	.894	10.25	3	3.41	3.90*	**.014**
Data Analytics	2.32	1.04	3.46	0.97	2.89	1.01	3.26	0.76	0.626	.602	12.43	3	4.14	4.27**	**.009**
Data Governance	2.74	1.28	3.80	1.06	3.46	0.85	4.30	0.35	2.523	.068	15.32	3	5.11	4.61**	**.006**
Communication	3.01	0.92	3.89	0.86	3.46	0.88	3.93	0.57	0.577	.633	8.18	3	2.72	3.64*	**.019**
Problem-Solving	2.77	1.03	3.57	1.03	2.98	0.87	3.36	0.52	1.908	.140	6.48	3	2.16	2.33	.084
Critical Thinking	2.57	1.02	3.62	1.09	2.86	0.85	3.33	0.67	2.372	.081	11.18	3	3.72	3.79*	**.016**
Creativity	2.52	1.11	3.64	0.99	3.11	0.83	3.56	0.51	2.024	.122	12.37	3	4.12	4.41**	**.008**

Note. * p<.05, ** p<.01, *** p<.001(two-tailed).

5.1 Types of Organisations: Tukey HSD Post Hoc Comparisons

Dependent Variable						95% CI	
Expected	(a) Type of organisation	(b) Type of organisation	*MD* (a - b)	*SE*	*p*	Lower Bound	Upper Bound
Information System	Public Practice - Audit	Public Practice - Non Audit	-0.50	0.20	.073	-1.03	0.03
	Public Practice - Audit	Private Sector	0.20	0.23	.808	-0.40	0.81
	Public Practice - Audit	Public Sector	-0.68	0.28	.094	-1.44	0.08
	Public Practice - Non Audit	Private Sector	.70*	0.22	**.013**	0.11	1.29
	Public Practice - Non Audit	Public Sector	-0.18	0.28	.912	-0.93	0.56
	Private Sector	Public Sector	-.89*	0.30	**.025**	-1.69	-0.08
Data Visualisation	Public Practice - Audit	Public Practice - Non Audit	-0.51	0.23	.139	-1.12	0.10
	Public Practice - Audit	Private Sector	0.29	0.26	.678	-0.40	0.99
	Public Practice - Audit	Public Sector	-0.61	0.33	.270	-1.48	0.27
	Public Practice - Non Audit	Private Sector	.80*	0.25	**.015**	0.12	1.48
	Public Practice - Non Audit	Public Sector	-0.10	0.32	.991	-0.96	0.76
	Private Sector	Public Sector	-0.90	0.35	.059	-1.82	0.02
Data Analytics	Public Practice - Audit	Public Practice - Non Audit	-0.61	0.24	.064	-1.23	0.02

	Public Practice - Audit	Private Sector	0.35	0.27	.584	-0.37	1.06
	Public Practice - Audit	Public Sector	-0.37	0.34	.702	-1.28	0.53
	Public Practice - Non Audit	Private Sector	.95**	0.26	**.004**	0.25	1.65
	Public Practice - Non Audit	Public Sector	0.24	0.33	.895	-0.65	1.12
	Private Sector	Public Sector	-0.72	0.36	.206	-1.67	0.24
Data Governance	Public Practice - Audit	Public Practice - Non Audit	-0.25	0.23	.687	-0.87	0.36
	Public Practice - Audit	Private Sector	0.20	0.26	.870	-0.50	0.90
	Public Practice - Audit	Public Sector	-0.85	0.33	.067	-1.73	0.04
	Public Practice - Non Audit	Private Sector	0.46	0.25	.290	-0.22	1.14
	Public Practice - Non Audit	Public Sector	-0.59	0.32	.285	-1.46	0.28
	Private Sector	Public Sector	-1.05*	0.35	**.022**	-1.98	-0.11
Problem-Solving	Public Practice - Audit	Public Practice - Non Audit	-0.37	0.23	.420	-1.00	0.26
	Public Practice - Audit	Private Sector	0.35	0.27	.578	-0.37	1.07
	Public Practice - Audit	Public Sector	-0.52	0.34	.439	-1.42	0.39
	Public Practice - Non Audit	Private Sector	.72*	0.26	**.043**	0.01	1.41
	Public Practice - Non Audit	Public Sector	-0.15	0.33	.970	-1.04	0.74
	Private Sector	Public Sector	-0.87	0.36	.090	-1.82	0.09
Critical Thinking	Public Practice - Audit	Public Practice - Non Audit	-0.47	0.26	.290	-1.17	0.22
	Public Practice - Audit	Private Sector	0.38	0.30	.585	-0.42	1.19
	Public Practice - Audit	Public Sector	-0.56	0.38	.457	-1.57	0.44
	Public Practice - Non Audit	Private Sector	.86*	0.29	**.025**	0.08	1.63
	Public Practice - Non Audit	Public Sector	-0.09	0.37	.995	-1.08	0.90
	Private Sector	Public Sector	-0.95	0.40	.097	-2.01	0.11
Creativity	Public Practice - Audit	Public Practice - Non Audit	-0.48	0.26	.257	-1.17	0.0
	Public Practice - Audit	Private Sector	0.33	0.29	.683	-0.45	1.12
	Public Practice - Audit	Public Sector	-0.70	0.37	.253	-1.69	0.29
	Public Practice - Non Audit	Private Sector	.82*	0.28	**.032**	0.05	1.58
	Public Practice - Non Audit	Public Sector	-0.22	0.36	.935	-1.19	0.76
	Private Sector	Public Sector	-1.03	0.39	.055	-2.08	0.01
Acquired							
Information System	Public Practice - Audit	Public Practice - Non Audit	-.91**	0.26	**.007**	-1.62	-0.19
	Public Practice - Audit	Private Sector	-0.41	0.30	.554	-1.22	0.41
	Public Practice - Audit	Public Sector	-1.31**	0.38	**.007**	-2.33	-0.28
	Public Practice - Non Audit	Private Sector	0.50	0.29	.340	-0.28	1.29
	Public Practice - Non Audit	Public Sector	-0.40	0.37	.719	-1.40	0.60

	Private Sector	Public Sector	-0.90	0.40	.133	-1.98	0.18
Data Visualisation	Public Practice - Audit	Public Practice - Non Audit	-1.03**	0.31	**.009**	-1.86	-0.20
	Public Practice - Audit	Private Sector	-0.58	0.35	.359	-1.52	0.35
	Public Practice - Audit	Public Sector	-0.90	0.44	.193	-2.08	0.28
	Public Practice - Non Audit	Private Sector	0.45	0.34	.562	-0.46	1.36
	Public Practice - Non Audit	Public Sector	0.13	0.43	.990	-1.03	1.30
	Private Sector	Public Sector	-0.32	0.46	.905	-1.56	0.92
Data Analytics	Public Practice - Audit	Public Practice - Non Audit	-1.13**	0.32	**.005**	-1.99	-0.27
	Public Practice - Audit	Private Sector	-0.57	0.37	.431	-1.55	0.42
	Public Practice - Audit	Public Sector	-0.94	0.46	.200	-2.18	0.30
	Public Practice - Non Audit	Private Sector	0.57	0.36	.400	-0.38	1.52
	Public Practice - Non Audit	Public Sector	0.20	0.45	.973	-1.02	1.41
	Private Sector	Public Sector	-0.37	0.49	.875	-1.67	0.93
Data Governance	Public Practice - Audit	Public Practice - Non Audit	-1.06*	0.34	**.018**	-1.98	-0.13
	Public Practice - Audit	Private Sector	-0.72	0.39	.272	-1.77	0.32
	Public Practice - Audit	Public Sector	-1.56*	0.50	**.015**	-2.88	-0.23
	Public Practice - Non Audit	Private Sector	0.33	0.38	.821	-0.68	1.35
	Public Practice - Non Audit	Public Sector	-0.50	0.49	.738	-1.80	0.80
	Private Sector	Public Sector	-0.83	0.52	.397	-2.23	0.56
Communication	Public Practice - Audit	Public Practice - Non Audit	-.88*	0.28	**.017**	-1.63	-0.12
	Public Practice - Audit	Private Sector	-0.45	0.32	.508	-1.32	0.41
	Public Practice - Audit	Public Sector	-0.92	0.41	.125	-2.01	0.16
	Public Practice - Non Audit	Private Sector	0.42	0.31	.542	-0.41	1.26
	Public Practice - Non Audit	Public Sector	-0.04	0.40	1.000	-1.11	1.02
	Private Sector	Public Sector	-0.47	0.43	.704	-1.61	0.68
Critical Thinking	Public Practice - Audit	Public Practice - Non Audit	-1.05*	0.32	**.012**	-1.91	-0.18
	Public Practice - Audit	Private Sector	-0.29	0.37	.865	-1.28	0.70
	Public Practice - Audit	Public Sector	-0.76	0.47	.384	-2.00	0.49
	Public Practice - Non Audit	Private Sector	0.76	0.36	.167	-0.20	1.72
	Public Practice - Non Audit	Public Sector	0.29	0.46	.920	-0.93	1.52
	Private Sector	Public Sector	-0.47	0.49	.783	-1.78	0.85
Creativity	Public Practice - Audit	Public Practice - Non Audit	-1.11**	0.31	**.006**	-1.95	-0.26
	Public Practice - Audit	Private Sector	-0.59	0.36	.382	-1.55	0.38
	Public Practice - Audit	Public Sector	-1.03	0.45	.122	-2.25	0.18
	Public Practice - Non Audit	Private Sector	0.52	0.35	.456	-0.41	1.46

	Public Practice - Non Audit	Public Sector	0.07	0.45	.998	-1.12	1.26
	Private Sector	Public Sector	-0.45	0.48	.789	-1.73	0.83

Note. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed).

Appendix 6.4 *Cross tabulation of Graduates' Level of Education by Employment Status*

	Level of Education			
Employment status	Diploma	Bachelor's Degree	Master's Degree	Other
Working	3.3% (2)	71.7% (43)	21.7% (13)	3.3% (2)
Not Working	80.3% (49)	16.4% 10	3.3% (2)	0.0% (0)

Appendix 6.5 *Cross tabulation of Graduates' Age by Employment Status*

	Age			
Employment status	Below 25 years	25 to below 35 years	35 to below 45 years	45 to below 55 years
Working	10.0% (6)	78.3% (47)	8.3% (5)	3.3% (2)
Not Working	96.7% (59)	1.6% (1)	1.6% (1)	0.0% (0)

Appendix 6.6 *Digital Competencies Variation by Graduates' Demographics*

1. Employment status	Working		Not Working			Levene's Test		T-test for Equality of Means					
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	MD	*F*	*p*	t	df	*p*	SE	Lower	Upper
Information system[a]	4.11	0.78	4.20	0.54	-0.08	12.064	.001	-0.69	105.02	.492	0.12	-0.33	0.16
Data Visualisation[a]	4.11	0.81	4.16	0.65	-0.05	5.790	.018	-0.39	112.43	.695	0.13	-0.32	0.21
Data Analytics[a]	4.03	0.90	4.03	0.65	0.01	9.634	.002	0.05	107.24	.962	0.14	-0.28	0.29
Data Governance[a]	4.11	0.79	4.17	0.60	-0.06	5.170	.025	-0.47	109.83	.636	0.13	-0.31	0.19
Communication[a]	4.10	0.89	4.24	0.65	-0.14	4.123	.045	-1.02	107.86	.312	0.14	-0.42	0.14
Problem-Solving[a]	4.01	0.91	4.10	0.66	-0.09	6.514	.012	-0.59	105.86	.556	0.15	-0.37	0.20
Critical Thinking[a]	4.06	0.92	4.14	0.71	-0.07	6.954	.009	-0.49	110.73	.626	0.15	-0.37	0.22
Creativity	3.98	0.92	4.11	0.74	-0.14	2.229	.138	-0.91	119.00	.362	0.15	-0.44	0.16
Acquired													
Information system[a]	3.83	0.83	4.08	0.55	-0.25	11.886	.001	-1.93	102.29	.056	0.13	-0.50	0.01
Data Visualisation[a]	3.78	0.94	4.05	0.64	-0.28	5.789	.018	-1.89	104.22	.062	0.15	-0.57	0.01
Data Analytics[a]	3.71	0.96	3.91	0.63	-0.21	13.255	.000	-1.39	102.26	.167	0.15	-0.50	0.09
Data Governance[a]	3.93	0.86	3.98	0.64	-0.06	6.780	.010	-0.40	108.88	.690	0.14	-0.33	0.22
Communication[a]	3.92	0.94	4.09	0.60	-0.18	7.420	.007	-1.24	99.93	.217	0.14	-0.46	0.11
Problem-Solving[a]	3.73	0.95	3.94	0.66	-0.21	5.686	.019	-1.43	103.07	.155	0.15	-0.51	0.08
Critical Thinking[a]	3.79	1.11	4.00	0.65	-0.21	13.439	.000	-1.26	94.58	.210	0.17	-0.54	0.12
Creativity[a]	3.65	0.99	4.06	0.65	-0.40	7.001	.009	-2.64	101.67**	**.009**	0.15	-0.71	-0.10

Note. *p<.05 **p<.01 ***p<.001(two-tailed). [a]Equal variances not assumed.

2. **Organisations' size**	Less than 50		50 and above		Levene's Test		T-test for Equality of Means						
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	F	*p*	*t*	*df*	*p*	*MD*	*SE*	Lower	Upper
Information System	4.20	0.76	4.07	0.80	0.306	.582	0.62	58	.535	0.13	0.22	-0.30	0.56
Data Visualisation	4.11	0.74	4.11	0.86	0.893	.349	-0.01	58	.988	0.00	0.22	-0.45	0.45
Data Analytics	4.16	0.89	3.97	0.91	0.012	.913	0.74	58	.463	0.18	0.25	-0.31	0.68
Data Governance	4.10	0.83	4.12	0.78	0.468	.497	-0.07	58	.941	-0.02	0.22	-0.45	0.42
Communication	4.23	0.81	4.03	0.93	0.236	.629	0.80	58	.426	0.19	0.24	-0.29	0.68
Problem-Solving	3.96	1.01	4.04	0.86	1.094	.300	-0.32	57	.752	-0.08	0.25	-0.58	0.42
Critical Thinking	4.12	0.92	4.04	0.93	0.007	.934	0.34	58	.738	0.09	0.25	-0.42	0.59
Creativity	3.91	0.98	4.01	0.89	0.663	.419	-0.37	58	.711	-0.09	0.25	-0.60	0.41
Acquired													
Information System	3.97	0.96	3.76	0.77	2.309	.134	0.92	58	.363	0.21	0.23	-0.25	0.67
Data Visualisation	3.77	0.96	3.78	0.93	0.006	.939	-0.03	58	.977	-0.01	0.26	-0.52	0.51
Data Analytics	3.93	0.94	3.60	0.96	0.060	.807	1.28	58	.206	0.33	0.26	-0.19	0.85
Data Governance	4.10	0.78	3.84	0.89	0.382	.539	1.08	58	.282	0.25	0.23	-0.21	0.72
Communication	4.29	0.65	3.73	1.01	3.015	.088	2.24	58*	**.029**	0.56	0.25	0.06	1.05
Problem-Solving	3.95	0.76	3.62	1.02	1.515	.223	1.28	57	.205	0.33	0.26	-0.19	0.85
Critical Thinking	4.07	0.90	3.65	1.19	1.285	.262	1.38	58	.174	0.42	0.30	-0.19	1.02
Creativity	3.85	0.76	3.56	1.09	2.175	.146	1.07	58	.288	0.29	0.27	-0.25	0.84

Note. * p<.05 **p<.01 ***p<.001(two-tailed).

3. **Years of experience**	Up to five years		More than five years			Levene's Test		T-test for Equality of Means					
												95% CI	
Expected	*M*	*SD*	*M*	*SD*	*MD*	*F*	*p*	t	*df*	*p*	SE	Lower	Upper
Information system[a]	4.17	0.63	4.11	0.75	0.05	1.393	.240	0.45	119	.653	0.13	-0.20	0.32
Data Visualisation[a]	4.15	0.68	4.09	0.84	0.06	5.586	.020	0.41	57.47	.682	0.16	-0.25	0.38
Data Analytics[a]	4.07	0.68	3.92	0.95	0.15	8.629	.004	0.87	53.03	.387	0.17	-0.20	0.50
Data Governance[a]	4.21	0.62	3.97	0.83	0.23	4.314	.040	1.53	54.64	.130	0.15	-0.07	0.54
Communication	4.24	0.66	3.99	0.96	0.25	4.195	.043	1.44	51.51	.155	0.17	-0.10	0.60
Problem-Solving[a]	4.09	0.72	3.96	0.92	0.13	3.019	.085	0.87	118	.382	0.16	-0.17	0.45
Critical Thinking[a]	4.13	0.73	4.01	0.98	0.12	5.983	.016	0.69	54.60	.492	0.18	-0.24	0.49
Creativity[a]	4.11	0.74	3.87	1.00	0.24	3.414	.067	1.46	119	.146	0.16	-0.08	0.56
Acquired													
Information system	3.93	0.71	3.98	0.72	-0.04	0.074	.785	-0.33	119	.737	0.14	-0.33	0.23
Data Visualisation	3.87	0.78	3.99	0.86	-0.11	0.004	.950	-0.73	119	.463	0.16	-0.43	0.20
Data Analytics	3.78	0.78	3.86	0.87	-0.07	0.361	.549	-0.46	119	.643	0.16	-0.39	0.24
Data Governance	3.91	0.73	4.03	0.79	-0.11	0.017	.897	-0.79	118	.428	0.15	-0.41	0.18
Communication	3.96	0.77	4.10	0.80	-0.13	0.045	.832	-0.89	119	.372	0.16	-0.45	0.17
Problem-Solving	3.81	0.81	3.89	0.83	-0.07	0.104	.748	-0.44	118	.654	0.16	-0.40	0.25
Critical Thinking	3.83	0.93	4.03	0.84	-0.19	0.735	.393	-1.06	119	.288	0.18	-0.55	0.16
Creativity	3.84	0.89	3.89	0.79	-0.04	0.740	.392	-0.28	119	.780	0.17	-0.39	0.29

Note. * p<.05 ** p<.01 *** p<.001(two-tailed). [a]Equal variances not assumed.

4. **Types of Organisations**	PP - Audit Firm		PP - Non Audit Firm		Private Sector		Public Sector		Homogeneity of Variance		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene Statistic	*p*	*SS*	*df*	Mean Square	*F*	*p*
Information system	4.30	0.44	4.54	0.80	4.04	0.82	4.08	0.79	1.564	.208	1.15	3	0.38	0.61	.606
Data Visualisation	4.16	0.57	4.11	0.94	4.10	0.84	4.11	0.87	0.966	.415	0.02	3	0.00	0.01	.998
Data Analytics	4.13	0.80	4.60	0.49	3.99	0.97	3.91	0.81	1.419	.247	1.57	3	0.52	0.63	.594
Data Governance	4.10	0.74	4.45	0.68	4.11	0.81	4.00	0.81	0.247	.863	0.60	3	0.20	0.31	.817
Communication	4.26	0.74	4.35	0.85	4.00	0.90	4.22	0.96	0.354	.786	0.98	3	0.32	0.40	.750
Problem-Solving	4.16	0.70	4.30	0.87	3.94	0.97	4.05	0.83	0.632	.598	0.66	3	0.22	0.25	.855
Critical Thinking	4.16	0.82	4.37	0.75	4.00	0.99	4.07	0.82	0.855	.470	0.56	3	0.18	0.21	.885
Creativity	4.03	0.73	4.45	0.68	3.94	1.02	3.89	0.70	1.607	.198	1.04	3	0.34	0.40	.753
Acquired															
Information system	3.97	0.89	3.70	1.25	3.77	0.82	3.95	0.75	1.299	.284	0.49	3	0.16	0.22	.877
Data Visualisation	3.86	0.37	3.50	0.57	3.66	0.97	4.16	1.05	1.169	.330	2.64	3	0.88	1.00	.396
Data Analytics	3.70	0.80	3.58	1.16	3.70	1.00	3.76	0.92	0.505	.680	0.10	3	0.03	0.03	.991
Data Governance	3.70	1.15	3.50	1.05	3.97	0.78	4.02	0.92	1.198	.319	1.24	3	0.41	0.55	.648
Communication	4.16	0.42	3.20	1.47	3.84	0.93	4.25	0.83	1.625	.194	3.94	3	1.31	1.54	.213
Problem-Solving	3.96	0.58	3.25	1.25	3.66	0.98	4.00	0.88	0.880	.457	2.22	3	0.74	0.81	.493
Critical Thinking	3.93	0.67	2.80	1.72	3.80	1.15	4.00	0.86	1.853	.148	4.60	3	1.53	1.25	.298
Creativity	3.73	0.70	2.65	1.77	3.71	0.99	3.76	0.72	2.330	.084	4.33	3	1.44	1.50	.224

Note. * p<.05, ** p<.01, *** p<.001(two-tailed).

5. **Position**	Senior Level		Executive Level		Entry Level		Homogeneity of Variance		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	SS	*df*	MS	*F*	*p*
Information system	4.11	0.77	4.14	0.77	3.88	0.92	0.693	.504	0.33	2	0.16	0.26	.765
Data Visualisation	3.97	0.95	4.13	0.80	4.36	0.40	2.673	.078	0.70	2	0.35	0.52	.597
Data Analytics	3.94	0.95	4.08	0.89	3.96	0.89	0.104	.902	0.23	2	0.11	0.13	.871
Data Governance	4.06	0.78	4.08	0.84	4.40	0.43	2.306	.109	0.56	2	0.28	0.44	.646
Communication	4.19	0.78	4.03	0.96	4.20	0.66	1.167	.319	0.33	2	0.16	0.20	.813

Problem-Solving	3.98	0.91	4.01	0.95	4.06	0.68	0.615	.544	0.03	2	0.01	0.01	.982
Critical Thinking[a]	4.11	0.87	4.01	1.00	4.26	0.39	4.320	.018	0.39	2	0.19	0.22	.550
Creativity	4.20	0.78	3.88	1.01	3.93	0.50	2.658	.079	1.19	2	0.59	0.70	.498
Acquired													
Information system	3.74	1.00	3.83	0.79	4.02	0.59	2.239	.116	0.36	2	0.18	0.25	.774
Data Visualisation[a]	3.50	1.25	3.84	0.83	4.07	0.21	4.916	.011	1.89	2	0.94	1.08	.128
Data Analytics[a]	3.64	0.97	3.71	1.02	3.83	0.36	3.627	.033	0.17	2	0.08	0.09	.769
Data Governance	3.88	0.98	3.93	0.86	3.96	0.49	1.868	.164	0.03	2	0.01	0.02	.976
Communication	4.09	0.81	3.86	1.04	3.80	0.42	1.924	.155	0.68	2	0.34	0.38	.685
Problem-Solving	3.80	0.85	3.70	1.05	3.66	0.48	2.450	.095	0.12	2	0.06	0.06	.934
Critical Thinking	3.81	0.84	3.76	1.26	3.90	0.76	2.442	.096	0.10	2	0.05	0.03	.962
Creativity[a]	3.89	0.66	3.58	1.15	3.44	0.42	3.919	.025	1.38	2	0.69	0.69	.184

Note. * *p*<.05, ***p*<.01, ****p*<.001(two-tailed). [a]homogeneity of variance violated, use Welch's test.

6. Level of Education	Diploma		Bachelor Degree		Master/ Prof Cer		Homogeneity of Variance		ANOVA				
Expected	*M*	*SD*	*M*	*SD*	*M*	*SD*	Levene	*p*	*SS*	df	MS	*F*	*p*
Information system[a]	4.12	0.56	4.26	0.67	3.89	0.89	5.127	.007	1.82	2	0.91	2.06	.252
Data Visualisation[a]	4.20	0.54	4.17	0.76	3.83	1.02	8.059	.001	1.89	2	0.94	1.79	.369
Data Analytics	4.09	0.61	4.12	0.83	3.55	0.91	2.356	.099	4.47	2	2.23	3.86	**.024**
Data Governance[a]	4.20	0.54	4.15	0.75	3.90	0.89	4.332	.015	1.14	2	0.57	1.17	.448
Communication	4.21	0.66	4.26	0.75	3.72	1.00	2.827	.063	4.00	2	2.00	3.47	**.034**
Problem-Solving[a]	4.11	0.64	4.10	0.81	3.71	1.04	4.752	.010	2.18	2	1.09	1.78	.352
Critical Thinking[a]	4.17	0.67	4.16	0.85	3.69	0.99	3.727	.027	3.26	2	1.63	2.51	.191
Creativity	4.16	0.67	4.06	0.88	3.63	0.99	3.082	.050	3.60	2	1.80	2.66	.073
Acquired													
Information system[a]	4.03	0.58	3.93	0.72	3.74	0.97	4.618	.012	1.13	2	0.56	1.11	.442
Data Visualisation[a]	4.05	0.57	3.89	0.72	3.57	1.41	17.046	.000	2.98	2	1.49	2.32	.248
Data Analytics[a]	3.93	0.61	3.80	0.85	3.48	1.11	7.479	.001	2.58	2	1.29	1.98	.254
Data Governance	3.93	0.62	3.91	0.81	4.11	0.90	2.873	.061	0.54	2	0.27	0.48	.620

Communication[a]	4.05	0.59	3.97	0.83	3.93	1.13	4.836	.010	0.27	2	0.13	0.21	.805
Problem-Solving[a]	3.92	0.67	3.90	0.79	3.33	1.15	5.445	.005	4.64	2	2.32	3.60	.165
Critical Thinking[a]	3.97	0.66	3.89	1.00	3.69	1.22	4.103	.019	0.97	2	0.48	0.58	.644
Creativity	4.03	0.65	3.70	0.96	3.82	1.00	2.972	.055	2.81	2	1.40	1.92	.150

Note. * $p<.05$, ** $p<.01$, *** $p<.001$(two-tailed). [a]homogeneity of variance violated, use Welch's test.

6.1 Level of Education: Tukey HSD Post Hoc Comparisons

Dependent Variable					95% CI	
		MD	*SE*	*p*	Lower Bound	Upper Bound
Data Analytics (Expected)						
Diploma	Bachelor’s Degree	-0.03	0.14	.973	-0.38	0.32
Bachelor’s Degree	Master’s Degree / Prof Cer	0.56*	0.21	**.023**	0.06	1.07
Master’s Degree / Prof Cer	Diploma	-0.53*	0.21	**.036**	-1.04	-0.02
Communication (Expected)						
Diploma	Bachelor’s Degree	-0.04	0.14	.943	-0.40	0.30
Bachelor’s Degree	Master’s Degree / Prof Cer	.054*	0.21	**.031**	0.04	1.04
Master’s Degree / Prof Cer	Diploma	-0.49	0.21	.056	-0.99	0.01

Note. * $p<.05$, ** $p<.01$, *** $p<.001$.